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Process Industries Skills Dialogue

July 2002

- Ceramics
- Chemicals
- Downstream Petroleum
- Extractives and Minerals Processing
- Glass
- Metals
- Offshore Petroleum
- Paper
- Pharmaceuticals
- Polymers
- Refractories and Building Products
- Surface Coatings

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Foreword

The twelve industries represented in this report have sought to identify and share common skill gaps and shortages which might be addressed through working in partnership with regional and local stakeholders. It is important to note the context of global competitiveness in which these UK industries operate. Whilst many are among the most efficient and productive in the world, pressures from foreign imports, exchange rates and supply chains mean constant vigilance is required in reducing costs, improving productivity and building workforce capability.

Each of the twelve industries has, to date, been represented by its own employer-led National Training Organisation and the report builds on intelligence produced by employers, trade associations and trades unions and on industry-based research and project activity carried out over a substantial period of time. Competitiveness and real business needs are thus the drivers for the issues identified and the industry bodies have already developed a significant range of strategic responses. Good examples of how industry-stakeholder partnerships can build on these solutions - to reach more employers and increase impact - are also emerging.

The new Sector Skills Councils (SSC) provide a unique opportunity to carry forward and to build on this momentum. 'Cogent', the SSC for offshore oil and gas, downstream petroleum and chemicals, has already been approved as a 'trailblazer' and it is expected that there will be more than one further SSC formed within the group. It is important to recognise that, while there are commonalities, there are also significant differences between the needs of industries within the group. However, the industries remain committed to working together on collaborative activities where this will produce value added and business results.

We hope this report will increase understanding of the competitiveness issues, skills needs and pace of change facing manufacturing industries in the UK and that it will lead to further joint action between Sector Skills Councils, Regional Development Agencies, local Learning and Skills Councils and other regionally and locally based agencies concerned with economic development and skills.

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May 2002

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Summary and Conclusions

This report sets out the conclusions of a Skills Dialogue covering a group of process industries - ceramics, chemicals, downstream petroleum, extractives and minerals processing, glass, metals, offshore petroleum, paper, pharmaceuticals, polymers, refractories and building products, and surface coatings.

This Dialogue differed from most others in the extent to which it built on substantial work carried out by the former NTOs over a period of years. It also drew on information from other sources of labour market intelligence, which corroborates the conclusions of the NTO work. (This statistical information is set out in full in Appendix B, under the headings of industry structure and drivers of change, changing demand for skills, supply of skills and skill imbalances). The report also sets out examples of good practice of how the industries are addressing needs, as pointers to opportunities for further work.

This Dialogue was also innovative in that two regional dialogues were held between employers, sector organisations and local Learning and Skills Councils to share understanding and develop further action. All of these elements are described in the report that follows.

The industries covered in the report are absolutely essential elements of the supply chain for British industry. They account for around 5% of value added and at least 5 per cent of total employment in the UK. Over recent years they have undergone dramatic change, often in response to global competition. They now have fewer, more highly skilled, employees. The industries are facing the need for continuing change, and managing that change is the main driver for investment in skills.

The key issues identified in the Dialogue are as follows:

- **Recruitment.** Most companies have not been major recruiters for some time. However, they now have many employees in older age-groups and so the likelihood is that companies will need to recruit significant numbers over the coming decade. The need will not just be for more new entrants, but also for those of better calibre in terms of their skills and qualifications;
- **Management and leadership skills.** The rapidly changing environment and the need to lead culture change makes new and changing demands on managers at all levels, from chief executives to first-line supervisors. At the same time the process of 'delayering' is increasing the range of leadership skills required;
- **Supporting process improvement and supply chain development.** Economic and business pressures are driving the search for continuous process improvement using a range of approaches. These have implications for management development, for the skills needed from production workers, for new understanding of customer relationships and for engineering and science skills;
- **Safety, health and the environment.** In many of the industries these are a top priority. They represent a large proportion of the total training effort. New approaches are being developed that raise skill levels and recognise them while at the same time reflecting culture changes in the industries. The industries have expressed a desire to work more closely with funding bodies on these issues;

- **Using workplace qualifications.** There is growing good practice in the industries of the use of national occupational standards, NVQs and SVQs to upskill and demonstrate competence in the workforce. The industries are also involved with higher education and professional qualifications. The Dialogue has confirmed the need for continuing joint action with funding agencies to encourage and support take-up;
- **Basic and key skills.** The proportion of employees in the industry with literacy and numeracy difficulties, and lacking key skills, is thought to be significant. Addressing these issues is essential for the industries to introduce the technological and culture change that they need. Valuable initiatives are already under way, and the industries are looking to work further with Regional Development Agencies (RDAs) and local Learning and Skills Councils (LSCs);
- **New technology skills.** Information technology has had a major impact on process industries in many different ways such as in record keeping on the shop-floor and in the growth of e-commerce. Although much work is contracted out, a lot is also done within companies. However, even where work is contracted out, companies still need the skills to understand their needs and manage outsourcing and to implement the systems that have been developed;
- **Choosing high quality learning provision.** Companies seeking to buy learning and training in the market place often face a bewildering choice from providers, with no guarantee of quality or value for money. There are no consistent quality standards for those learning providers that are not publicly-funded. Some sector bodies including Polymers and Metals have taken action and there is scope for sector bodies and local LSCs to work together to provide better information.

The two pilot regional dialogues supported the need for action on these issues. Much of the necessary development of employees can only be achieved with the combined resources and funding of government agencies and employers. It is important to seek out and develop innovative methods of training and learning and ways of working in partnership that can meet business needs.

The regional meetings, comprising employers, sector organisations and local Learning and Skills Councils, demonstrated an effective way to address the key issues and common skill needs and produce an action plan. Each pilot meeting identified how action could be taken further and though it is too early to report the outcomes, there was clearly substantial commitment from sector and local bodies. The optimum shape for these meetings is emerging and future meetings will include RDA representation, for example and combining this with other experience, the approach offers real prospects of success.

1. Introduction

1.1 The Process Industries

The Process Sectors Group (PSG) is a voluntary coming together of 12 National Training Organisations (NTOs) that pre-dates the recently announced development of Sector Skills Councils (SSCs). While it is too early to anticipate the exact make-up of SSCs covering process industries, the economic importance of the industries means that there are likely to be several of relevance to the PSG.

The industries that make up the PSG have realised that they share a number of major challenges covering all or most of their sectors and despite forthcoming structural changes, they feel there is value in taking forward this Skills Dialogue.

The industries covered are as follows:

- Ceramics
- Chemicals
- Downstream petroleum
- Extractives & Minerals Processing
- Glass
- Metals
- Offshore Petroleum
- Paper
- Pharmaceuticals
- Polymers
- Refractories & Building Products
- Surface coatings

Further information on industry coverage and approximate employment is given in the Annex showing that around 1.4 million jobs are sustained by the industries.

Though process industries have a great deal in common, they are also very diverse, ranging from researching the human genome, extracting oil and gas from under the North Sea and making fine china, to quarrying, brick making and making the paper for bank notes. Some are highly geographically concentrated, such as offshore petroleum in Aberdeen and ceramics in Stoke-on-Trent.

Together these industries are directly responsible for about five per cent of national value added and at least five per cent of total employment in the United Kingdom. The upstream and downstream supply chains add significantly to these figures. In a very real sense, process industries underpin much of the UK's productive economy; their products are used throughout industry and commerce.

Although gross output has fallen in most process industries, productivity in most parts has been increasing, rapidly in some cases, and is forecast to increase in all process industries in the five years to 2005. For example, in steel, productivity has risen at an annual average of 9 per cent over the last 20 years[5]; in glass productivity rose by 340 per cent over the 20 years to 1995.

Although the number of employees in many of the industries has been falling for some time, and this is likely to continue, process industries continue to make a major contribution to the UK economy.

However, in order to continue to make this valuable contribution, companies face the challenge of continuous change to cut costs, improve processes and develop new and high quality products. This in turn demands continuous change, much of it culture, at all levels, from senior management to process operators.

Many of the leading companies are world class, whether UK or foreign-owned. Examples include Shell, Wedgwood, Corus and Pilkington.

Many of the process industries have a high proportion of small firms (almost half the firms in the PSG employ fewer than 50) and the challenges facing these small companies are particularly acute. While many are at the cutting edge of technological development, others face a continuous struggle for survival and owner managers may have little time to consider future skill needs, either their own or their employees.

1.2 The Report

This main text of this report is largely based on existing documents produced within the industries (source material is referenced in parentheses throughout the text), supplemented by interviews by an independent consultant with senior staff of the NTOs.

The report assesses the eight key issues which the industries regard as the key skills challenges they currently face and illustrates, through examples, what individual industries are doing about each of them. These are as follows:

- Recruitment needs
- Management and leadership skills
- Process improvement and supply chain development
- Safety, health and the environment
- Workplace qualifications
- Basic and key skills
- New technology skills
- Choosing high quality learning provision

Opening dialogues have been held in two pilot regions, North West and East Midlands, and the results of these are summarised in Section 4 of the report. The remaining regions and devolved administrations have been consulted and the potential for further dialogue with them will be explored.

Appendix A contains an analysis of the identified priorities in Scotland, Wales and Northern Ireland and the Regional Development Agencies (RDAs) in England and their relevance to the process industries.

Additional supportive work has been done profiling the industries and their skills using available labour market information and this is presented in Appendix B.

Overall, this report provides a snapshot of the current priorities of the industries, as a basis for discussion with relevant organisations and stakeholders. It has been produced in order to help develop a new and robust relationship that, over time, will be of mutual benefit to all those involved with the process industries.

2. The Key Issues

2.1 Recruitment Needs

Most companies have not been major recruiters for some time. Partly because of this, and partly because of demography (the post Second World War baby boom, for example), 47 per cent of employees are over 41 years old, and only 5.8 per cent are under 22 (LFS Autumn 2001). The figures vary between industries; for example, 52 per cent of manual employees in the paper industry are over 40[7].

This means that **recruitment needs are changing**. Offshore oil and gas increased recruitment of technician apprentices from 20 in 2000 to 150 in 2001[6]. Although total employment in most process industries is likely to fall over the coming decade, it is likely that many companies will still be recruiting significant numbers of young people, graduates and adults over the coming decade, mainly to replace existing employees who retire or leave for other reasons (see analysis of replacement demand in Appendix B, Section 3.4).

However, recruitment needs are not just changing quantitatively but are also changing qualitatively. **The need is not just for more new entrants, but for better quality recruits.** The challenges of globalisation, which is driving the quest for continuous process improvement and cost-cutting leading to flatter structures means that, at all levels, the need is for high calibre recruits with the right mix of technical and key skills.

Process industries offer good job prospects to new entrants at all levels, whether adult, post-graduate, graduate or school leaver. The task they face is to get this message across effectively to potential recruits. For example, EPIC (the NTO for quarrying and the extractives sector), is working with the Quarry Products Association to develop an interactive web site to attract new entrants[4]. With similar aims, the ceramics industry has produced a *Manufacturing Pack* to support the introduction of GNVQs[1].

Process industries use frameworks such as sector focused Modern Apprenticeships, foundation degrees and graduate apprenticeships as part of the initial training of new entrants. This helps address issues such as the image and attractiveness of the industry as well as addressing skill needs.

For many of the industries, image is an important issue. The recent history of employment decline means that many of the industries are not seen as attractive employment options. Some are seen as dirty and dangerous, and environmentally unfriendly. Safety, health and the environment are now among the top priorities throughout the industries and their record is improving dramatically.

Several industries are taking action to improve their image. The NTOs and trade associations for refractories, clay building products and ceramics, for example, have jointly set up a group to analyse the factors affecting recruitment and to take action to improve their image in order to attract both school leavers and graduates[11].

Shift working, which is common in many of the industries, is often seen as a barrier to recruitment. On the other hand, it can also be seen as an opportunity for young graduates and others to take the lead and make decisions in what are regarded as unsocial hours.

The balance of emphasis varies across industries between postgraduates, graduates, school leavers and adults. In pharmaceuticals, for example, where research and development drives the future prosperity of the industry, the priority is to attract better qualified recruits with postgraduate qualifications in relevant disciplines[9]. There are similar concerns in the chemicals industry. In steel and metals, the NTO is working with the South Yorkshire and Black Country LSCs to attract better quality materials science and engineering graduates. For surface coatings, school leavers are the main concern. In some activities (for example oil refining) there are statutory age restrictions (usually restricting under 18s) and here there is a need for less restrictive age limits on support for Modern Apprenticeships.

The industries have major concerns about the number of young people achieving science and technology qualifications, at all levels from GCSE to post-graduate, and about young peoples' understanding of the role and importance of industry (see Appendix B, Section 5.3-5.4 for further explanation of the trends). This is reinforced by the analysis of numbers enrolling in relevant higher and further education courses (see Appendix B, Section 4). As Sir Gareth Roberts's recent report on the supply of scientists and engineers has shown, there are also issues of quality as well as of quantity[13]. More needs to be done (along the lines of the *Refinery Schools Links Programmes*) to encourage young people to study science (particularly physics), mathematics and engineering at school and university and to improve teaching and the teaching environment for science. School leavers and graduates need good key skills such as communication and problem solving. Careers teachers and Connexions Services need a better understanding of the good job opportunities available in the industries.

Most of the industries are currently male-dominated, particularly in production areas. The industries have also not benefited from the substantial growth in the number of women with qualifications in relevant subject areas (see Appendix B, Section 2.5). Similarly, the data that exists suggests that some of the industries recruit a lower proportion of people from ethnic minorities than are represented in the communities in which they operate. These are issues that need to be addressed, and some sectors such as chemicals are already doing so.

Further analysis of skills supply issues including those with relevant qualifications, is in Appendix B, Section 4.

2.2 Management and Leadership

The rapidly changing environment makes very different skill demands on managers at all levels, from chief executives to supervisors. Leadership (working with the team to enable people to do the right things) has become as important as management (ensuring people are doing things right). Leading and managing culture change require new and different skills from managers at all levels. Managers can no longer behave in old-fashioned ways and authoritarian ways if their need is to encourage flexibility and new ways of working through empowering their employees. The skills needed are softer and inter-personal. More than ever, the behaviour of the leaders of companies needs to be consistent with what they are requiring of others.

At the same time, the **process of delayering is increasing**. Empowerment, flexibility, team working, quality improvement, coaching and mentoring have all become important aspects of leadership (for further analysis of managerial skills shortages and gaps, see Appendix B, Tables 5.3, 5.4 and 5.15).

While the demands on managers have grown, many consider that Britain has fallen behind on **management development**, and that is has not been high enough on the list of priorities. For example, the metals sector believes that 50 per cent of managers lack relevant training, and the DTI supported project *Metals Industry Managers in the C21st* has led to a range of practical solutions, aimed particularly at strategic thinking and at the most senior levels[12].

Leadership and management development is most effective when it takes place firmly in the context of the sector and the company and is best done in or near the workplace. At the same time, leaders and managers need some opportunity to learn about best practice elsewhere.

Change makes particular demands on first line managers - team leaders, supervisors and foremen. Here, the traditional foreman role is changing rapidly and leadership skills are becoming more important alongside management skills. In the glass industry for example, *Learning for All* is addressing management development needs[5], and the polymers industry has developed a series of supervisory management modules[10].

Much of the work of NTOs in this field is about stimulating demand for management development. This is particularly true in relation to SMEs, where owner/managers often feel that they have little opportunity to develop themselves and other managers.

Process industries want to share good practice and successes with the devolved administrations, RDAs and local LSCs, and need to consider how they can be rolled out more widely to achieve greater volume and impact, not least in SMEs.

2.3 Process Improvement and Supply Chain Development

Economic and business pressures are driving the search for **continuous process improvement** in the industries, in order to reduce costs, improve quality, develop new products and get them to market quickly. Many different approaches are being used, including lean manufacturing, statistical process control, the European Foundation for Quality Management (EFQM) model, ISO 9002, benchmarking and others. What they share is a need for a willingness to learn new techniques from those who are taking part, and an open-minded approach to culture change.

This has major skills implications, summarised as follows:

- For management development;
- For production workers there are increasing demands for better technical, decision making, problem solving and basic skills;
- For engineering and science skills there are implications for the content of courses in universities and colleges.

In general, process improvement skills are best learned within the industries to which they apply. This is reflected in the role of NTOs as standard setting bodies for their industries. In polymers, **on-line learning** in process improvement is now available[10]. In refractories and building products, **distance-learning** material on processes, science and technology has been developed and delivered by Staffordshire University and Rotherham College[11].

There is, as with management development, a need to stimulate demand from SMEs.

There is potential for RDAs to work together with process industries to develop initiatives in industries they have decided are priorities in their regions. A flagship example is the work Advantage West Midlands is supporting with the Ceramic Industries Forum on **process improvement** in the ceramics, refractories and clay building products industry[1].

Customer service skills are an important aspect of process improvement. They are needed as much for in-company business as for business with other companies. In general, customer-handling skills are seen as a major skills gap in the process industries (see Appendix B, Table 5.15). In ceramics, 74 per cent of staff lack customer service skills, and most companies have difficulty in meeting their customer service objectives[1]. In glass, 87 per cent of companies have identified customer service as a skills need[5]. In the surface coatings industry, customer service NVQs are being promoted as a means of reviewing and improving competence[3].

The same pressures that are driving process improvement are leading **more companies to engage with their suppliers** to help them to improve their processes by reducing waste and costs. This can apply both to upstream and downstream suppliers, including retailers and end-users of products. Where **supply chain development** is taking place, suppliers need help to diagnose and develop their skill needs. For example, the DTI is investing £1.6 million over five years in Metals Industry Competitive Enterprise (MICE), which includes workshops on lean manufacturing and supply chain management and practical assistance to companies[12]. The Ceramic Industries Forum is also working on supply chain development in its industry[1].

For companies, suppliers and users of products, there is an additional requirement to develop **negotiation** and **relationship building skills**.

In some industries there is an additional aspect of supply chain development. Here, the need is to ensure that products are used and disposed of in a safe, healthy and environmentally friendly way. An example is the *Product Stewardship* initiative in the chemicals industry[2].

The increasing **contracting** out of functions such as routine plant maintenance as well as major overhauls and installations, transport and security, means that companies have become increasingly concerned to ensure that contractors' staff meet high standards in quality and cost reduction as well as the same standards of safety and health as their own employees. In the glass industry for example, 64 per cent of companies have identified a need to work more effectively with contractors to reduce costs[5]. This has led to companies imposing training standards on contractors and introducing passport schemes. Such passport schemes are now increasingly competency based and can require the achievement of NVQs, for example in quarrying[4]. In the petroleum sector, where ensuring the skills of contractor staff is one of the NTO's three key priorities, there is a target for 60 per cent of contractor staff to obtain competence passports by 2004[8].

2.4 Safety, Health and the Environment

In many process industries, safety, health and the environment are a top priority. There are several drivers for this, summarised as follows:

- The cost of accidents, including the cost of lost time;
- The increasing weight of regulation and the need to reduce the cost of compliance;
- The impact that a poor reputation has on the image of companies and industries, which has implications, among many others, for meeting recruitment needs;
- The often very clear link between process improvement and better safety, health and environmental practices;
- The legal responsibilities and duties of company directors.

In the polymer industry in Northern Ireland, 45 per cent of employers have highlighted health and safety as a training need[10]. Additionally, the quarrying industry has made a commitment to the Health and Safety Executive to reduce accidents by 50 per cent by 2005[4] and targets have also been set in the ceramics[1] and pre-cast concrete industries[11].

The implications for skills are clear. Line managers increasingly understand that it is they and not the specialists, who must take the lead responsibility. In the metals industry, a new competency based health and safety passport scheme has been introduced and is being used at regional level to raise skill and qualification levels[12]. In offshore petroleum, *Vantage*, a new offshore smart card passport, records safety related training, offshore working time and competency[6].

Safety, health and the environment represent a large proportion of the total training effort (see Appendix B, Table 4.11 for more information), though most formal and structured training is quite short. Better practices are however part of the culture change that many companies are seeking, and therefore part of the overall approach to staff development.

Health, safety and the environment present an important opportunity for industries, RDAs and local LSCs to work together to raise skills and qualification levels.

2.5 Workplace Qualifications

Process industries use a wide range of qualifications, from process operator to the highest professional levels and in a wide range of occupations.

National Training Organisations have led the setting of occupational standards and the development and promotion of qualifications, including of course National Vocational Qualifications (S/NVQs) for their industries. Until quite recently, there have been problems in promoting their use to companies because of the complications and associated costs. Some still have concerns about this. In other cases, financial support available from the former Training and Enterprise Councils helped build the take-up of S/NVQs. The transition from TECs to local LSCs has in some cases caused a hiatus, and industries need to work with the Learning and Skills Council at national and local levels to ensure that these problems are overcome.

In general, however, many employers, particularly the larger ones, now recognise that S/NVQs have a direct relevance to workplace competence and lead to measurable business benefits. Making them available to their staff is an important part of the package available to employees, particularly in a world where lifetime employment is no longer the norm. In petrol forecourt retailing, for example, where staff turnover approaches 30 per cent, BP has, in conjunction with the downstream NTO, introduced S/NVQs[8]. In ceramics, over 3,000 S/NVQs have been achieved since they were introduced in the mid 1990s[1]. In the glass industry, 67 per cent of companies encourage all employees to achieve recognised qualifications, and in polymers on line learning at levels 2 and 3 is available[5].

The proportion of employees in process manufacturing with no qualifications has fallen, but in some industries is still high, particularly where there is no history of workplace qualifications for process operators. There is a higher proportion of employees with no qualifications than in employment generally (see Appendix B, Figure 4.3), so there is still a long way to go. **Companies recognise the benefits of upskilling and demonstrating competence**, while local LSCs recognise the need to increase qualification levels in the workforce. Process industries seek continuing opportunities for joint action with local LSCs to encourage and support the use of workplace qualifications.

There are also a number of initiatives relevant to higher level and professional qualifications, such as the *Integrated Graduate Development Scheme* run by the glass and metals industries in co-operation with Sheffield and Sheffield Hallam Universities, through which mature employees can achieve an MSc in management and relevant materials technology. Industries are also involved in the establishment of foundation degrees and student apprenticeships, and are working with local LSCs to roll them out.

2.6 Basic and Key Skills

There are no consistent figures for numbers of employees by industry with literacy or numeracy difficulties and for many people with such difficulties their problems often remain hidden. However, information from the NTOs suggests some sectoral variations. For example in the glass industry, it is estimated that 41 per cent of employees have literacy and 36 per cent numeracy problems[5], and in ceramics the respective figures are 17 per cent and 16 per cent[1]. Companies wishing to tackle these issues usually need expert help in identifying employees with needs and in adopting the right strategies to persuade them to take action.

In some industries, such as paper and surface coatings, where basic skills are being tackled as a **health and safety** matter, this has been recognised as a major issue that needs to be addressed. In the polymers industry, the NTO is to design and implement a basic skills pilot programme[10]. In ceramics, there are plans to carry out a feasibility study with leading companies to establish a *University of the Shop Floor*[1]. In downstream petroleum, development is under way to address deficiencies in **basic language skills** (spoken and written) on petrol forecourts[8]. In other industries, the drive to improve processes as well as safety and health means that basic and key skills are likely to come to the fore in the near future.

Many companies accept that they share with Government and public agencies a joint responsibility to tackle these issues. In polymers for example, the majority of companies have said that they are prepared to support basic skills development[10]. For many employees this is best done in the workplace and the first step is to identify those individuals concerned and persuade them that they need to take action. Trade unions, for example in ceramics and metals, play an important role through *learning advocates* funded with help from the *Union Learning Fund*. There are opportunities to develop further innovative approaches to attract employees who do not find traditional learning attractive.

Key skills (for example, basic IT literacy, communication, team working, etc) are also a major issue and represent substantial skill gaps across all industries. Further details can be found in Appendix B, Table 5.15.

Process industries want to explore with RDAs and local LSCs the potential for joint action to tackle literacy, numeracy and key skills in workplaces where companies have recognised the value of making progress. This is already happening in the East Midlands, where the East Midlands Development Agency (EMDA) and the polymers industry have worked together to develop basic skills material (IT based) and mentoring[10].

2.7 New Technology Skills

Information Technology has had a major impact on process industries in many different ways. On the shop floor, for example, for record keeping to assist quality management and for process automation. This requires new IT skills and skills to manage and interpret information. Elsewhere, **E-commerce** is increasingly used for inter- and intra-company transactions, though many companies, particularly small ones, still lack the necessary technology and understanding.

Though a significant amount of **systems design and maintenance** is contracted out, much is also done within companies. When done in house, companies need sophisticated IT skills that are in short supply. When work is contracted out, companies still need the skills to understand their IT needs and manage contracts with suppliers effectively. Although the supply of graduates and post-graduates in **computer science** has been increasing, the attractiveness of the process industries remains an issue.

Increasing numbers of employees, on the shop floor and elsewhere, need IT skills, often at quite basic levels. Where skills gaps exist (see Appendix B, Table 5.15), NTOs and companies are working in collaboration with local providers to tackle IT skills needs. For example, the refractories and building products industry has a peripatetic IT training service to train staff in the workplace in the whole range of software[11].

E-commerce is having an increasing impact. Some 24 per cent of companies in the glass industry use E-commerce[5], and many pottery companies now sell direct to the public through the Internet[1]. In the surface coatings industry, a study is to be undertaken later this year into the operational and skills issues involved in E-commerce[3]. The development of skills for E-commerce is rapidly growing in importance and is a major need.

Finally, there is also a shortage of IT specialists for systems design, development and maintenance work. Very often these functions are contracted out and here skill shortages also drive up costs. Several industries, such as paper, are experiencing difficulty in attracting IT specialists[7].

2.8 Choosing High Quality Learning Provision

Companies seeking to buy learning and training in the market place often face a bewildering choice from providers, with no guarantee of quality or value for money. This can be a significant deterrent to companies, particularly SMEs, engaging in training.

There is now a unified set of arrangements for the inspection of publicly funded learning provision and inspection reports are publicly available. However, most process industries' requirements are not met in publicly funded provision, and there are no consistent quality standards for learning providers that are not publicly funded.

Some NTOs, such as Polymers, have taken action to address this by developing directories of providers[10], and in the case of downstream petroleum, the setting up of an approved training provider network[8] so that companies can buy with confidence. Metals has developed a registered providers scheme, establishing a network and two-way communication with providers relevant to the range of industry needs[12].

There is scope for industry training bodies and local LSCs to work together to pool their knowledge of training providers, share best practice and develop common approaches to quality assurance.

3 The Dialogue Process

3.1 Introduction

There is a relatively new set of institutions, national, regional and local, set up by Government to deal with economic development and skills issues. As well as the devolved administrations in Scotland, Wales and Northern Ireland, there are, in England, the Learning and Skills Council with its 47 local LSCs, Regional Development Agencies (RDAs), Connexions and others. Sectoral skills bodies want and need to build stronger relationships with this still relatively new set of institutions. It would help both sectoral and geographically based sets of institutions to have a better understanding of each other's priorities. Where these coincide, each can help the other. Where they do not, there is a need for re-examination of the priorities.

For this reason, the PSG decided to use the Skills Dialogue process to help build its relationships with English RDAs and other geographically based organisations. In order to carry out this task, PSG and the Department for Education and Skills (DfES) commissioned two independent consultants, one to review existing NTO documents and interview each NTO, the other to analyse available statistical material. The material available from the NTOs was used to produce a *Stimulus Report*, which was used as the basis for pilot dialogues with two English RDAs, in the North West and East Midlands. This process led to the selection of eight issues for the *Stimulus Report* that all of the NTOs believe are of vital importance for the future of their industries and on which it is essential to engage regional and local agencies in dialogue.

Following on from this activity (summarised in Appendix A of this Report), two pilot dialogues were held in the regions of the North West and East Midlands and a summary of the main issues emerging from these discussions is given below.

3.2 Pilot Regional Dialogues

The two pilot regional dialogues tested an approach to working more closely with regional and local agencies to meet identified skills priorities. The workshops were attended by employers, and by senior staff from local LSCs in the region and relevant NTOs. RDAs were invited, but in the event were not able to be represented appropriately because of prior commitments. The emerging issues are summarised overleaf:

- Both workshops endorsed the priorities identified in the 'Summary of Key Issues' circulated for the meetings, based on the early part of this report;
- Employers stressed the widespread implications for skills of the need to introduce change, which was a dominant factor in their businesses. This led to people needing stronger basic skills, new technical skills and IT, and management and leadership skills (particularly in the management of change). In a number of cases this was related to the introduction of e-business process systems management (e.g. SAP). Management of change also led to recruitment issues, as identified in the earlier part of this report. For example, the shift patterns of many companies in the industry are often unattractive to potential recruits, and therefore companies have to recruit at lower levels than they would choose. Employees often have poorer basic skills, and may be set in their ways. Therefore introducing change is more difficult;
- Employers also raised the issue of the heavy demands of training to meet health and safety requirements. In many companies this is a major call on the training budget. A number regarded an understanding of health and safety issues as much of a basic skill issue as the more usually-defined basic skills, and sought public support for health and safety training;
- Employers also saw the different issues as inextricably linked. They were not happy to prioritise them separately, but saw the need for the issues to be tackled in parallel to enable change to be implemented effectively;
- In the East Midlands workshop the need for employers to influence schools and education was discussed. This was seen as a possible area for partnership between the industries and the local LSCs;
- Employers had been frustrated by previous approaches from funding bodies, in which what they saw as bureaucratic rules prevented action. The limitation on the funding of Modern Apprenticeships to under-25s was particularly criticised;
- There was also strong criticism of the limitation of some schemes to small firms, though there were also examples where large high-profile companies had been supported to avoid redundancies. Employers involved in the North West workshop were keen that the substantial effect on the regional economy of a succession of smaller redundancies, from medium-sized companies, was recognised;
- Employers were confused by the plethora of players in the system. They were looking for a straightforward tailored service leading to action and results;
- The LSCs were keen to engage with sectorally-based groups of employers. In each region they pointed to existing sectoral partnerships which were proving effective and worthwhile. In the East Midlands these included engineering and polymers, and in the North West the chemicals industry;

- Slightly different models for working together in the two regions were proposed, but in both cases the broad approach was the same. The key requirements were seen as follows:
  - The partnership needed to be visibly driven by employers, through information on the needs of employers *in the region;*
  - It needed to produce early results, to build confidence that it reflected a change from previous approaches. At the same time, it should be seen as a long-term investment, providing firm foundations. The existing partnerships in the East Midlands, for example, started small and have grown over time;
  - Employers need to make a case to the LSCs, to show what the impact of action would be. But it is for the LSCs and NTOs to work out how funding could be put together to meet the needs - not employers. When a strategic proposition has been tabled, it would be for discussion exactly how it should be met.
- In each region it was agreed that immediate action should be set in hand to develop joint working to meet employer needs in the sectors in the region.
  In the East Midlands a *Process Forum* was to be set up, bringing together the SSCs and local LSCs, which the RDA would be invited to join. This would identify issues that employers wanted addressed and develop action on them.
  In the case of the North West a short note of specific employer needs was to be developed urgently. The NTOs would work with the LSCs to identify how needs would be met - with an expectation that flexible responsive solutions could be found.

Overall, therefore, the approach seems to be promising. It is far too early to judge the eventual success nevertheless in the two regions concerned it seems to have got off to a good start. There was no disagreement whatsoever with the overall picture of skill needs that was set out in this report; indeed, it provided a useful background and starting-point. But there was also a recognition, strongly articulated by the LSCs, that they needed to know the needs of employers in their region. The need for direct expression of needs by local employers in the sectors was very clear. However, it was also recognised that more detailed discussion was necessary, and indeed that continuing contact was needed. This suggests that some continuing mechanism, such as a sector forum, may be needed.

References

1 Association for Ceramic Training and Development:
- Sector Workforce Development Plan (2001).

2 Chemical Manufacturing and Processing NTO:
- Draft Sector Workforce Development Plan (2001).

3 Training Alliance for Surface Coatings:
- Sector Workforce Development Plan for the Surface Coatings Industry (2001).

4 Extractive and Minerals Processing (EPIC) NTO:
- Sector Workforce Development Plan for the Extractive and Mineral Processing Industries 2001/2-2003/4 (2000).

5 Glass NTO:
- Workforce Development Plan 2001-3 (2001);
- Skills Foresight Report 2000/1 (2000);
- Sector Workforce Development Plan (2000).

6 The NTO for Oil and Gas Extraction (OPITO):
- Vantage - The New Offshore Passport (2001);
- Skills Foresight (2000);
- Sector Workforce Development Plan (2001).

7 Paper Education and Training Council (PETC):
- Sector Workforce Development Plan (2001).

8 Petroleum Industry NTO (PINTO):
- The Petroleum Industry Workforce Development Plan 2001-2004 (2001).

9 Association of the British Pharmaceutical Industry (ABPI):
- Workforce Development Plan (2001).

10 Polymers NTO:
- Draft Sector Workforce Development Plan (2001).

11 Refractories and Building Products Training Council (RBPTC):
- Skills Foresight Analysis (2001).

12 Metals Industry Skills and Performance (Metskill):

- Metals Industry Health and Safety Passport (2001);
- Metals Industry Skills and Performance 2001 (2001);
- Steel and Metals Industry Workforce Development Plan (2000);
- Metals Industry Managers in the C21st.

13 Sir Gareth Robert's *Review of the Supply of Scientists and Engineers - A Summary of the Responses to the June 2001 Consultation Paper* (HM Treasury, November 2001).

14 Additional Source Material:

- DfES, *Trailblazer Sector Skills Councils - Expressions of Interest* (2001);
- EEF, *Catching up with Uncle Sam* (2002);
- HM Treasury, *Review of the Supply of Scientists and Engineers - A Summary of the Responses to the June 2000 Consultation Paper* (2000);
- NTO National Council, *Leading the Drive for World Class Skills - Regional Prosperity through Sectoral Partnership* (2001).

Annex: Industry Overview
For the purposes of this report, the industries have been defined as follows:

Industry	Coverage	Employment
Ceramics	• Giftware; • Industrial ceramics; • Tiles; • Tableware; • Sanitary ware; • Craft potters; • Cold cast.	40,000
Chemicals	• Chemical manufacture & processing	250,000
Coatings	• Decorative & industrial paints; • Printing inks; • Powder coatings; • Aerosols; • Surface engineering.	27,000
Extractive minerals processing	• Mineral extraction & processing	49,000
Glass	• Flat; • Fibre; • Container; • Automotive; • Scientific & special; • Tableware.	50,000
Offshore petroleum	• Offshore oil & gas extraction	25,000
Paper	• Paper	21,000
Petroleum	• Petroleum	115,000
Pharmaceuticals	• Pharmaceuticals	60,000
Polymers	• Plastics; • Rubber; • Sign-making; • Man-made fibres.	350,000
Refractories & Building Products	• Refractories; • Clayware; • Pre-cast concrete.	25,000
Metals	• Metals manufacture & processing; • Stockholding & distribution; • Constructional steelwork; • Metals recycling.	350,000

Source: PINTOG Directory 2001

Appendix A - Regional Analyses and Outcomes of the Pilot Dialogues

Introduction

This Appendix contains an analysis of the plans of English Regional Development Agencies (RDAs) and their equivalents in Scotland, Wales and Northern Ireland presented in a reasonably consistent format. It reviews sectoral priorities in these plans and highlights where process industries have been identified as priorities. It also identifies skills priorities that they share with the PSG NTOs.

East Midlands Development Agency (EMDA)

- *East Midlands Prosperity through East Midlands people - Economic Development Strategy for the East Midlands 2000 - 2010 (East Midlands Development Agency);*
- *Skills Action Plan 2000 - 2010 (East Midlands Development Agency).*

Key Clusters with particular growth potential in the region:

Communications	Learning industry
Construction and development	Retail
Fashion and design	**SMEs**
Financial and professional services	Tourism, cultural, creative industries
Food chain	**High growth engineering,** including **plastics**
Healthcare	

Issues discussed:

- Key Skills;
- A high proportion of adults have basic skills problems;
- Encourage employers to value and reward skills and learning and to support a learning continuum that develops people to meet changing needs, with emphasis on key, transferable skills, competencies in the workplace and accredited learning. NTOs and Trade Associations have a key role to play, linking to the Region's sectoral growth potential;
- IT Skills - priority should be given to ICT skills, which are fundamentally important to realising our goal of a knowledge smart region;
- ICT learning and advanced skills in the use and exploitation of ICT is a priority for the region. Promoting ICT literacy in the workplace e.g. by encouraging on-line training for senior executives;
- Management - focus on key transferable generic skills such as communications, problem solving and higher levels skills such as innovation, leadership and creativity;
- Target business leadership and management for special attention at regional level e.g. by taking fresh look at need and demand for management development in SMEs and how management development training can be enhanced in terms of content and innovative delivery;
- Skill shortages - address current and anticipated skill shortages e.g. in technical levels skills;
- The majority of regional employers reported difficulty finding suitable staff to fill vacancies with lack of skills/qualifications being a major problem;
- In partnership with NTOs, identify issues that affect employers in specific industries and forecast future trends;
- Employers report problems recruiting professional, managerial and higher level people;
- Supply chain development - consolidate East Midlands' framework for supply chain development and support focusing on priority business clusters identified.

North West Development Agency (NWDA)

- *England's North West - a strategy towards 2020 - North West Development Agency;*
- *The NW Learning and Skills Action Plan (2000) Draft.*

Targeted emerging sectors - identification of actions that would help them expand and become more competitive:

Environmental technologies	Tourism
Life science industries **(biotechnology and pharmaceuticals)**	Computer software and services / internet-based services
Medical equipment and technology	Creative industries, media, advertising and public relations
Financial and professional	

- NWDA will work with these targeted emerging sectors to support actions such as supply chain programmes.

Established sectors:

Chemicals	**Energy**
Textiles	**Automotive**
Aerospace	Food and drink
Mechanical and other engineering (including marine)	

- As a first step within seven established industries to work with Aerospace, Chemicals and Nuclear industries to encourage networks of common interests, share best practice and identify new business and opportunities;
- In addition the Agency will work with the Chemicals industry to identify ways to make full use of derelict land in their ownership.

Other issues for discussion:

- Workforce development;
- The first objective in the Learning and Skills Action Plan is to raise the demand of employers for skilled people, to increase their skills investment and improve their workforce development capacity;
- Establishment of regional sector -specific networks (involving NTOs) e.g. Chemicals led by NWDA Business Development Group, and Engineering-Technology Sector a project designed to better understand skills needs and develop action plan to upgrade;
- Establishment of local networks with a generic focus;
- Commitment to workforce development linked to business needs;

- Support for delivery of training programmes e.g. Modern Apprenticeships through establishment of group training organisations;
- Provision of forum for identification and spread of good practice.

Basic and Key Skills:

- Need to address lack of basic skills in the workplace;
- Need to raise significantly the level of key skills, other generic skills such as customer-service.

IT Training:

- Campaign to raise significantly the ICT competence of workforce and overall understanding of contribution of e-learning.

Management and Leadership:

Need to improve skills by enhancing the capabilities and competence of managers, including skills to manage change and promote best human resource development.

Yorkshire Forward (Yorkshire and the Humber RDA)

- *'Turning the Vision into Reality - Regional Economic strategy for Yorkshire and the Humber';*
- *Improving Education, Learning and Skills - Skills Action Plan for Yorkshire & the Humber 2001 - 2003.*

Regional Clusters

Advanced engineering and metals	Digital industries
Bioscience	Food and drink
Chemicals	

- The benefits identified for the advanced engineering and metals industry includes strong university links to this industry, suppliers, employees and research services;
- Benefits identified for chemicals cluster in the Humber Trade Zone include skills development. In West Yorkshire the Chemicals Industry Regional Centre of Excellence provides training and incubator facilities along with other support to the chemicals industry in the region;

Supply chain development:

- Objective 3 is concerned with attracting and retaining more investment by providing the right product for investors and more effective marketing of the Region. Part of this is by the development of local supply chains, matching demands of investors with local suppliers;

Basic and key skills:

- Objective 4 concerns achieving a radical improvement in the development and application of education, learning and skills, particularly high quality vocational skills;
- The strategy aims to develop and strengthen local partnerships and strategies to raise achievement and address national targets in literacy, numeracy and key skills;
- Enhance the skills and increase the qualifications and employability of the existing workforce and of new labour market entrants;
- Foster skills for business innovation and development;
- Improve links between business and each tier of education.

Increasing demand for higher level skills:

- Region's skills levels are inadequate to meet the projected future needs, particularly the continuing expansion of managerial, professional and associate professional occupations;
- Work on higher-level skills provides the management, innovation and personnel skills required for growth and adaptability.

Action Plan Framework:

- Improving qualifications and employability of labour market entrants;
- Raising the general skill level of the workforce;
- Supporting the development of higher-level skills needed for senior management;
- Lead partners to include employers, NTOs, LSCs.

IT Skills:

- European Computer Driving Licence.

The South West of England RDA

- *Regional Strategy for the South West of England 2000 - 2010;*
- *Skills and Learning - South West of England Regional Framework for Action Jan 2000 to 31 March 2001(Draft).*

Sectors being promoted by the Region

Advanced engineering	Information and Communication Technologies
Customer Marketing Services	Leisure and Tourism
Environmental Technologies	Marine Technologies
Food and Drink	

In addition the region is encouraging the strategic development of the following sectors:

Biotechnology	**Printing and Packaging**
Financial Services	

Other issues:

Basic and key skills:

- Need to address basic and key skills identifying needs, access and availability;
- Need to upgrade the regional skills base and encourage adaptability and flexibility, continuous learning and specialist basic and core skills.

Management/Leadership skills related to management of change:

Through the Skills and Learning Driver part of the Regional Strategy:

- A Regional Action Plan for identifying delivery of management training;
- Ensuring that all organisations in the Region adopt novel and innovative ways of meeting the challenges they face, as well as building on tried and tested solutions;
- Ensuring people and organisations can respond quickly and effectively to change;
- Sub-regionally to develop management skills and further develop regional polymer facility at Trowbridge with a training programme to support the industry.

Process Improvement and associated skills demands:

- Detailed action plans to be prepared by the appropriate NTOs and partners for skills development within the economic sectors to be promoted and encouraged in the South West.

Health and Safety and the Environment:

- Establishing programme of continuous profession development for advisers in Safety, Health and the Environment to enable them to provide quality advice relating to sustainability, particularly to SMEs.

Strategic Drivers:

- The environment
- Innovation and Technology
- Skills and Learning
- Partnership - promoting greater quality and effectiveness in ways region works together and organisations operate.

London Development Agency (LDA)

- *London's Economic Development Strategy;*
- *A Skills Strategy for all London's People - London Development Partnership.*

Business Clusters:

- London supports some of the densest clusters of employment in the country (research shows 43 per cent of employment is in such clusters);
- Supporting the breadth of the London economy is a complementary policy, with economic diversity reducing risk of over-dependence on single economic sectors;
- Clusters include: Advertising, Publishing, Financial services;
- These clusters have implications for the LDA's strategy in relation to the support and development needs of firms in business services, manufacturing, design and creative industries, and tourism and hospitality;
- The LDA will draft a London Success Strategy for future cluster growth.

Other Issues:

Supply Chains:

- Evidence that suppliers in London are not sufficiently aware of potential of winning local project supply contracts. London would benefit from a more strategic approach to the identification of opportunities to win work via major supply chain initiatives.

Increasing knowledge transfer and innovation in business:

- London has exceptional strengths in the area of medical research, which support major economic sectors in both pharmaceuticals and biotechnology;
- London Innovation and Knowledge Transfer Strategy to promote knowledge transfer and innovation, enhancing links between businesses and sources of new ideas and knowledge, encouraging start-up businesses from HE and research institutes by working with partners to provide linked accommodation and business support;
- Support needed for sector initiatives such as sharing best practice, benchmarking, etc.

Basic and Key Skills:

- Ensuring basic skills for all - 1 in 4 Londoners has no or minimal qualifications;
- Responding to skills deficiencies - 33 per cent of difficult to fill vacancies attributable to skills shortages;
- Developing ICT skills (see below).

IT Skills:

- ICT skill shortages and a lack of e-business appreciation are key inhibitors to success. London's workforce needs to extend its ICT knowledge. ICT must come to be seen and used as an everyday working tool in London, at every level in the organisation; in every organisation - from very smallest firm to the largest employer; and in every sector;
- The LDA will work with the local LSCs, higher and further education providers learn direct and sector NTOs to ensure that London has the required level of skilled workforce with a strong appreciation of ICT, e-business applications and benefits.

LDA Actions on Skills:

Key objectives for the new Skills Commission for London will include:

- Engaging with businesses to establish better information on emerging skills gaps /shortages, ensuring this informs planning and funding of skills provision of London;
- Exploring new delivery mechanisms for skills provision;
- Encouraging the development of ICT skills at all levels, especially entry-level skills;
- Improving co-ordination between FE and employers, developing specific sectoral targets.
- As well as literacy and numeracy, core employer requirements now include IT skills, customer care, problem solving, creativity and team working. The Skills Strategy identifies the need to establish support for the educational sector to help all learners develop these competences and demonstrate them to employers. Support should also be made available to existing members of the workforce and for employers who wish to improve the key skills of their employees.

East of England Development Agency (EEDA)

- *East of England 2010 prosperity and opportunity for all - the regional economic strategy;*
- *Skills Strategy and Action Plan 2000-2002 - East of England Development Agency.*

Key Sector Groups:

Agriculture/food processing	Tourism/leisure and heritage
Automotive industry	Transport 'gateways'
Financial/business services development	High technology, research and
Media and cultural industries	Information and communications technology
Pharmaceuticals and biotechnology	

Other Issues:

Management Skills:

- Employers face a number of barriers to promoting skills development and learning within their organisations, including lack of management skills, and lack of knowledge about new technology;
- Need to finalise and implement the regional management development strategy across the region.

Basic and key skills:

- Businesses need to work with education and training organisations to raise skills and create a more positive attitude to business and entrepreneurship;
- The Region needs to raise skill levels across the region and deal with forecast skills gaps;
- There is evidence that employers cannot access the skills that they need, especially basic skills in literacy and numeracy;
- Regional Skills Priority 2 focuses learning and skills providers on the needs of emerging and key sectors. The nine key sector groups include pharmaceuticals and biotechnology;
- NTOs have an important role in providing sector assessments and advising on occupational needs. It will be a priority for regional partners to work with NTOs to help them maximise their capacity to develop regional expertise.

IT Skills:

- Region needs to secure a region-wide infrastructure for ICT training and learning centres;
- Individuals and businesses need to be encouraged to access ICT based training and learning.

Recruitment needs:

- Key actions to support business growth and success are to equip workforce with vocational and generic skills that businesses need to be competitive and to respond quickly and efficiently to market changes;
- The East of England needs science and engineering professionals, high-level skills, particularly in administration and management, as well as skills to meet medium-term shortages such as construction and computing services.

One NorthEast (North East of England RDA)

- *Unlocking our Potential - Regional Economic Strategy for the North East;*
- *Building an Adaptable and Highly Skilled Workforce - A North East Regional Skills Strategy and Action Plan.*

Key Clusters in the North East:

All of the Region's clusters will be knowledge-driven. North Eastern companies, particularly those in traditional manufacturing industries, need to embrace advances in design and production technologies, logistics and marketing to develop new ways of satisfying customer requirements.

High volume manufacturing. The region will build on strengths in production engineering and supply chain management.
Low volume manufacturing. The aim will be to build new industries based on regional strengths in incremental engineering design excellence.
Process industries, with 3 sub clusters/groups: **Chemicals,** Food and drink Agriculture and life sciences
Transactional services e.g. call centres
Bespoke services e.g. legal, consultancy and financial
Other clusters of importance include tourism, culture, sport, logistics, public authorities and the voluntary sector.

Other Issues:

IT Skills:

- Developing a pool of people with basic and advanced ICT skills is vital;
- A renewed strategic framework and delivery mechanisms are needed to ensure that ICT take-up and useage increases.

Basic and Key Skills:

- Traditionally learning and qualifications, particularly work-based learning routes, have not been highly valued in the Region. There has been a slow response to the need to acquire skills and qualifications to meet requirements of new industries;
- Many employers do not recognise the value of training and/or are reluctant to train.

Key Investment Priorities (Sub Regional):

- In the Tees Valley activities in the area will include working to attract and encourage growth of investment in sectors including: chemicals, engineering (including offshore);
- ICT use will be promoted amongst Tees Valley companies;
- Maintaining the manufacturing base to sustain and develop the economic contribution of sectoral strength. This includes developing the R & D base in the process industries; offering attractive sites and premises to capture mobile investment in speciality chemicals; stimulating growth in onshore and offshore engineering and assisting in the promotion of Teesside for continued investment in steel making;
- The Teesside Chemical Initiative and EPICC will form the basis of cluster teams for the development of the chemical industries. Also in Teesside there are plans for an Institute for Research and Technical Support for the chemical industry. The Partnership will also strengthen links between company research centres, university research centres, speciality organisations and the process industries to build on the research and development base.

South East England Development Agency (SEEDA)

- *Building a World Class Region - An Economic Strategy for the South East of England (SEEDA).*

Initial Sector Groups:

To develop strategies to influence physical and intellectual infrastructure within the sector and develop opportunities for collaboration by sharing knowledge and expertise:

Automotive	Information and communication technologies
Creative	Land based industries
Defence and aerospace	Marine technologies
Environmental technologies	**Pharmaceuticals, biotechnology** and healthcare
Financial and professional	Property services
Food and drink	Tourism and leisure
Transport and logistics	

Issues discussed:

Management:

- Strategic priority to develop many more world-class managers;
- In partnership with businesses and learning providers, create management development solutions and give managers in the South East the ability to match and ultimately exceed the qualifications and capabilities of their international rivals;
- Consider feasibility of establishing 'Virtual Management Centre' based within the 'Wired Region' network.

Basic and Key Skills:

- Strategic priority to raise achievement levels across the South East and develop opportunities for everyone to acquire the skills needed to find and remain in work;
- Strategic priority to engage employers in both influencing learning provision and the delivery of learning opportunities;
- There is a pressing need for vocational learning to be viewed with the same esteem as academic learning. Employers need to be aware of what is on offer and play their part in developing and delivering the skills of the future;
- All bids to the RDA for learning and skills funding to demonstrate the active participation of employers/employer representative bodies.

Skills shortages:

- Key and potential growth sectors have urgent need for highly skilled/educated people;
- Need to ensure that skills shortage do not inhibit companies' competitive performance, by targeting supply effectively and ensuring learning providers can react quickly to demand;
- Solutions are being developed through business clusters and supply chains, but more needs to be done to promote these links;
- Regional networks should be activated involving NTOs, UfI, HE and FE regional groupings;
- Existing learning centres serving specific sectors should be encouraged and new centres developed.

IT Training:

- ICT capability to be developed at all levels to respond to significant increase in demand for skilled ICT personnel across many sectors.

Advantage West Midlands

- *Creating Advantage - The West Midlands Economic Strategy (Advantage West Midlands);*
- *Creating Advantage through Learning and Skills - Framework for Learning and Skills (Advantage West Midlands);*
- *Agenda for Action (Advantage West Midlands).*

Advantage West Midlands (AWM) has three regional focuses for action that relate to the targeting and concentration of regional resources: Business Clusters, High Technology Corridors and Regeneration Zones.

Business Clusters - Ten business clusters chosen to create high growth and high value for the region which provide the focus for prioritising and use of regional resource.

Transport Technologies	Creative Industries
Food and Drink	Tourism and Leisure
Medical Technology	Specialist Business and Professional Services
Building Technologies	ICT
High Value Added Consumer Products	Environmental Technologies

Established Sectors - These form the cornerstone of some business cluster developments. AWM and partners will support and develop these sectors in line with the aspirations for business clustering by building on the work of established groups and organisations:

Motor industry (including products such as electronics, **rubber, plastics** etc
Ceramics
Engineering (e.g. foundries and castings, forging, machining and **structural steel**)

High Technology Corridors - Three corridors will provide new business opportunities for diversifying the economy as part of the region's business cluster strategy. In the first instance they will be located on designated sites and brownfield land. Business activity within the corridors will improve the interface between University research establishments and firms.

Regeneration Zones - Six Zones will be the focus for targeting regeneration resources from AWM and other key funders. Boundaries have been defined to cover areas of greatest need and deliberately include key opportunity locations. Activity within the Zones is closely linked to business cluster strategies.

Other Issues discussed:

Spreading best practice and developing the supply chain:

- Regional Supply Team of Advantage West Midlands will play an important role in the development of clusters and work with other projects such as the ERDF-supported 'Networks for Change' Scheme.

Skill Shortages:

- Skill shortages, skill gaps and recruitment difficulties are being tackled through a multi-agency concordat approach as part of the Framework for Regional Employment and Skills Action (FRESA). Resources, policies and actions will be co-ordinated to address skills issues and explore new ways to encourage greater participation by businesses and individuals. Skill priorities and actions will be closely aligned with business cluster strategies;
- Need for specific skills to meet present and future business needs - high-level skills in engineering, advanced technologies, ICT and research;
- Need to increase the number of people continuing to learn through FE, HE and work-based training programmes;
- Set up business learning networks in business clusters;
- Need to ensure continuous improvement in education and training provision to respond to and meet current and future needs of employers and individuals.

Basic and Key Skills:

- The West Midlands has a history of low educational achievement. It is essential to improve qualification and skill levels in the region;
- A regional network has been established to target resources to tackle basic skills deficiencies.

IT Training:

- Need to achieve high standards of ICT within the workforce and this is reinforced through the developments taking place through an ICT business cluster strategy;
- A West Midlands ICT strategy is being implemented. An E-business and E-learning strategy will be developed this year;
- The region aims to be the leading region for broadband connectivity by 2003.

Management Training:

- There is a need to increase management skills within SMEs;
- A Regional Management Skills Strategy Group is bringing employers and suppliers of management development together to address barriers to participation;
- A feasibility study for a regional 'virtual centre for management' to encourage the development of management skills that will increase the number of creative and competitive businesses.

Welsh Development Agency (WDA)

- *A New Economy for Wales - Welsh Development Agency Corporate Plan 2001-2004;*
- *A Winning Wales - the National Economic Development Strategy of the Government of the National Assembly for Wales (Draft);*

- Sectors in which Wales has or can gain some form of competitive advantage and which we see as helping to drive future economic growth. These sectors include:

Aerospace	Customer contact centres
Medical & diagnostic equipment & products	Media, creative and culture related sectors
Biotechnology, e.g. organic semiconductors; Bio-electronics; Bio-metrics	ICT/software. e.g. Wearable computing; Robotic agents; Display technologies; Battery components; Quantum computing.
Renewables	**Optronics**
Environmental services	Niche tourism
Telecommunications e.g. Peta/yotta bit routing devices	

- Developing a software cluster is a long-term venture, requiring significant prior investment in skills development;
- Wales is also strong in a number of more established sectors where modernisation is particularly important. These should build on by establishing Wales as a centre of excellence for manufacturing.

Metals	**Plastics**
Automotive components	Agriculture
Electronics	Food

Other issues:

Education Training and Skills:

- Raising basic and generic skills - issues include the relatively high proportion of people with little or no qualifications and a lack of basic employment skills such as literacy, numeracy and ICT;
- Ensuring adult numeracy, literacy and basic skills programmes can be delivered flexibly online and via employers;
- Boosting vocational skills - ensuring that employees (and future employees) are equipped with the key skills that business requires is essential (such skills include management, communication, IT, problem-solving and languages). Addressing skill shortages e.g. management skills is also important. Expanding modern apprenticeships and providing programmes for the provision of links into the world of work;

- Implementing the Skills Task Force recommendation of a centre of excellence for management training to develop current and future managers;
- Ensuring for those in work that their skills and knowledge are regularly updated. Increasing adaptability - skill requirements change over time as a result of changing technology, new ways of doing business, new opportunities and new products. Ensuring programmes are regularly reviewed for continuing relevance and modified in the light of important changes;
- Strengthening the science and technology base in Wales - this links to both industry and higher education. We need to develop the research capability in education - potential for new clusters, attracting new firms, and providing well-qualified researchers/scientists;
- Introducing technology schools to improve workforce skills where there are skills gaps;
- Creating technology centres in universities to act as magnets for funding, talent and projects and would be able to reap economies of scale.

Supply Chains and Networks:

- Supply chain networks such as the automotive industry's 'Accelerate Wales' programme can help businesses meet needs of major customers;
- All Wales and local programmes to increase efficiency of supplier firms through networking and sharing best practice, including increasing level of in-Wales sourcing;
- Development of sector networks and industry fora.

Scotland

- *A Smart, Successful Scotland - Ambitions for the Enterprise Networks (Scottish Executive);*
- *www.scottish-enterprise.com;*
- *Survey of Scottish Economic Trends - Scottish Enterprise Network/CBI Scotland.*

Current priority areas of investment include:

Biotechnology	Food and Drink
Chemicals	Forest Industries
Communication Technologies	Microelectronics
Creative Industries	Optoelectronics
Electronics	Software and E-Business Suppliers
Energy	Textiles
Financial Services	Tourism

Issues raised include:

Skills and training:

- Scotland needs new skills and better matching of skills and opportunities. This demands a more informed and active labour market policy and a shared understanding between the education system and the wider economy of the needs of young people and the skills, attitudes and expectations they will require to develop;
- Scotland currently faces significant skills shortages in IT/electronics, financial services, construction, engineering, hospitality/tourism, call centres, oil and gas, and basic management skills and skills to enable potential entrepreneurs to run their own businesses;
- Young people need to be offered vocational and high level technical and IT skills at a comparable level to international competitors;
- Scotland has a weak record in workforce training. Careers Scotland, the Employment Service, NTOs employers and FE and HE to deliver an improvement in the long-term employability of Scots, including stronger management and leadership capabilities able to rise to the challenges of rapid change;
- Within the construction sector, skills availability was found to be the biggest inhibitor of growth (46% of those firms surveyed);
- Generally marketing and management skills were found to be the most needed areas for training within organisations;
- Customer care, communication and IT technical support, were identified as areas needing improved skills;
- Staff training is carried out by just over 50 per cent of firms. The smaller the organisation, the less likely it is to train its workers.

Northern Ireland

- *Strategy 2010 - report by the Northern Ireland Economic Development Strategy Review and Steering Group (published March 1999 and shortly to be replaced)*.

Sector groups with greatest growth potential:

Electronics	Agri-Food and Food Processing
Telecoms	Tourism
Software	Textiles and Apparel
Health Technologies inc. **pharmaceuticals**, biotechnology, medical packaging, medical devices	Engineering inc.aerospace, automotive, heavy engineering, shipbuilding
Tradeable services (e.g. financial & business services)	Construction

Issues arising:

Health Technologies:

- Establishment of sector drivers - a refocused Growth Challenge Health Technologies cluster to maintain strategic direction;
- Need for well-qualified workforces.

Engineering:

- Too few companies in the sector are involved in R & D, or in networking including supply chain management;
- To achieve growth need use of new skills and technologies;
- Education and training seen as essential, particularly in relation to boosting innovation and entrepreneurship;
- Need to establish consortia along with widespread involvement in networking, through clustering of firms and more effective supply chain management.

Other issues raised:

Management of change:

- Manufacturing at risk from relative lack of innovation and technical change;
- Firms must compete on basis of quality of new and better-designed products and of improved processes and organisation;
- Firms wishing to succeed in knowledge based economy will acquire knowledge from their own R & D, developing and training their own employees, recruitment of skilled staff, benchmarking, collaboration with: suppliers, customers, research institutions and possibly with their competitors;
- Need developing skills base and fostering environment conducive to innovation.

Training and skills shortages:

- Northern Ireland employees least likely to receive job-related training;
- There are skill shortages at intermediate levels in the labour market - skills of manufacturing employees compare badly to other countries;
- Low level of R & D may be partly result of shortage of adequately skilled labour, especially at intermediate level;
- Need for an educated creative and flexible workforce, including high calibre managers;
- There is a need for a valued, sub-degree level vocational educational programme, collaborating with and involving employers;
- Need to invest in education and training in ICT, opportunities that should be available to all.

Networking and Supply Chains:

- Northern Ireland can learn from European competitors in terms of inter-company co-operation and networking;
- Increased networking would be likely to encourage strong supply chains involving suppliers in product design and development.

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Appendix B:

Analysis of Labour Market Intelligence for the Process Industries

1. Introduction

1.1 The Report

This report presents the findings from a study on the Process Industries commissioned by the Department for Education and Skills (DfES) to provide additional, complementary information to the essentially qualitative findings reported in the first part of this dialogue. The report uses the available labour market intelligence, along with secondary qualitative sources (where appropriate) focusing on the following key themes:

- Structure of the industry
- Changing demand for skills
- Supply of skills
- Skill imbalances.

These four headings effectively form the structure of the subsequent report. A feature of the main sections is a bullet point summary at the end of each that focuses on the key issues emerging from the analysis.

In all cases, selective use has been made of the available statistics (using diagrams where appropriate). Some additional data on a range of the key sources is provided in the Statistical Annex (B2).

1.2 Industry Definitions

In many ways the PSG represents a hybrid group of industries that causes some definitional problems when labour market statistics are accessed resulting in some compromises having to be made.

They have been grouped into six industries allowing the allocation of relevant Standard Industrial Classification (SIC) codes thus permitting the use of the main statistical series. The six industries are as follows:

- Manufacture of metal products (not including manufacture of machinery and equipment);
- Construction and manufacture of non-metallic products;
- Wholesale and retail trade (including automotive fuel) and manufacture of coke, refined petrol and nuclear fuel;

- Manufacture of chemical products, rubber, plastic and other wood products, recycling of non-metal products, waste and scrap, R&D and technical testing;
- Manufacture of pulp and paper;
- Transport by land and by pipeline and cargo handling.

These industries can be fairly well defined by allocating an appropriate range of three-digit SIC codes to them (see Annex B1 for details of these), though some are more closely matched than others. For example, the manufacture of pulp and paper is closely covered by SIC 21.1 and 21.2. However, for the more diffuse industries it becomes more difficult to bring precise sectoral boundaries to bear. In the industries wholesale and retail trade, etc, 'maintenance and repair of motor vehicles' (SIC 50.2) is included with the fuel dispensing activities (SIC 50.5) because of the difficulties in separating the two in those garages offering both services. This has the effect of inflating the 'process industries' element. So, whereas the motor vehicle repair sector has a preponderance of skilled/semi-skilled jobs, in the 115,000 to 135,000 direct employees in garage forecourt retailing, low skills predominate.[1]

However, these industry definitions are as close as it is possible to get for statistical purposes and while not providing a precise numerical picture, they nevertheless are closely indicative of trends and developments in the process industries element of the occasionally slightly more widely defined parts.

Unfortunately some of the datasets available for analysis are not available in such a disaggregated form and so more compromises have to be made with the industry definitions. This is a particular problem with the information on future skill needs produced by the Institute for Employment Research (IER) and used extensively in other Skills Dialogue reports. Here the analysis is only available at two-digit SIC level and so aggregation necessarily means widening some industry definitions further. For example, in 'construction and manufacture of non-metallic products', the inclusion of the much wider two-digit sectors of 'non-metallic mineral products' (SIC 26) and 'construction' (SIC 45) would clearly grossly overstate the construction element of the industry and so in the IER tables used in the analysis for this report, only SIC 26 has been used. Furthermore, the lack of any suitable close match to the 'manufacture of pulp and paper' and 'transport by land, etc' means that it has not been realistically possible to cover these at all in the IER projections. Further details of the allocation of SIC codes to the PSG industries for these data are in Annex B1.

1 See PINTO Workforce Development Plan for further discussion of this point.

1.3 Methodology

A range of data sources were accessed for this report, some proving to be more useful than others. In particular the following key sources have been used:

- Annual Business Inquiry
- Labour Force Survey
- Institute for Employment Research Data Pack:
  - Projections of Occupations and Qualifications
  - Skills Task Force Employer Skills Survey
- Higher Education Statistics Agency (HESA) student statistics
- Learning & Skills Council funded student statistics
- Unemployment (JSA Claimants) and vacancies (notified to ES).

The above sources provide the core of the analysis presented here and they represent the principal datasets available. Most of the information is presented for the United Kingdom as a whole, but some (such as the important Employer Skills Survey findings in the IER data pack) are only available for England. This stems from the responsibility for certain tasks previously done on a UK-wide (or Great Britain in some cases) basis now falling within the remit of the devolved administrations.

Enquiries were made on the availability and range of data from the devolved administrations of Northern Ireland, Scotland and Wales to seek comparable data, particularly on skills issues, but only limited and largely qualitative information was forthcoming. However, where appropriate this has been incorporated into this report.

For ease of analysis in the subsequent discussion of the statistics and in particular for the tables used in the main text and the statistical appendix, the six industries will be referred to using an abbreviated name rather than the full name, according to the following key:

Abbreviation	Industry
Metals	Metals manufacture, processing, recycling, distribution and design, fabrication and installation of constructional steelwork
Non-Metallics	Construction and Manufacture of non metallic products
Fuel	Wholesale and retail trade and mfg of coke, refined petrol, etc.
Chemicals, etc	Mfg chemical products, rubber, plastic & other wood products
Pulp and Paper	Manufacture of pulp and paper
Transport	Transport by land and by pipelines and cargo handling

2 Industry Structure and Key Drivers of Change

2.1 Introduction

This section of the report maps out further the structure of the industries within the PSG and some of the key economic indicators that show how the industries have developed and are expected to develop over the next few years.

Principally, use has been made of the available statistics from the Annual Business Inquiry (ABI), IER Occupational Projections and the LFS, focusing where possible on the process industries as a whole and its constituent parts.

2.2 Key Indicators

Table 2.1 provides a set of key economic indicators for selected process industry sectors as follows:

- 23: Manufactured fuels
- 24.4: Pharmaceuticals
- 25: Rubber and plastics
- 26: Non-metallic mineral products
- 27: Manufacture of basic metals
- 28: Metal goods.

It shows that the contribution of the six industries to the UK economy is significant with together 4.8 per cent of national value added. However, gross output has grown over the period 1995-2000 in only two of the industries, Pharmaceuticals and Rubber and Plastics. In the other four industries output has fallen and significantly so in Manufactured Fuels. However, the forecast for output change over the period 2000-2005 is positive for all six industries, albeit modest in all but pharmaceuticals.

Table 2.1:
Key Economic Indicators for Selected Industries

Indicator/SIC	23	24.4	25	26	27	28
Gross Output (1999 £m at 1995 prices)	9,731	9,961	15,772	9,803	17,174	19,949
Share of national value added (1999, %)	0.3	0.7	1.0	0.7	0.8	1.3
Gross output change (1995-2000, % pa)	-5.0	5.0	0.2	-1.6	-1.3	-1.1
Gross output change (2000-2005, % pa)	2.4	6.8	2.3	0.4	1.3	0.9
Productivity change (1995-2000, % pa)	-3.6	7.0	-0.5	0.4	0.9	0.3
Productivity change (2000-2005, % pa)	4.3	3.0	3.4	3.3	8.3	3.2

Source: IER

Looking at productivity, the period 1995-2000 saw gains in four of the industries, pharmaceuticals, Non-metallic mineral products, Basic metals and Metal goods (though only significant in pharmaceuticals). Productivity fell by 3.6 per cent in Manufactured Fuels and just 0.5 per cent in Rubber and Plastics.

Future productivity gains are expected in all six industries over the period 2000-2005, all significant and Basic Metals showing the greatest expected rise of 8.3 per cent.

However, gains in productivity are often at the expense of employment and this is illustrated well in the case of Wales, where a sharp fall in employment in the metals industry (especially steel) has been partly attributed to the rise in productivity over the same period. Furthermore, the metals industry in Wales (and again especially steel) is expected to lose further significant numbers of jobs to 2007 partly through this productivity effect, accompanied by plant closures and the transfer of work to abroad.[2]

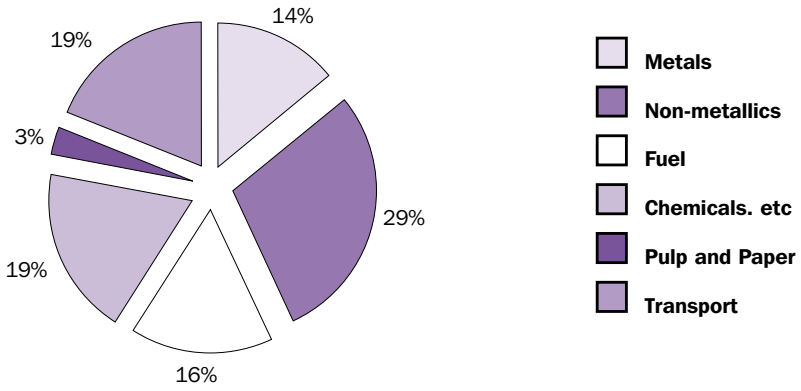
2 See *Future Skills Wales – A report addressing the future skill needs of Wales 1998-2007*

2.3 Employment by Industry and Size

Figures from the ABI (Figure 2.1) show that in 1999 there were over 3.4 million employed in the process industries, with the largest proportion (29.8 per cent) in the industry of non-metallics. The smallest industry, accounting for just 2.9 per cent of overall employment was the manufacture of pulp and paper.

Figure 2.1
Employment by Sub-sector

(UK, Employees, 1999)

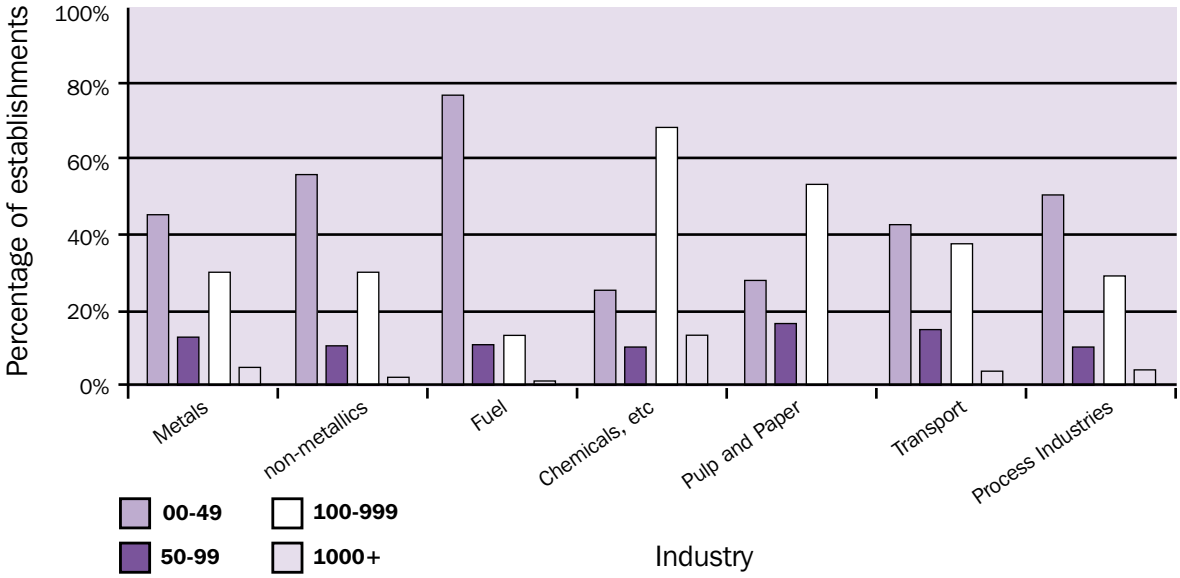


Source: Annual Business Inquiry 1999

The analysis of employment by size of establishment (Figure 2.2) shows that in the process industries sector overall, the majority of employment was in firms with fewer than 1000 employees. The very largest firms accounted for just 5.2 per cent of total employment. However, among the different industries there were some distinct differences. For example, in Fuels almost three quarters of employment was in smaller firms no doubt reflecting the composition of this sector with many smaller retail outlets. By contrast, in Chemicals, etc. fewer than one quarter of employment was in smaller firms, and proportionately more (10.4 per cent) in larger establishments.

Smaller firms (under 50 employees) account for almost half the firms in the process industries. In Fuels this rises to 74 per cent and it is also higher than the average in Non-metallics. The lowest proportion of smaller firms is in Chemicals, etc. where just under one quarter employ fewer then 50.

Figure 2.2
Employment by Size of Establishment (UK, 1999)



Source: Annual Business Inquiry 1999

2.4 Employment by Occupational Group

Analysing the structure of the industries by occupational group provides a useful perspective on the current skills composition. Here use has been made of the IER data for 1999. However, due to the analysis only being available at two-digit SIC level (see Appendix A for further details), it is not possible to provide an aggregate view of the process industries, though it is possible to provide partial information on four of the industries and these are shown in Tables 2.4a through to 2.4d below for the main ten occupational groups (a full set of statistics for all 24 occupational categories is in the Statistical Appendix). Because of the somewhat different composition of the industries, the information is not strictly comparable with other sector definitions as, for example, used in the ESS statistics. Nevertheless, the tables are useful in providing an indication of the spread of occupations.

In the Metals industry (Table 2.2a), for example, there is a predominance of skilled metal/electrical trades with almost one quarter of the workforce categorised as such. Process plant and machine operatives is another significant occupational group with 13.7 per cent. Both these figures are well above the proportions for all sectors of industry. In Non-metallics (Table 2.2b) the differences with the figures for all sectors are not so pronounced, the exceptions being process plant & machine operatives (15.1 per cent compared to 5.4 per cent) and Elementary - trades/plant/machinery (15.1 per cent to 3.7 per cent). Fuels (Table 2.2c) shows a main difference from the overall picture in skilled metal/electrical trades (15.1 per cent compared to 5.6 per cent), while in Rubber and Plastics (Table 2.2d) the main variation is in process plant & machine operatives (20.7 per cent to 5.4 per cent) and elementary - trades/plant/machinery (11 per cent to 3.7 per cent).

Table 2.2a
Employment by Main Occupational Groups in Metals Industry

(UK, 1999, Manufacture of metal products, etc*)

Occupational Group	Number	% of Process Industries	% All Industry
Corporate Managers	57247	10.4	9.7
Science/Technical Professionals	18072	3.3	3.2
Business/Public Service Assoc Prof	21067	3.8	5.1
Admin & Clerical Occupations	26675	4.8	10.5
Skilled Metal/Electrical Trades	135906	24.6	5.6
Skilled Construction Trades	36906	6.7	3.6
Process Plant & Machine Operatives	75570	13.7	5.4
Transport Drivers and Operatives	38979	7.1	3.4
Elementary: Trades/Plant/Machinery	52051	9.4	3.7
Elementary: Clerical/Service	32708	5.9	9.8
All Occupations	**552513**	**100.0**	**100.0**

** Includes SIC92: groups 27, 28*
Source: IER

Table 2.2b
Employment by Main Occupational Groups in Non-Metallics Industry

(UK, 1999, Construction and Manufacture of Non-metallic products*)

Occupational Group	Number	% of Process Industries	% All Industry
Corporate Managers	14745	10.1	9.7
Business/Public Service Assoc Prof	5781	4.0	5.1
Admin & Clerical Occupations	9271	6.4	10.5
Skilled Metal/Electrical Trades	13010	8.9	5.6
Skilled Construction Trades	5493	3.8	3.6
Other Skilled Trades	6200	4.3	3.3
Process Plant & Machine Operatives	22055	15.1	5.4
Transport Drivers and Operatives	13082	9.0	3.4
Elementary: Trades/Plant/Machinery	22055	15.1	3.7
Elementary: Clerical/Service	9015	6.2	9.8
All Occupations	**145841**	**100.0**	**100.0**

** Includes SIC92: group 26*
Source: IER

Overall the analysis in the occupational tables indicates that the four industries generally have a greater proportion of skilled trades and process operatives than all industries and a comparatively higher proportion of low/semi-skilled operatives.

Table 2.2c
Employment by Main Occupational Groups in Fuel Industry

(UK, 1999, Wholesale & Retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	Number	% of Process Industries	% All Industry
Corporate Managers	3566	11.9	9.7
Science/Technical Professionals	2521	8.4	3.2
Science Associate Professionals	1097	3.7	1.5
Business/Public Service Assoc Prof	1422	4.7	5.1
Admin & Clerical Occupations	2111	7.0	10.5
Skilled Metal/Electrical Trades	4522	15.1	5.6
Process Plant & Machine Operatives	2767	9.2	5.4
Transport Drivers and Operatives	2390	8.0	3.4
Elementary: Trades/Plant/Machinery	1159	3.9	3.7
Elementary: Clerical/Service	2706	9.0	9.8
All Occupations	**29953**	**100.0**	**100.0**

** Includes SIC92: group 23*
Source: IER

Table 2.2d
Employment by Main Occupational Groups in Chemicals, etc. Industry

(UK, 1999, Manufacture of chemical products, rubber, plastic and other wood products, etc*)

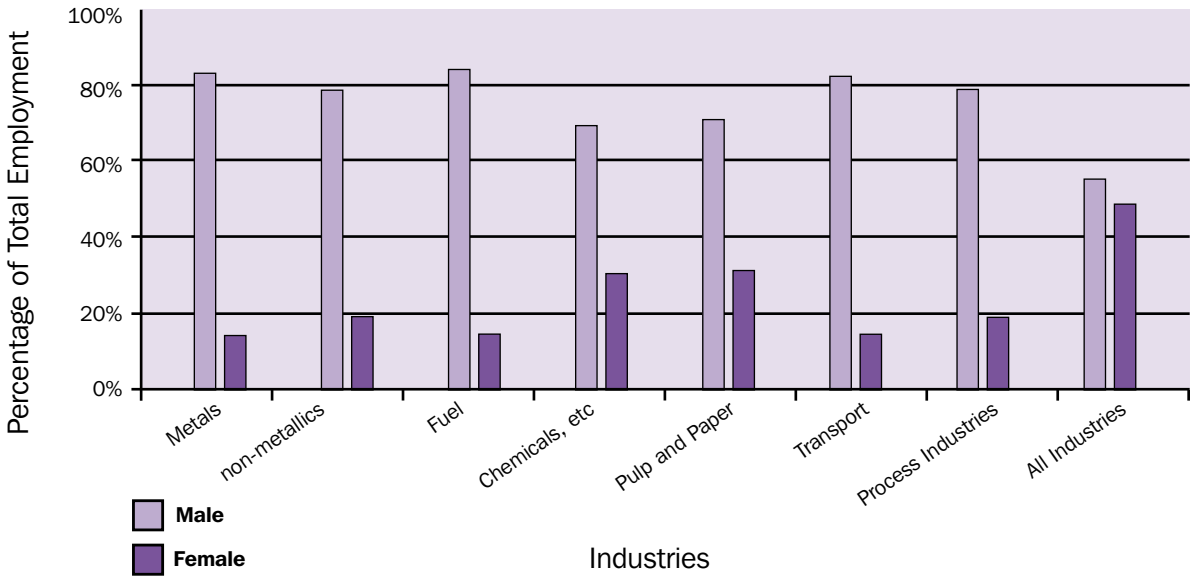
Occupational Group	Number	% of Process Industries	% All Industry
Corporate Managers	27298	11.2	9.7
Science/Technical Professionals	7806	3.2	3.2
Business/Public Service Assoc Prof	11769	4.8	5.1
Admin & Clerical Occupations	13850	5.7	10.5
Skilled Metal/Electrical Trades	18605	7.7	5.6
Other Skilled Trades	7725	3.2	3.3
Process Plant & Machine Operatives	50359	20.7	5.4
Transport Drivers and Operatives	23581	9.7	3.4
Elementary: Trades/Plant/Machinery	26675	11.0	3.7
Elementary: Clerical/Service	18403	7.6	9.8
All Occupations	**243150**	**100.0**	**100.0**

** Includes SIC92: group 25*
Source: IER

2.5 Employment by Gender

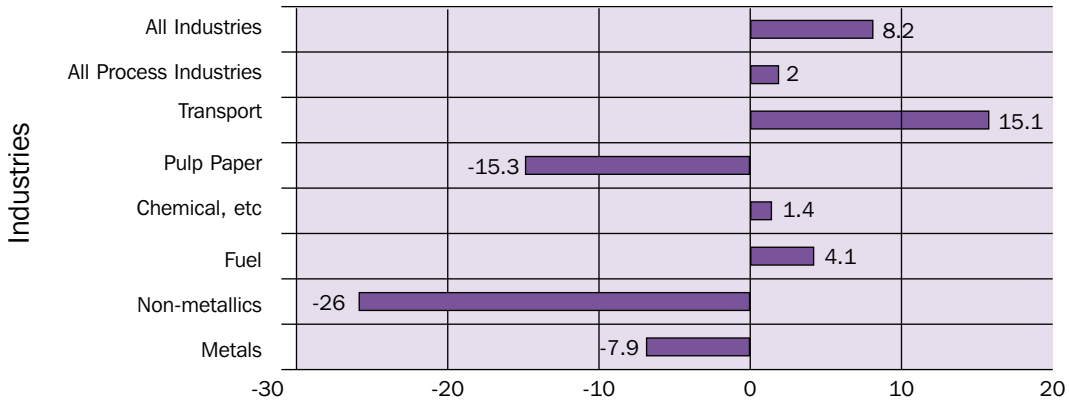
Figures from the Autumn LFS of 2001 (Figure 2.3) show the process industries to have predominantly male employment, accounting for almost four fifths of total employment (including self employed). This compares with a figure of 55 per cent for all industry and there has been little change in this proportion since 1995. By industry, Metals and Fuels have the highest proportions of male employment with over 84 per cent each, though in the case of Metals, this has fallen slightly since 1995. The Chemicals industry has the highest proportion of women in employment at 29.2 per cent in 2001, though all indications are that this has remained fairly static since 1995.

Figure 2.3: Employment by Gender 2001



Source: Labour Force Survey

Figure 2.4
Employment Change 1995-2001



Source: Labour Force Survey

2.6 Employment Change

According to the LFS employment in the process industries has increased by two per cent between 1995-2001, though as Figure 2.4 shows, this is much lower than the increase of over eight per cent in employment overall. Between the different industries there have been mixed fortunes. Metals, Non-metallics and Pulp and Paper have seen falls in their employment and significantly for Non-metallics (down 26 per cent) and Pulp and Paper (down 15.3 per cent), but less so for Metals (down 7.9 per cent). By contrast, there have been modest increases in the Fuel and Chemicals industry while in Transport the 15.1 per cent increase translates into over 124,000 new jobs in this large industry (though only some of which will strictly be attributable to the process industries).

2.7 Summary of Key Issues

- Gross output has grown over the period 1995-2000 in only two of the industries, Pharmaceuticals and Rubber and Plastics. In the other four industries output has fallen and significantly so in Manufactured Fuels;
- Productivity between 1995-2000 increased in four of the industries, pharmaceuticals, Non-metallic mineral products, Basic metals and Metal goods (though only significant in pharmaceuticals). Productivity fell by 3.6 per cent in Manufactured Fuels and just 0.5 per cent in Rubber and Plastics;
- Significant future productivity gains are expected in all six industries over the period 2000-2005, with Basic Metals showing the greatest expected rise of 8.3 per cent;
- The majority of employment in the process industries overall was in firms with fewer than 1000 employees. The very largest firms accounted for just 5.2 per cent of total employment;
- Smaller firms (under 50 employees) account for almost half the firms in the process industries;
- Four industries have a greater proportion of skilled trades and process operatives than all process industries and a comparatively higher proportion of low/semi-skilled operatives;
- There is predominantly male employment in the process industries overall, accounting for almost four fifths of total employment (including self employed);
- Employment in the process industries has increased by two per cent between 1995-2001, though this is much lower than the increase of over eight per cent in UK employment overall.

3. Changing Demand for Skills

3.1 Introduction

The demand of skills can be gauged by using a range of different sources, including information on job vacancies and projected changes in sectoral employment. In this section use has been made of the IER occupational projections as providing the best measure of changing skill needs for the future. Unfortunately, the projections are disaggregated only to the two-digit SIC level and so it is not possible to derive a reliable match for the process industries as a whole, though it is possible to look at four of the industries, Metals, Non-metallics, Fuel and Chemicals, etc.

3.2 Current vacancies

Information on vacancies notified to the Employment Service provide a useful indicator of labour demand and Table 2.1 summarises the data for October 2000 in selected industries. Across the five industries there were over 23,000 jobs notified, the most being in Metals and the fewest in Fuel. However, while the majority of the vacancies had been registered for around eight weeks, the small number of jobs in the Fuel industries showed a mean duration of 13.2 weeks, well above this average, indicating some difficulty in filling them (see Section 5 for further discussion of the reasons for difficulties in filling vacancies).

Table 3.1:
Vacancies Notified

(GB, October 2000, Selected Industries)

Industries	Vacancies Notified	Duration Mean (weeks)
Metals	9960	8.2/6.8*
Non-Metallics	3028	8.6
Fuel	278	13.2
Chemicals, etc	7453	9.6/8.8*
Pulp and Paper	2778	7.2

** Separate figure for constituent SIC groups*
Source: NOMIS/Employment Service

For many of these industries the main reason for the vacancies is to replace staff who have left, rather than for expansion. This is certainly the case in the refractories industry, for example, where there is concern that an inability to recruit the replacement staff its firms need is likely to have a direct impact on business performance.

Information on labour turnover is not readily available. However, in the polymers industry, for example, the main causes of staff wastage are given as low wages, lack of prospects within firms and shift patterns[3].

3 See Polymer and Associated Industries Skills Foresight Report for further details.

3.3 Projected Employment Change

The IER projections show that between the base year of 1999 and 2010, overall employment in the four industries together is expected to fall by 20 per cent (Table 3.2). By industry there are some differences. Employment in Metals is expected to fall by 22.4 per cent (Table 3.3a), 24.2 per cent in Non-metallics (Table 3.3b), 16 per cent in Fuel (Table 3.3c) and by 12.5 per cent in Chemicals, etc, (Table 3.3d). This contrasts with the 7.7 per cent increase in employment expected for all industry over the period.

However, if overall demand for labour in the four industries of the process industries is set to fall, this does not necessarily mean that it will be easy for employers to meet their future skill needs. To understand this it is necessary to look in greater detail at the changes in the mix of skills needed. Here the IER data provides some useful indicators. For example, in the Metals industry, the sharpest declines will be in the following occupational groups (figures in parentheses indicate the percentage fall):

- Secretarial and related (-41.5 per cent)
- Elementary - clerical/service (-33.8 per cent)
- Customer service operations (-31.6 per cent)

However, numerically these account for somewhat small proportions of the overall workforce and so those occupations where the total number of jobs declines most include the following (figures in parentheses indicate the approximate number of jobs likely to be lost):

- Skilled metal/electrical trades (-25,000)
- Process plant and machine operatives (-14,000)
- Corporate managers (-9,000)

From this industry example, it is possible to detect a number of key changes in the demand for skills. Firstly, a decline in the traditional skills of the sector, plus a reduced demand for low skilled staff. Secondly, changes in the use of administrative staff, with fewer secretarial and clerical jobs, but also fewer middle managers. The other industries display similar broad patterns, albeit with different emphases.

There are few occupational groups expected to show an increase in demand over the period. In the Non-metallics industry, for example, only leisure/other personal service occupations are expected to increase, but numbers are small anyway. In Fuels modest increases are expected in teaching/research professionals (0.4 per cent), protective service occupations 6.9 per cent), culture/media/sport occupations (4.9 per cent), and elementary - trades/plant/machinery (4 per cent), but taken together these are numerically small occupations in the industry and so will only offset the job losses elsewhere in a modest way.

Table 3.2
Projected Employment Change by Main Occupational Groups

(1999-2010, Process Industries - selected industries*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All Sectors
Corporate Managers	10.6	85983	11.1	-16.4	8.3
Science/Technical Professionals	3.3	29795	3.8	-6.4	28.2
Business/Public Service Assoc Prof	1.6	14171	1.8	-9.3	36.7
Admin & Clerical Occupations	5.3	39234	5.0	-24.4	5.5
Skilled Metal/Electrical Trades	17.7	131809	17.0	-23.4	-7.4
Skilled Construction Trades	5.3	38594	5.0	-25.5	-6.5
Process Plant & Machine Operatives	15.5	119581	15.4	-20.7	-8.4
Transport Drivers and Operatives	8.0	64266	8.3	-17.6	2.4
Elementary: Trades/Plant/Machinery	10.5	87021	11.2	-14.6	-2.2
Elementary: Clerical/Service	6.5	45293	5.8	-27.9	-5.7
All Occupations	**100.0**	**777356**	**100.0**	**-20.0**	**7.7**

** Includes SIC92: groups 15, 17, 18, 23, 26, 27,28*
Source: IER

Table 3.3a
Projected Employment Change by Main Occupational Groups in Metals Industry

(1999-2010, Manufacture of metal products, etc*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All Sectors
Corporate Managers	10.4	46667	10.9	-18.5	8.3
Science/Technical Professionals	3.3	16654	3.9	-7.8	28.2
Business/Public Service Assoc Prof	3.8	17969	4.2	-14.7	26.1
Admin & Clerical Occupations	4.8	19352	4.5	-27.5	5.5
Skilled Metal/Electrical Trades	24.6	102697	23.9	-24.4	-7.4
Skilled Construction Trades	6.7	26921	6.3	-27.1	-6.5
Process Plant & Machine Operatives	13.7	57629	13.4	-23.7	-8.4
Transport Drivers and Operatives	7.1	31194	7.3	-20.0	2.4
Elementary: Trades/Plant/Machinery	9.4	44210	10.3	-15.1	-2.2
Elementary: Clerical/Service	5.9	21653	5.0	-33.8	-5.7
All Occupations	**100.0**	**428827**	**100.0**	**-22.4**	**7.7**

** Includes SIC92: groups 27, 28*
Source: IER

Table 3.3b
Projected Employment Change by Main Occupational Groups in Non-Metallics Industry

(1999-2010, Construction and Manufacture of non-metallic products*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All Sectors
Corporate Managers	10.1	11710	10.6	-20.6	8.3
Admin & Clerical Occupations	6.4	6603	6.0	-28.8	5.5
Skilled Agricultural Trades	4.6	4405	4.0	-34.0	-11.7
Skilled Metal/Electrical Trades	8.9	9782	8.8	-24.8	-7.4
Skilled Construction Trades	3.8	4225	3.8	-23.1	-6.5
Other Skilled Trades	4.3	3799	3.4	-38.7	2.3
Process Plant & Machine Operatives	15.1	16987	15.4	-23.0	-8.4
Transport Drivers and Operatives	9.0	10272	9.3	-21.5	2.4
Elementary: Trades/Plant/Machinery	15.1	17283	15.6	-21.6	-2.2
Elementary: Clerical/Service	6.2	6013	5.4	-33.3	-5.7
All Occupations	**100.0**	**110557**	**100.0**	**-24.2**	**7.7**

** Includes SIC92: group 26*
Source: IER

Table 3.3c
Projected Employment Change by Main Occupational Groups in Fuel Industry

(1999-2010, Wholesale & Retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All Sectors
Corporate Managers	11.9	3099	12.3	-13.1	8.3
Science/Technical Professionals	8.4	2445	9.7	-3.0	28.2
Business/Public Service Assoc Prof	4.7	1294	5.1	-9.0	26.1
Admin & Clerical Occupations	7.0	1374	5.5	-34.9	5.5
Skilled Metal/Electrical Trades	15.1	3704	14.7	-18.1	-7.4
Skilled Construction Trades	6.0	1378	5.5	-22.9	-6.5
Process Plant & Machine Operatives	9.2	2351	9.3	-15.0	-8.4
Transport Drivers and Operatives	8.0	2112	8.4	-11.6	2.4
Elementary: Trades/Plant/Machinery	3.9	1205	4.8	4.0	-2.2
Elementary: Clerical/Service	9.0	2026	8.1	-25.1	-5.7
All Occupations	**100.0**	**25163**	**100.0**	**-16.0**	**7.7**

** Includes SIC92: group 23*
Source: IER

Table 3.3d
Projected Employment Change by Main Occupational Groups in Chemicals, etc. Industry

(1999-2010, Manufacture of chemical products, rubber, plastic and other wood products*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All Sectors
Corporate Managers	11.2	24507	11.5	-10.2	8.3
Science/Technical Professionals	3.2	7791	3.7	-0.2	28.2
Business/Public Service Assoc Prof	4.8	11274	5.3	-4.2	26.1
Admin & Clerical Occupations	5.7	11905	5.6	-14.0	5.5
Skilled Metal/Electrical Trades	7.7	15626	7.3	-16.0	-7.4
Other Skilled Trades	3.2	6129	2.9	-20.7	2.3
Process Plant & Machine Operatives	20.7	42614	20.0	-15.4	-8.4
Transport Drivers and Operatives	9.7	20688	9.7	-12.3	2.4
Elementary: Trades/Plant/Machinery	11.0	24323	11.4	-8.8	-2.2
Elementary: Clerical/Service	7.6	15601	7.3	-15.2	-5.7
All Occupations	**100.0**	**212809**	**100.0**	**-12.5**	**7.7**

** Includes SIC92: group 25*
Source: IER

3.4 Replacement Demand Projections

The IER data goes beyond the straightforward comparisons between occupational needs and attempt to estimate the components of labour demand and how these will influence the future skill needs of the Process Industries. Here there are two main measures to consider:

- Expansion demand
- Replacement demand

Expansion demand is, as the name suggests, the expected changes in labour needs as a result of business expansion or contraction. Replacement demand recognises that all businesses will need to replace staff leaving for the usual reasons (for example, natural wastage such as retirements, deaths in service, etc) and for less predictable events such as people simply changing jobs (occupational mobility). It is therefore the net of these two effects that will give a better indication of the needs of the sectors[4].

4 See the 'Commentary on Employment Projections'by the IER for further details on definitions used and assumptions applied deriving the estimates.

Again the IER two-digit SIC analysis limits the detail to the four industries of Metals, Non-metallics, Fuel and Chemicals, etc. Full details of the occupational groups are in the Statistical Appendix and discussed here are the main ten for each of the industries.

In Metals, for example, Table 3.4a shows that despite an expected decline in the industries by 2010, there will be a net increase in staff needed of 116,743. Much of this is concentrated in skilled occupations such as skilled metal/electrical trades (83,782 new entrants needed) but also important is the business/public service associated professional group. However, around 39,000 new entrants in low skilled jobs (elementary - trades/plant/machinery) will also be needed.

Table 3.4a
Projected New Entrants by Main Occupational Groups in Metals Industry

(UK, 1999-2010, Manufacture of metal products,etc*)

Occupational Group	Employment 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Science/Technical Professionals	18072	-1418	5186	3768
Business/Public Service Assoc Prof	21067	-3098	14265	11167
Secretarial & Related Occupations	10745	-4458	6930	2472
Skilled Agricultural Trades	1850	-576	987	411
Skilled Metal/Electrical Trades	135906	-33209	116991	83782
Skilled Construction Trades	36906	-9985	18631	8646
Process Plant & Machine Operatives	75570	-17941	47804	29863
Transport Drivers and Operatives	38979	-7785	17753	9968
Elementary: Trades/Plant/Machinery	52051	-7841	46859	39018
Elementary: Clerical/Service	32708	-11055	16644	5589
All Occupations	**552513**	**-123686**	**240429**	**116743**

**Includes SIC92: groups 27, 28*
Source: IER

Table 3.4b
Projected New Entrants by Main Occupational Groups in Non-Metallics Industry

(1999-2010, Construction and manufacture of non-metallic products*)

Occupational Group	Employment 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	14745	-3035	1521	1514
Business/Public Service Assoc Prof	5781	-948	3602	2654
Admin & Clerical Occupations	9271	-2668	2827	159
Secretarial & Related Occupations	3085	-1365	1782	417
Skilled Agricultural Trades	6674	-2269	6324	4055
Skilled Metal/Electrical Trades	13010	-3228	8888	5660
Skilled Construction Trades	5493	-1268	1870	602
Process Plant & Machine Operatives	22055	-5068	13328	8260
Transport Drivers and Operatives	13082	-2810	7124	4314
Elementary: Trades/Plant/Machinery	22055	-4772	20482	15710
Elementary: Clerical/Service	9015	-3002	3886	884
All Occupations	**145841**	**-35284**	**60671**	**25387**

**Includes SIC92: group 26*
Source: IER

Table 3.4c
Projected New Entrants by Main Occupational Groups in Fuel Industry

(1999-2010, Wholesale & Retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	Employment 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Science/Technical Professionals	2521	-76	1486	1410
Business/Public Service Professionals	794	-6	151	145
Science Associate Professionals	1097	-193	397	204
Business/Public Service Assoc Prof	1422	-128	1051	923
Admin & Clerical Occupations	2111	-737	816	79
Secretarial & Related Occupations	819	-382	503	121
Skilled Metal/Electrical Trades	4522	-818	3663	2845
Skilled Construction Trades	1788	-410	880	470
Process Plant & Machine Operatives	2767	-416	1287	871
Transport Drivers and Operatives	2390	-278	1327	1049
Elementary: Trades/Plant/Machinery	1159	46	992	1038
Elementary: Clerical/Service	2706	-680	2171	1491
All Occupations	**29953**	**-4790**	**12814**	**8024**

**Includes SIC92: group 23*
Source: IER

Table 3.4d
Projected New Entrants by Main Occupational Groups in Chemicals, etc. Industry

(1999-2010, Manufacture of chemical products, rubber, plastic and other wood products, etc*)

Occupational Group	Employment 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	27298	-2791	4744	1953
Science/Technical Professionals	7806	-15	2347	2332
Business/Public Service Assoc Prof	11769	-495	8566	8071
Secretarial & Related Occupations	5109	-1457	2543	1086
Skilled Agricultural Trades	3210	-665	2719	2054
Skilled Metal/Electrical Trades	18605	-2979	12240	9261
Skilled Construction Trades	7592	-1522	2247	725
Process Plant & Machine Operatives	50359	-7745	39312	31567
Transport Drivers and Operatives	23581	-2893	14718	11825
Elementary: Trades/Plant/Machinery	26675	-2352	24279	21927
Elementary: Clerical/Service	18403	-2802	9955	7153
All Occupations	**243150**	**-30341**	**103604**	**73263**

**Includes SIC92: group 25*
Source: IER

Most losses in Metals will be among managers and proprietors, other skilled trades, caring personal service occupations and customer service occupations. There will be significant negative net demand for these over the period to 2010.

The other three industries show broadly similar findings, with a net increased need for 25,387 jobs in Non-Metallics (Table 3.4b), 8,024 jobs in Fuel (Table 3.4c) and 73,263 jobs in Chemicals, etc (Table 3.4d).

3.5 The Changing Nature of Skills Demand

Information from the various *Skills Foresight* and *Workforce Development Plans* allows some further exploration of the changing nature of the demand for skills in the process industries. Much of the discussion is not so much about numbers, but about the type of recruit needed and principally the skill base. This is summarised in the metals industry in the following statement:

'Whilst the industry is not seeking to recruit in large numbers, it needs new entrants that are better equipped than ever[5]*.*

Pursuing this general point further, the different industries have tried to articulate their key needs and a range of these is reproduced in Table 3.5 below. These are not intended to be comprehensive, but more to show where some of the concerns lie.

Table 3.5:
The Nature of the Demand for Skills in the Future

Industry	Future Demand for Skills
Chemicals	Increasing demand for graduates to have experience of a broader range of multidisciplinary skills
Pharmaceuticals	Need for multidisciplinary graduates with well developed interpersonal skills as well as academic knowledge
Glass	Window installation craft, engineering craft, setter/operator craft, managers, automotive glazing installers
Petroleum	Improvement in soft skills, especially communication, management, project management

Source: Various sector reports

So, in Chemicals and Pharmaceuticals, the need for graduates has some prominence but with multidisciplinary and generic skills, rather than too specific or academic a background. However, it would be wrong to give the impression that these and other industries are mainly interested in the highly qualified. This is not the case, and most jobs will still be in craft level and below, but with greater functional flexibility. This is evident in the petroleum industry, for example, where the smaller numbers employed are expected to have a wider range of skills.

In many ways the Fuel sector provides a contrasting demand scenario, with the refining business requiring a highly skilled workforce which has proved to be relatively stable, while on the petrol forecourts the need is for relatively low skilled and unqualified staff willing to work flexibly but at a recruitment price. Labour turnover in the forecourts is put as high as 60 per cent[6].

5 UK Steel Association (2000) *Performance and Perspective: The UK Steel Industry in 2000*.

6 See PINTO Workforce Development Plan for further information.

3.6 Summary of Key Issues

- For many industries in the process industries, the main reason for current and future vacancies is to replace staff who have left, rather than for expansion;
- Projections show that between 1999 and 2010, overall employment in the four industries together is expected to fall by 20 per cent;
- There will be a decline in the traditional skills of the sector, plus a reduced demand for low skilled staff. Also there will be changes in the use of administrative staff, with fewer secretarial and clerical jobs, but also fewer middle managers;
- There are few occupational groups expected to show an increase in demand over the period;
- In some industries the need for graduates has some prominence but with multidisciplinary and generic skills, rather than too specific or academic a background;
- Most jobs will still be at craft level and below, but with greater functional flexibility required for those in employment.

4. Supply of Skills

4.1 Introduction

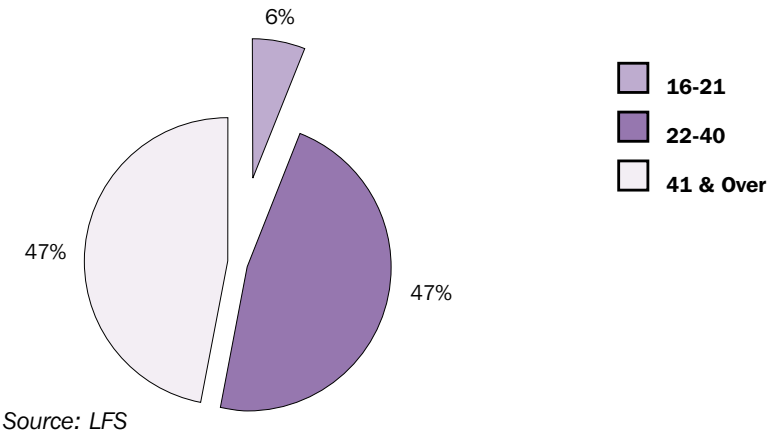
In examining the supply of skills to the process industries a range of relevant indicators has been brought together, this provides useful information particularly on the potential for change in the supply characteristics. More detailed information on the current and anticipated skill supply problems are covered in Section 5 below. Here the emphasis is more on broad indicators and trends.

4.2 Employment by Age Group

The LFS allows an analysis of employment by age group and this can provide a useful indicator of future labour supply, looking in particular at the proportion of employment in the older age categories.

In Figure 4.1 the proportion of those employed in the process industries aged over 41 was around 47 per cent in 2001, only slightly above the figure for all sectors of industry. Furthermore, the proportion had fallen from 55 per cent in 1995, no doubt reflecting natural wastage from the sector through retirements (including early retirements). However, the somewhat lower proportion of young people (aged 16-21) in the sector can be viewed less positively, with just 5.8 per cent in 2001 compared to 8.7 per cent for all industries.

Figure 4.1
Process Industries Age Structure of Workforce 2001



Source: LFS

Looking at the various industries, it is clear that some have older workforces than others. For example, Metals and Transport had over half their employees aged over 41 in 2001 and in both cases the proportions had increased from 1995. However, the Non-metallics, Fuel and Pulp and Paper industries had also seen increased proportions of their employment aged over 41, though by contrast Chemicals, etc, shows a small decline (Table 4.1). It would also appear that none of the industries is managing to significantly increase the proportions of young people among their workforces, which may indicate difficulty in attracting trainees. This corresponds with some of the concerns set out in various industry *Foresight reports*.

Table 4.1
Employment by Age Group

(UK, percentages of total employment, men and women, Autumn figures)

Industry	16-21		22-40		41 & Over	
	1995	2001	1995	2001	1995	2001
Metals	6.6	6.9	45.9	41.4	47.6	51.7
Non-metallics	*	*	50.4	42.3	46.6	48.5
Fuel	8.5	8.6	51.6	47.7	39.9	43.7
Chemicals, etc	5.1	5.9	51.9	52.8	43.0	41.3
Pulp and Paper	*	*	49.2	53.0	44.9	45.0
Transport	4.3	4.2	47.8	44.2	47.9	51.6
Process Industries	5.7	5.8	49.3	47.0	55.0	47.2
All	**8.1**	**8.7**	**48.6**	**46.2**	**43.3**	**45.1**

**Too few observations*
Source: LFS

Reasons for some of the difficulties in attracting young people to the process industries emerges from the various industry reports. In the chemicals industry, for example, there is concern that employers have failed to attract the 'brightest and best' people into technical jobs, with the image of the industry possibly the main factor working against achieving this goal. Here the issue of quality rather than quantity of recruit dominates the discussion, with 'intense' competition for the most able and qualified students.

The Polymers *Skills Foresight* report highlights the concern over the low number of school leavers and graduates coming into the industry, as well as Modern Apprentices and National Trainees[7]. This is broadly echoed in the Paper industry where attracting young people into the industry is seen as a priority but also a 'major challenge'.

The Ceramics industry has lost a significant number of its workforce in the traditional skills such as gilders, dishmakers and lithographers and upheavals in the industry are thought to have contributed to a negative image that is deterring recruits and particularly young recruits. One of the main reasons is thought to be that parents have 'black listed' the sector and have prevented their children from seeking careers there.

The generally ageing workforce is of concern to many parts of the process industries, with the prospect of retirements of skilled staff over the next ten years failing to be matched by new recruits. This is highlighted by the metals industry, for example, where just two per cent of the current workforce is aged under 21[8]. However, the industry has to some extent responded to this problem by recruiting older, semi-experienced people who can be given 'fast-track' training.

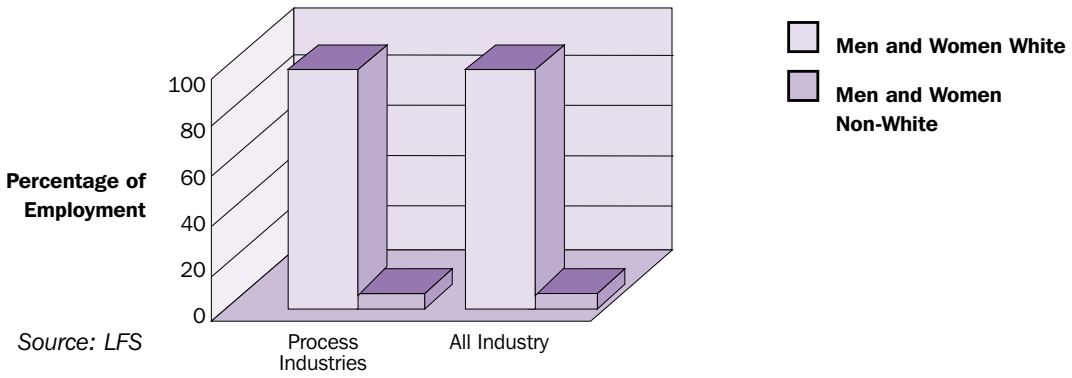
7 Now called 'Foundation and Advanced Modern Apprentices'.
8 'Workforce Development Plan 2000 (Steel NTO).

There is some hope in improving the supply of women entrants to the process industries. The previous section of this report highlighted the relatively low proportion of women currently employed here and there may be scope for improving take-up rates as, for example, has been achieved in the chemicals industry with a high proportion of women recruited to chemical engineering.

4.3 Employment by Ethnic Group

Figure 4.2 shows that the process industries have an ethnic workforce composition broadly in line with the situation in all UK industry. Furthermore, there is no discernable difference when men and women are looked at separately. Analysis by industry from the LFS data is only partial due to problems with sample size, but for Transport, where an analysis is possible, the proportions are somewhat different with non-whites accounting for over nine per cent of total employment in the sector[9].

Figure 4.2:
Employment by Ethnic Group - Process Industries 2001



Source: LFS

Table 4.2
Employment by Ethnic Group

(UK, percentages of total employment, Autumn figures)

Ethnic Group		Process Industries	All Industries
Men	White	94.4	94.0
	Non-White	5.6	6.0
Women	White	94.6	93.8
	Non-White	5.4	6.2
Men and Women	White	93.6	94.3
	Non-White	6.4	5.7

Source: LFS

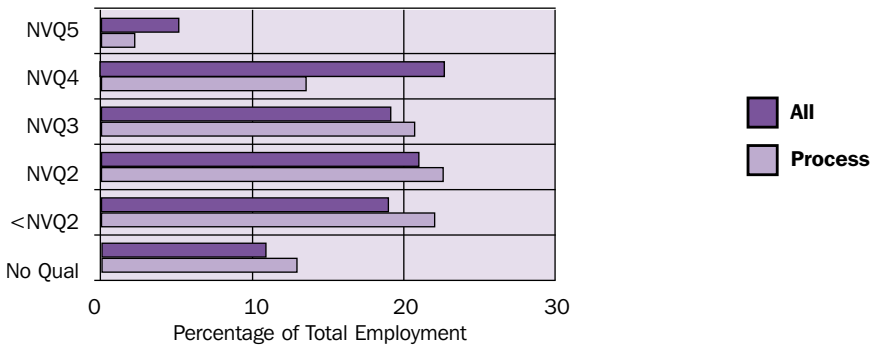
9 The definition of this sub-sector in the LFS data is somewhat wider than those parts applicable to the process industries and includes all transport. This may account for this difference.

4.4 Employment by Qualifications Attained

According to LFS information, around 13.9 per cent of those employed in the process industries in 2001 had no qualifications and this was significantly down on the figure of 16.7 per cent in 1995 (Tables 4.3 and 4.4). However, in both years the figures were above those for industry as a whole. Comparing the situation in 1995 and 2001 by industry, it is evident that fewer workers have no qualifications, with a particularly marked improvement for Pulp and Paper where the proportion fell from 25.4 per cent to 17.5 per cent. The Chemicals, etc. industry had the lowest proportion of its workforce with no qualifications at 12 per cent representing a substantial improvement on the figure of 17.1 per cent in 1995.

Figure 4.3:
Employment by Highest Qualification Held - Process Industries 2001

Employment by Highest Qualification Level Held



Source: LFS

Table 4.3
Employment by Highest Qualification Level Held, 1995

(UK, percentages of total employment, Autumn figures)

Industry	No Qual	<NVQ2	NVQ2	NVQ3	NVQ4	NVQ5
Metals	20.6	22.3	21.4	23.5	12.1	*
Non-metallics	26.2	25.4	20.0	15.4	13.1	*
Fuel	13.6	22.0	25.9	26.1	12.5	*
Chemicals, etc	17.1	20.1	19.0	16.1	22.3	5.5
Pulp and Paper	25.4	27.1	22.9	14.4	10.2	*
Transport	13.2	34.2	27.1	18.4	7.1	*
Process	16.7	25.4	23.0	19.6	13.2	2.0
All	**15.8**	**21.9**	**21.5**	**16.9**	**21.2**	**2.8**

** Too few observations*
Source: LFS

There is some evidence in the LFS figures of an upward drift in qualifications held and this is particularly evident in NVQ equivalent levels 3 and 4. For the process industries the proportion of those in employment with NVQ3 (which includes craft level, GNVQ and A level awards, for example) increased from 19.6 per cent in 1995 to 21.6 per cent in 2001. Level 4 holders also went up from 13.2 per cent to 15 per cent over the same period (no doubt reflecting the increasing supply of graduates nationally). Both trends are mirrored by the figures for all sectors and some of the industries had particularly strong increases in those with NVQ 3 and 4 equivalents. In the Metals industry, for example, the proportion of NVQ3 holders went up from 23.5 per cent to 28.2 per cent. The only industry to show a fall in the proportion of NVQ3 equivalent holders was the Chemical, etc. industry, where the figure fell from 16.1 per cent in 1995 to 15.5 per cent in 2001.

Table 4.4
Employment by Highest Qualification Level Held, 2001

(UK, percentages of total employment, Autumn figures)

Industry	No Qual	<NVQ2	NVQ2	NVQ3	NVQ4	NVQ5
Metals	13.9	21.4	22.2	28.2	14.3	*
Non-metallics	18.6	23.7	25.8	18.6	13.4	*
Fuel	12.5	17.9	24.2	30.0	13.3	2.1
Chemicals, etc	12.0	20.5	19.8	15.5	24.3	7.8
Pulp and Paper	17.5	25.8	23.7	17.5	15.5	*
Transport	15.5	28.9	26.7	20.0	9.0	*
Process	13.9	23.1	23.5	21.6	15.0	2.9
All	**11.5**	**19.0**	**22.0**	**19.8**	**22.6**	**5.1**

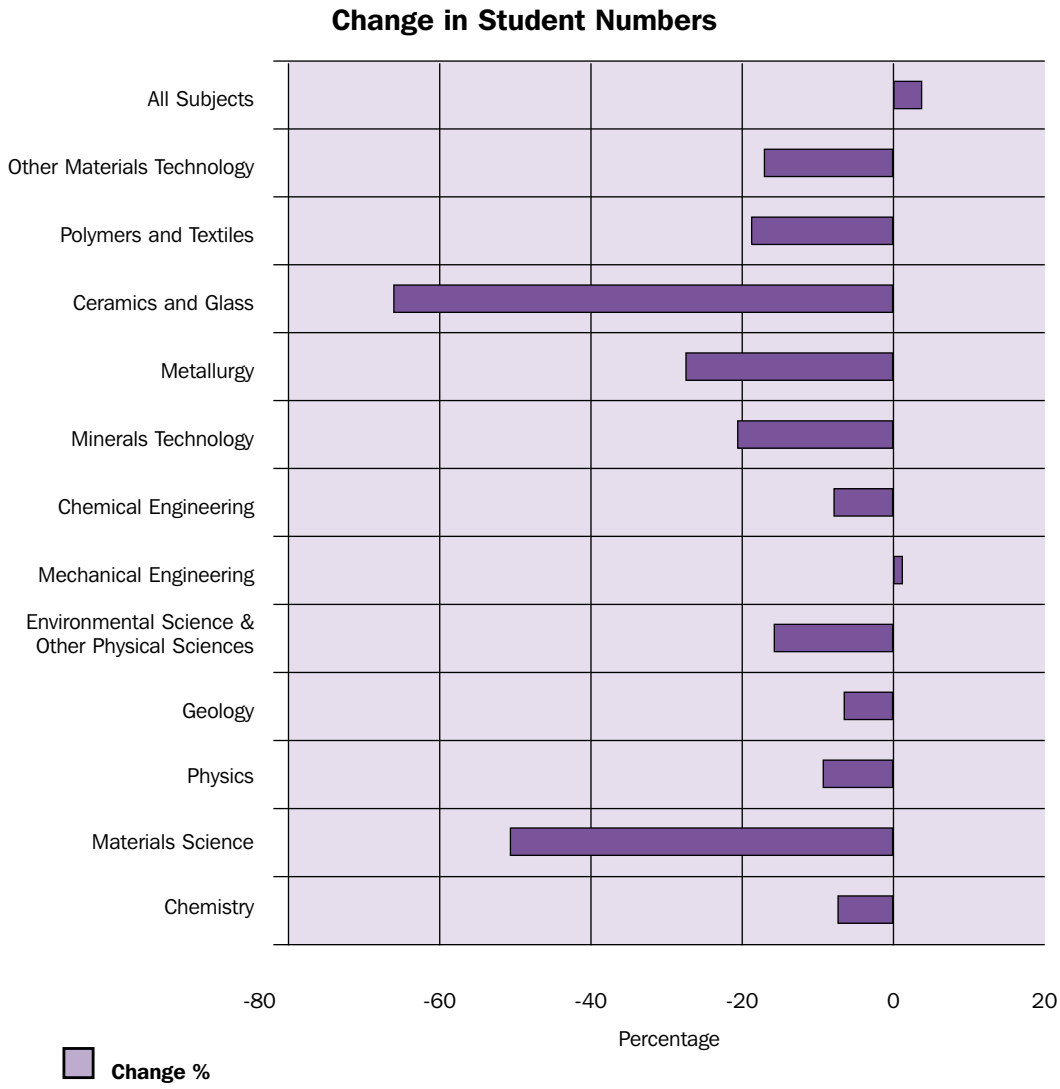
**Too few observations*
Source: LFS

The qualification level that showed the process industries to be most out of line with industry overall was the highest level, NVQ5 (higher degrees). Here the sector figure of 2.9 per cent in 2001 represented an important increase over the 2 per cent in 1995, but compares unfavourably with 5.1 per cent for all industry, up from 2.8 per cent in 1995.

4.5 Higher Education Supply

Between 1996/97 and 1999/2000 (the latest complete year available), the number of students studying in higher education increased by 5.7 per cent overall (Figure 4.4). However, for all but one of the subjects of study directly relevant to the process industries there were significant falls in student numbers, going against the overall trend. These falls were most pronounced in ceramics and glass (down 65.6 per cent), materials science (down 50.5 per cent), metallurgy (down 28.5 per cent) and minerals technology (down 21.6 per cent). In the case of ceramics and glass, where numbers are comparatively small anyway, it meant that just 110 students were studying the subject in 1999/2000, or a supply of approximately 37 per year to the labour market (based on a three year degree course).

Figure 4.4:
Change in Student Numbers in UK Higher Education - Selected Subjects 1996/97-1999/2000



Source: HESA

Information on qualifications obtained in selected relevant subjects is given for first degrees in Table 4.6 and for higher degrees in Table 4.7. For first degrees the overall trend has been for a modest increase of 3.6 per cent in degrees obtained through full-time study and 5.8 per cent for those gained through part-time study. However, within these overall figures there have been some contrasting experiences. Full-time degrees in the biological sciences have gone up by 14.5 per cent and computer science by 75.5 per cent while engineering and technology has also shown some growth at 6.8 per cent. By contrast, there have been significant falls in the number of full-time first degrees in physical sciences (down 35.3 per cent) and in mathematical science (down 26.8 per cent).

Table 4.5
Students in Higher Education

(UK, selected subjects of study)

Subject of Study	Students 1999/2000	Change 1996/97-1999/00 Number	Change 1996/97-1999/00 Percent
Chemistry	20910	-1769	-7.8
Materials Science	340	-347	-50.5
Physics	13150	-1216	-8.5
Geology	6200	-436	-6.6
Environmental Science & Other physical sciences	12940	-2356	-15.4
Mechanical Engineering	22110	210	1.0
Chemical Engineering	5650	-593	-9.5
Minerals Technology	680	-187	-21.6
Metallurgy	700	-279	-28.5
Ceramics and Glass	110	-210	-65.6
Polymers and Textiles	3830	-903	-19.1
Other Materials Technology	2370	-526	-18.2
All Subjects	**1856330**	**100151**	**5.7**

Source: HESA

For part-time degrees which account for just over ten per cent of all first degrees obtained, growth was significant in biological sciences (up 34.4 per cent) and computer sciences (up 18.4 per cent), but fairly static in mathematical sciences. There was a fall in the number of part-time first degrees in physical sciences and in engineering and technology.

For higher degrees, the overall situation is one of substantial growth over the period 1995/96-1999/2000. Full-time higher degrees increased by almost half and part-time by almost 60 per cent. Within this, of the full-time higher degrees only those in biological sciences and in computer sciences showed increases. Higher degrees in the physical sciences fell by 12.2 per cent and in mathematical sciences by a little less (11.1 per cent). Engineering and technology did a little better with a fall of just 3.7 per cent.

This is all in contrast to the growth in part-time higher degrees where all subjects shown increased the number of qualifications obtained and significantly so in all but mathematical sciences. Again computer sciences (up 90.5 per cent) and biological sciences (up 81 per cent) led the field. For higher degrees, those obtaining their qualifications by part-time study is a more important route than full-time studies, though over the review period the growth in full-time degrees obtained at almost 60 per cent, is greater than the 50 per cent growth in part-time degrees obtained.

Table 4.6
Higher Education - First Degree Qualifications Obtained

(UK, 1995/96-1999/2000)

Subject of Study	Full-Time		Part-Time		Change Part-Time	Change Full-Time
	95/96	99/00	95/96	99/00		
Biological Sciences	13312	17890	489	560	34.4	14.5
Physical Sciences	13166	12780	618	400	-2.9	-35.3
Mathematical Sciences	4027	4060	41	30	0.8	-26.8
Computer Science	8682	10280	530	930	18.4	75.5
Engineering and Technology	21689	18810	1629	1740	-13.3	6.8
All Subjects	**226626**	**239760**	**24622**	**25510**	**5.8**	**3.6**

Source: HESA

Table 4.7
Higher Education - Higher Degree Qualifications Obtained

(UK, 1995/96-1999/2000)

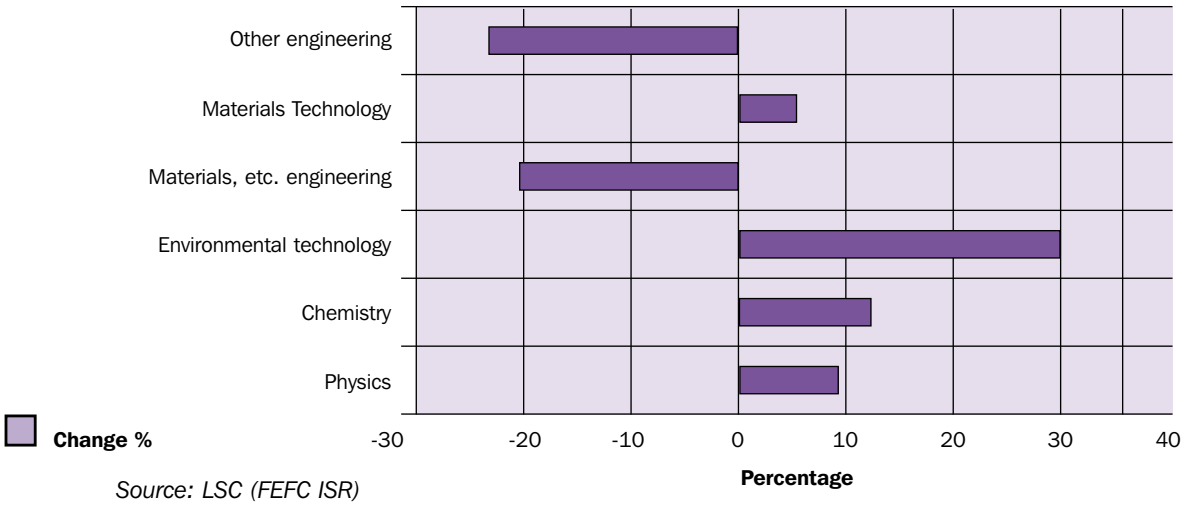
Subject of Study	Full-Time		Part-Time		Change Part-Time	Change Full-Time
	95/96	99/00	95/96	99/00		
Biological Sciences	906	1640	2006	2460	81.0	22.6
Physical Sciences	1453	1900	2425	2130	30.8	-12.2
Mathematical Sciences	349	360	585	520	3.2	-11.1
Computer Science	1223	2330	1177	1580	90.5	34.2
Engineering and Technology	3138	3740	3385	3260	19.2	-3.7
All Subjects	**21940**	**35010**	**24622**	**36900**	**59.6**	**49.9**

Source: HESA

Attracting graduates to the process industries is not always easy for the general reasons of image and conditions of work already outlined above. Furthermore, as the metals industry has found, once recruited, firms (particularly the small to medium sized ones) often have difficulty retaining them.

For further education students, as Figure 4.5 and Table 4.8 show, between 1996/97 and 1999/00 the picture for the subjects of mechanical, etc, engineering (down 20.7 per cent) and other engineering (down 23.1 per cent) was one of decline, though other relevant subjects showed more buoyancy. For example, the number of enrolments in environmental technology rose by 29.8 per cent and in chemistry by 11.9 per cent.

Figure 4.5:
Change in Student Enrolments on Selected FEFC-Funded Provision 1996/97-1999/2000



Source: LSC (FEFC ISR)

Table 4.8
Students in FEFC Funded Provision - Enrolments

Selected Subjects

Subject	1999/00	Change No	% Change
Physics	19160	1640	9.4
Chemistry	25865	2759	11.9
Environmental technology	4526	1040	29.8
Mechanical, etc, engineering	50284	-13115	-20.7
Materials technology	3245	173	5.6
Other engineering	69683	-20989	-23.1

Source: LSC (FEFC ISR)

At the same time as the number of students choosing to follow FE courses fluctuated according to subject of study, more positively most of the subjects relevant to the process industries sector showed important improvements in achievement rates (i.e. those students completing their courses and gaining a qualification). However, Table 4.9 shows the exception to be materials technology where achievement rates effectively halved over the reference period.

Table 4.9
Students in FEFC Funded Provision - Achievement Rates

Selected Subjects

Subject	1996/97	1999/00
Physics	73.4	79.2
Chemistry	73.7	79.4
Environmental technology	58.9	69.1
Mechanical, etc, engineering	62.7	72.4
Materials technology	91.9	43.6
Other engineering	64.8	77.5

Source: LSC (FEFC ISR)

In the fuel industry, there are indications that particularly in forecourt retailing and distribution, the current range of NVQs/SVQs have achieved only limited success. The preference now is for short, externally accredited and funded programmes that develop individual competence in relevant specific activities, but which contribute towards NVQ attainment[10].

10 See PINTO Workforce Development Plan for further details

4.6 Barriers to Workforce Development

From the ESS information it is possible to examine the ways in which employers felt constrained in developing their workforces. Employers need to change the nature of their labour supply to meet changing demands from technology, legislation, product development and other influencing factors and the ability to adapt is an important determinant of business success.

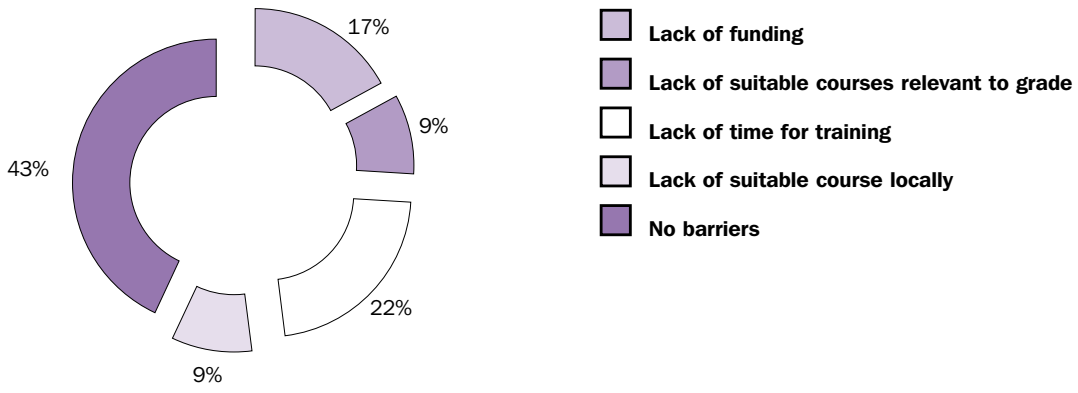
In fact, some of the industries have articulated these changing needs quite clearly. For example, the pharmaceuticals industry sees the express need to attract skills in the 'newer high technology' areas that are becoming more central to business success. The glass industry has managed to encapsulate its view of the changing workforce development needs in the following statement:

'The future career patterns of people who join the glass industry will come from job enlargement and not from hierarchical development structures'[11].

Figure 4.6 shows that many employers felt that there were no barriers to developing the proficiency of their workforces, though the figure for the process industries of 57.3 per cent was exceeded by all but two industries (Non-metallics and Chemicals, etc). The Pulp and Paper industry in particular had a very high proportion of its workforce without any barriers. Lack of time for training and lack of funding were the most significant factors preventing adequate workforce development.

Significantly, those firms in the smallest and largest size categories (as measured by employment - see Table 4.10) recorded the lowest figures for no barriers to workforce proficiency, with lack of funding and lack of time being particularly critical factors for the largest firms (over 1000 employees). This is a somewhat surprising finding given that it might be expected that larger firms would have both the capacity and resources to develop their workforces. It suggests, therefore, that it may be a problem of scale, where the task of coping with large numbers of employees presents another dimension (and clearly an obstacle) to workforce development.

Figure 4.6:
Most Significant Barriers to Maintaining Fully Efficient Workforce - Process Industries



Source: ESS 2001

11 Glass Sector Skills Foresight Report 2000/2001

Table 4.10
Barriers to Maintaining a Fully Proficient Workforce - Most significant Factors by Size of Establishment
(UK, Process Industries)

Percentage of workforce affected

Size of Establishment	Lack of Funding	Lack of Time	No Barriers
1-4	21.7	24.8	54.5
5-24	26.8	39.0	63.6
25-49	27.2	45.1	68.6
50-99	25.9	45.6	66.9
100-199	29.6	50.5	66.2
200-499	31.9	49.6	61.3
500-999	33.8	50.4	63.3
1000 & Over	34.8	61.6	58.4
Total	**23.1**	**29.3**	**57.3**

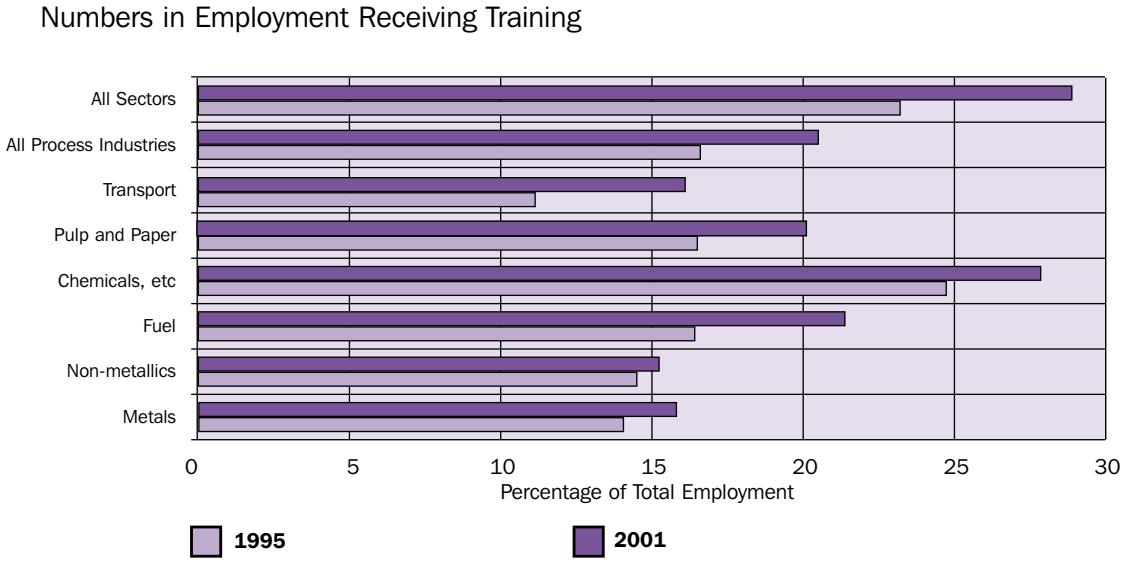
Source: ESS 2001

4.7 Training

The proportion of employees receiving training increased in the process industries from 16.9 per cent in 1995 to 20.4 per cent in 2001 (Figure 4.7), though this was less pronounced than the increase for all industry over the same period. The measure used here is the more generous LFS one of 'those receiving any training in the previous 13 weeks' so looked at from another angle, the figures indicate that the vast majority of employees (79.6 per cent in 2001) received no training at all.

By industry, most training was taking place in Chemicals, etc, (27.6 per cent in 2001) and in Fuel (21.7 per cent), but the increases over the situation in 1995 were more or less proportionate to that for the process industries as a whole. In the Non-metallics industry, only 15.3 per cent of the workforce received any training during the reference period, this being the lowest of all the process industries.

Figure 4.7:
Numbers in Employment Receiving Training by Industry

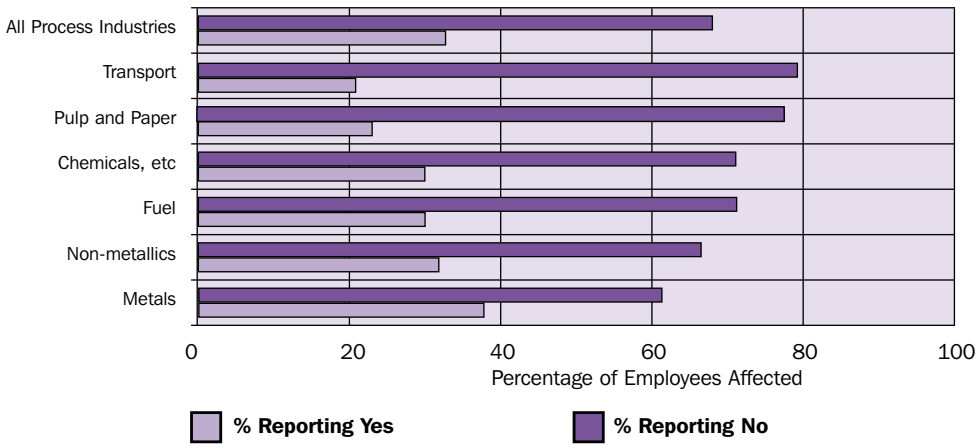


Source: LFS

Looked at another way, Figure 4.8 (from the ESS data) examines the proportion of employees where off-the-job training was funded or arranged. In contrast to the LFS figures and their rather restricted reference period, these data should be expected to show some different findings on the incidence of training support, especially since it only refers to off-the-job training (the LFS covers all training, on and off-the-job).

For the process industries overall, some 30.5 per cent of employees were covered by off-the-job training. However, by industry there were wide variations from the highest proportion in Metals (38.7 per cent) to the lowest in industry Pulp and Paper (21.1 per cent).

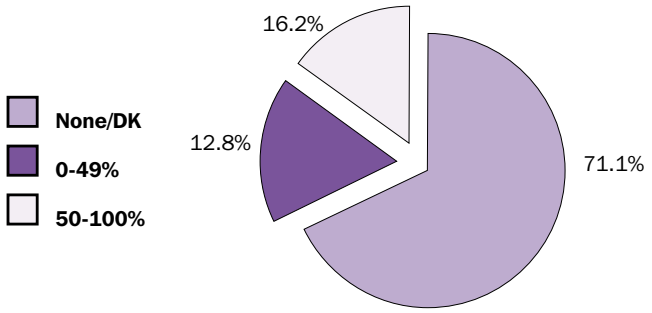
Figure 4.8:
Off-the-Job Training: Funding/Arrangements for Employees (England, Industries)



Source: ESS 2001

Figure 4.9 provides another perspective on the support by employers for off-the-job training. Here some 16.2 per cent of employees are in firms where over 50 per cent of them have participated in some off-the-job training, with an industry variation from a high of 21.6 per cent in Non-metallics, to a low of just 5.3 per cent in Pulp and Paper.

Figure 4.9:
Off-the-job Training: Employees Participating
(England, Process Industries)



Source: ESS 2001

The type of off-the-job training followed by the minority of employees is illustrated in Table 4.11. This provides a useful perspective on how the supply of labour in employment is changing. For example, for the process industries as a whole, the most popular type of training was job specific (68.7 per cent) closely followed by health and safety (62.3 per cent). Least popular was foreign languages (2.4 per cent) which may not be surprising given the specialist nature of this need. Job specific training was particularly important in the Chemicals, etc, and Transport industry, though in Metals and Pulp and Paper health and safety training attracted the most attention.

Table 4.11
Off-the-job Training: Type of Training
(England, Process Industries)

Percentage of all employees in each industry

Skill Area	Metals	Non-Metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Induction	41.7	29.5	34.6	40.2	42.2	33.0	33.1
Health & safety	70.1	60.9	62.7	67.1	81.5	56.7	62.3
Job specific	61.9	70.7	67.0	71.6	73.4	66.2	68.7
Supervisory	24.5	17.0	18.1	28.8	31.9	24.0	19.9
Management	24.0	14.3	28.9	25.6	37.0	24.3	20.5
New technology	47.3	43.3	56.3	55.4	54.4	43.5	47.5
Foreign languages	3.2	1.2	5.7	9.6	2.4	2.4	3.2
Soft & generic skills	18.5	9.2	25.5	20.5	34.6	26.6	16.6
None of these	2.1	4.9	4.1	2.7		3.3	4.1
Don't Know	0.3			0.2		0.1	0.1

Source: ESS 2001

4.8 Summary of Key Issues

- There is a lower proportion of young people (aged 16-21) in the process industries, with 5.8 per cent in 2001 compared to 8.7 per cent for all industries;
- The issue of quality rather than quantity of recruit is important to the process industries, with intense competition for the most able and qualified students;
- There is concern in the sector over the low number of school leavers and graduates coming into the industry, as well as Modern Apprentices and National Trainees;
- The generally ageing workforce is of concern to many parts of the process industries, with the prospect of retirements of skilled staff over the next ten years failing to be matched by new recruits;
- There is some hope in improving the supply of women entrants to the process industries, particularly in such areas as chemical engineering;
- Some 13.9 per cent of those employed in the process industries in 2001 had no qualifications and this was significantly down on the figure of 16.7 per cent in 1995. However, in both years the figures were above those for industry as a whole;
- There is some evidence of an upward drift in qualifications held and this is particularly evident in NVQ equivalent levels 3 and 4. The qualification level that showed the process industries to be most out of line with industry overall was the highest level, NVQ5 (higher degrees);
- The number of students studying in higher education has increased significantly over recent years. However, for all but one of the subjects of study directly relevant to the process industries there were significant falls in student numbers, going against the overall trend;
- Attracting graduates to some of the process industries is not always easy for the general reasons of image and conditions of work and once recruited, some firms (particularly the small to medium sized ones) often have difficulty retaining them;
- The number of students in further education in the subjects particularly relevant to the process industries of mechanical, etc, engineering and other engineering has been declining, though other relevant subjects showed more buoyancy (for example, environmental technology and chemistry);
- Lack of time for training and lack of funding were the most significant factors preventing adequate workforce development in the process industries;
- The proportion of employees receiving training increased in the process industries from 16.9 per cent in 1995 to 20.4 per cent in 2001, though this was less pronounced than the increase for all industry over the same period.

5. Skill Imbalances

5.1 Introduction

Skill imbalances in the sector need to be considered from two perspectives, as follows:

- Skill shortages;
- Skill gaps.

Skill shortages refer to the problems employers have in recruiting the skills they need from the labour market due to a shortage of supply (which may be through a combination of factors). They should be distinguished from hard-to-fill vacancies where jobs might be difficult to fill because of relatively poor pay and working conditions. The information used below from the ESS is on 'skills related' hard-to-fill vacancies that addresses this definitional issue. Skill gaps refer to the problems employers have with the skill needs of their current workforces. Both are relevant to the future performance of business.

5.2 Skill Shortages

Information from the ESS 2001 (Table 5.1) shows that among the process industries collectively, the proportion of establishments reporting hard-to-fill vacancies, skill shortages or skill gaps was relatively small. Skill shortages, for example, were evident in just 3.6 per cent of establishments and skill gaps in 6 per cent. It is also interesting to note that there was a greater incidence of both skill shortages and skill gaps in those firms where employment had increased. Not a surprising result, but one that illustrates the problems expanding firms might face in meeting their future skill needs.

Table 5.1
Establishments with at least one hard-to-fill vacancy, skill shortage and skills gap by employment trend over past 12 months
(England, Process Industries)

Percentage of establishments affected

Employment Trend	Hard to fill vacancy	Skill Shortage	Skills Gap
Increased	14.2	6.2	9.7
Stayed the same	4.2	2.6	4.4
Decreased	14.5	5.3	8.8
Don't Know	2.2	1.7	1.1
All establishments	**7.5**	**3.6**	**6.0**

Source: ESS 2001

Among the different occupational groups, the incidence of skill related hard-to-fill vacancies (the proxy for real skill shortages) in Table 5.2 shows clearly that most were in craft and related occupations (48.2 per cent of the total) and operative/assembly jobs (27.7 per cent). Compared to all industry, the process industries were significantly different in that the distribution of skill shortage vacancies was more evenly distributed among the nine SOC groups in all industry, with fewer craft and related jobs for example.

There is some evidence among the industry reports of a more general recruitment problem. For example, in polymers the latest *Skills Foresight* report found that half the firms it surveyed had vacancies and almost four in five were having difficulty in filling them. The majority of these hard-to-fill vacancies were for plant and machine operatives, process technicians and engineering technical posts. The main reasons for these recruitment problems were given as a general lack of applicants and a lack of qualifications, experience and skills of those that did apply.

Table 5.2
Skill Related Hard-to-fill Vacancies: Reported Occupations
(England, Process Industries)

Percentage of all skill related hard-to-fill vacancies

Occupation	Process Industries	All Industry
Managers/Administrators	2.7	4.7
Professional	3.7	18.2
Technical/Scientific	7.9	17.8
Clerical/Secretarial	3.4	6.8
Craft & Related	48.2	19.9
Personal Service	0.1	9.4
Sales	3.3	9.1
Operative/Assembly	27.7	9.1
Other Manual	2.9	5.1
All Occupations	**100.0**	**100.0**

Source: ESS 2001

Table 5.3 shows information for hard-to-fill vacancies only (not skills related) and here the vast majority of jobs are in craft and operative/assembly jobs, together accounting for almost three quarters of all such vacancies. These are likely to be jobs with unattractive terms and conditions of work that improvements in supply alone will not solve.

By industry (Table 5.4) it is clear that skills related shortages of craft and related occupations were not as important in Fuel (18.9 per cent) and Transport (7.4 per cent). Here there was more of a problem recruiting technical/scientific staff (also applies to metals and Non-metallics) and sales, personal service and professional staff in Transport[11]. Overall, skill related hard-to-fill vacancies accounted for significant proportions of all vacancies in five of the sub-sectors, the exception being Pulp and Paper. The worst affected industry was Non-metallics where 41.4 per cent of all vacancies were considered to be skill shortages.

Table 5.3
Hard-to-fill Vacancies: Reported Occupations
(England, Process Industries)

Percentage of all skill related hard-to-fill vacancies

Occupation	Process Industries	All Industry
Managers/Administrators	2.1	3.6
Professional	3.0	11.4
Technical/Scientific	4.5	16.6
Clerical/Secretarial	7.4	7.1
Craft & Related	40.5	16.0
Personal Service		10.8
Sales	4.3	12.5
Operative/Assembly	32.9	9.2
Other Manual	5.3	12.8
All Occupations	**100.0**	**100.0**

Source: ESS 2001

11 The demands for such staff in transport are inflated by the inclusion of the 'other land transport' sector (SIC 60.2 and 60.3) containing some addition coverage not directly applicable to 'transport' by land and by pipeline and cargo handling).

Table 5.4
Skill Related Hard-to-fill Vacancies by Industries
(England, Process Industries Sub-sectors)

Percentage of all reported vacancies in occupational group

Occupation/ Industry	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Managers/ Administrators	46.6	21.4	30.9	8.7			20.6
Professional	13.3	50.0	8.2	10.4		35.7	22.9
Technical/ Scientific	46.9	65.4	39.6	17.9		28.2	38.1
Clerical/Secretarial	2.6	8.6	17.4	0.8	25.4	7.9	9.1
Craft & Related	44.3	49.6	18.9	52.9	13.6	7.4	37.9
Personal Service						40.0	14.8
Sales	29.0	10.8	18.4			38.6	17.8
Operative/Assembly	17.7	33.3	22.5	18.9	4.3	20.2	20.8
Other Manual		7.4		2.3		26.2	10.1
All Occupations	**29.3**	**41.4**	**18.4**	**15.2**	**9.1**	**18.6**	**25.2**

Source: ESS 2001

For hard-to-fill vacancies only, Table 5.5 indicates that as proportions of all vacancies, there were large concentrations in managers/administrators in Metals and Fuel. In the Non-metallics industry professional, technical/scientific and craft & related had the largest proportions of hard-to-fill vacancies and craft & related was also high in Chemicals. The proportions of clerical/secretarial vacancies were relatively low in all but the Transport industry, suggesting that these jobs presented fewer recruitment challenges for the employer.

Table 5.5
Hard-to-fill Vacancies by Industries
(England, Process Industries Sub-sectors)

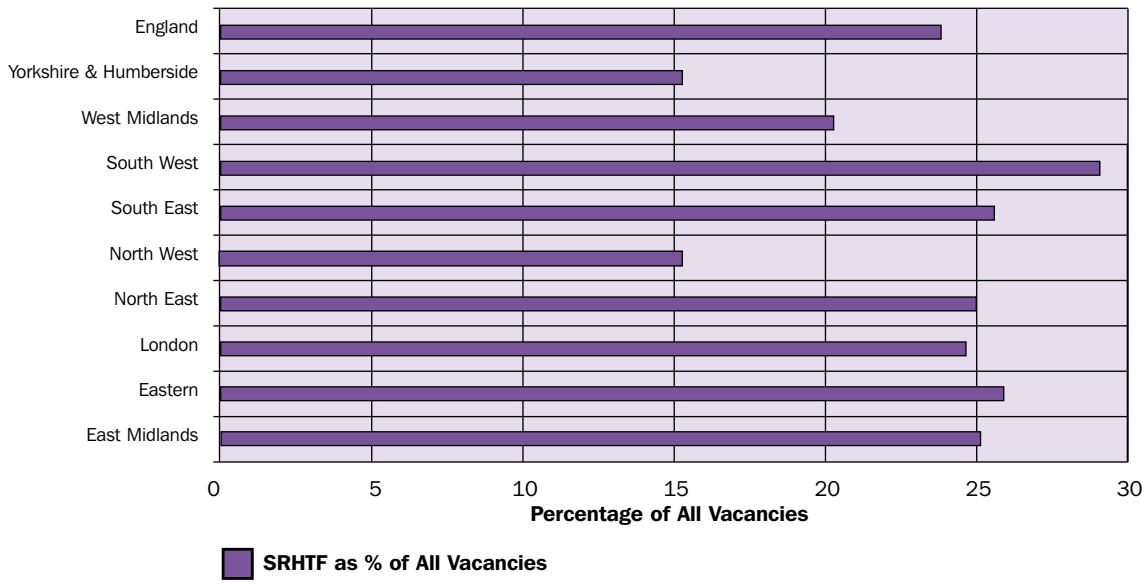
Percentage of all reported vacancies in occupational group

Occupation/ Industry	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Managers/ Administrators	57.9	35.8	58.6	15.4		19.5	37.8
Professional	32.1	70.9	20.5	30.3		42.0	42.2
Technical/ Scientific	63.0	81.7	40.9	31.1		28.2	50.5
Clerical/Secretarial	9.7	18.6	20.5	15.3	35.2	71.7	44.7
Craft & Related	58.8	71.7	87.1	60.5	13.6	14.4	73.1
Personal Service						40.0	14.8
Sales	29.0	39.4	64.8			59.1	52.3
Operative/ Assembly	52.0	46.6	67.0	34.5	4.3	64.7	56.8
Other Manual	32.1	47.7	40.3	19.7		56.5	41.8
All Occupations	**51.8**	**62.4**	**69.6**	**30.0**	**10.6**	**62.5**	**58.0**

Source: ESS 2001

Figure 5.1:
Skill Related Hard-to-fill Vacancies by Region

(England, 2001)



Source: ESS 2001

The problem of skill shortages is not uniform across the country and Figure 5.1 illustrates this well. In England overall, around 23 per cent of all vacancies were considered to be of the skills-related shortage variety, but this figure was exceeded in six regions, the highest being in the South West (28.2 per cent). By contrast, regions such as the North West and Yorkshire & Humberside had lower figures.

Table 5.6 provides an analysis of the SRHTF vacancies for each occupational group as a percentage of all SRHTF for that industry and shows more clearly where the main problems lie. In four of the industries most of the SRHTF vacancies were in craft and related occupations, accounting for 72.2 per cent in Non-metallics, 58.7 per cent in Metals, and down to 45.8 per cent in Pulp and Paper. In Chemicals, etc, the largest group was in the operative/assembly occupations at 48.3 per cent of the total and this was also the case in transport where the group accounted for almost three quarters of all SRHTF vacancies.

Table 5.6
Skill Related Hard-to-fill Vacancies as Percentage of All SRHTF Vacancies
(England, Industries)

Percentage of all skill related hard-to-fill vacancies

Occupation/ Industry	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Managers/ Administrators	6.0	2.2	6.9	2.6			2.7
Professional	0.9	5.3	0.4	11.5		0.8	3.7
Technical/ Scientific	8.6	9.4	5.5	18.5		1.8	7.9
Clerical/Secretarial	0.4	1.3	8.6	0.3	37.5	6.9	3.4
Craft & Related	58.7	72.2	54.4	17.1	45.8	1.2	48.2
Personal Service						0.5	0.1
Sales	1.9	1.0	13.7			3.5	3.3
Operative/ Assembly	23.6	7.7	10.6	48.3	16.7	74.6	27.7
Other Manual		1.0		1.7		10.8	2.9
All Occupations	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: ESS 2001

The above tables show quite clearly that difficulties in filling posts applies across the skills range and is not confined to any particular group. In most industries it is the middle ranking skills (for example, craft and related) and lower level skills (for example, operative/assembly staff) that cause the biggest problem since they are numerically the largest. However, this is not to under-estimate the importance of higher level skills which also figure prominently in most of the industries.

5.3 Causes and Effects of Skill Shortages

The causes of skill shortages can be varied and often there are multiple causes combining to make the problem even worse for the employer. Some of the causes can be considered external, over which the employer has little control. Here, for example, would be included the adverse demographics that makes fewer young people available to the labour market and more to leave work as they reach retirement age, or the higher participation rates in higher education that dissuades school leavers joining the industry.

Table 5.7 illustrates the sorts of causes for the major occupational groups with skill shortage problems. Significant in all three groups is the generally low number of applicants with the right skills for vacancies. However, for associated professional jobs, also important were the low number of applicants generally and the lack of qualifications from those that did bother to apply. In craft and related vacancies, there was more concern for the lack of work experience among applicants, which was also a problem for the production and process operative vacancies.

Table 5.7
Causes of Skill Related Hard-to-fill Vacancies
(England, Process Industries, percentage of firms reporting SRHTF vacancies)

Cause	Associated Professional	Craft & Related	Production & Process Operatives	All Occupations
Low number of applicants with skills	86.3	85.5	66.9	80.2
Lack of work experience	16.0	20.4	24.3	22.5
Low number of applicants generally	45.4	18.1	16.0	19.9
Not enough people interested	8.1	18.7	13.7	17.3
Lack of qualifications	15.9	13.2	21.9	15.7
Low number of applicants with motivation	10.8	9.1	13.8	11.0
Too much competition	4.4	7.0	9.7	8.8
Company does not pay enough	2.7	13.0	4.1	8.0
Poor career prospects	2.4	0.6	1.2	1.0

Source: ESS 2001

The causes of skill related hard-to-fill vacancies is further explored in Table 5.8 by industry. All six industries had recruitment problems largely caused by the generally low number of applicants with the right skills and this was highest in Non-metallics at 88 per cent and lowest in Pulp & Paper at 54.1 per cent. Lack of work experience was clearly a significant problem for applicants in the Metals industry, though less so in the rest. In the Fuel industry there was a problem with simply not enough people interested in applying and this may be indicative of an image problem for the industry. The lack of qualifications of applicants was really only a significant problem for the Pulp & Paper industry, whereas too much competition for staff worried it as well.

In Table 5.9 it is possible to explore a little further the sorts of skills composition employers were looking for in relation to their skill shortage vacancies. For both occupational groups shown, the need for technical/practical skills was considered very important, while other more general aptitudes in such areas as communication, team working, problem solving, etc, assumed less importance. Basically employers tended to put job specific skills above all other requirements.

Table 5.8
Causes of Skill Related Hard-to-fill Vacancies by Industry
(England, All Occupations, percentage of firms reporting SRHTF vacancies)

Occupation/ Industry	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port
Low number of applicants with skills	70.0	88.0	85.9	77.4	54.1	66.3
Lack of work experience	42.0	17.7	27.8	23.8		19.6
Low number of applicants generally	21.3	19.9	23.2	20.3		17.1
Not enough people interested	22.7	8.2	51.5	9.8		14.3
Lack of qualifications	17.5	11.1	18.8	24.2	45.9	18.8
Low number of applicants with motivation	27.1	9.3	11.7	5.3	15.8	8.8
Too much competition	10.6	6.1	8.9	8.0	38.3	13.9
Company does not pay enough	9.1	10.1	8.5	2.1	38.3	4.8
Poor career prospects	2.1	0.5				2.8

Source: ESS 2001

Table 5.9
Skills Sought by Employers in Connection with Skill Related Hard-to-fill Vacancies
(England, Process Industries, percentage of all SRHTF vacancies reported)

Skills Sought	Associated Professional	Craft & Related	Production & Process Operatives	All Occupations
Basic computer literacy	1.9	0.6	5.3	3.1
Advanced IT/software	4.9	0.4	3.1	3.4
Other technical/practical	46.6	70.2	45.2	56.5
Communication	16.0	5.0	6.9	8.9
Customer handling	12.9	2.6	13.0	8.0
Team working	13.4	6.0	7.8	7.7
Foreign language	10.2	0.3	1.4	1.7
Problem solving	15.0	7.7	6.7	8.4
Management	6.8	2.1	2.8	4.6
Numeracy	2.9	3.8	5.0	3.8
Literacy	4.2	1.4	2.5	3.7
Company/job specific technical skills	10.5	9.3	22.0	14.4
Sales, marketing, promotional	37.2			3.1
Personal attributes	4.0	0.9	4.5	4.1
Driving	1.2	3.9	7.0	3.2

Source: ESS 2001

In responding to skill shortages, employers have a number of options they can take and those preferred by employers in the process industries are shown in Table 5.10. Increasing the salaries on offer to attract new entrants is an obvious and common action, as is stepping up recruitment activity such as advertising. However, as alternatives to seeking skilled recruits, many employers reported increasing training of existing workers to help overcome the problem and in the same way, redefining jobs and tasks. The substitution of technology was mentioned most in the Metals industry, but was less popular in the other industries.

Table 5.10
Response to SRHTF Vacancies by Industry
(England, Process industries sub-sectors, all occupations)

Percentage of sub-sector workforce affected

Response	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Increased salaries	74.0	80.8	55.5	62.4		52.6	68.7
Increased training	59.2	65.0	59.8	58.0	54.1	24.3	54.3
Redefined existing jobs	64.4	28.1	48.5	32.0	84.2	15.1	32.3
Substituted technology	36.2	7.6	6.8	22.8		10.3	12.3
Increased recruitment adverts	65.5	46.0	80.4	76.3	100.0	67.1	60.2
Expanded trainee numbers	48.4	62.5	43.2	58.2	15.8	43.5	53.7
Expanded recruitment channels	64.6	76.0	66.6	80.2		59.6	70.2

Source: ESS 2001

According to the three most affected occupational groups (Table 5.11), increased salaries was less preferred for production and process operatives, though was important to the other two groups. Increased training was more evident in the higher level occupations, as was the expansion in the number of trainees. In an attempt at filling the vacancies, increased recruitment advertising and expanded recruitment channels were most common among the associated professionals. Least common of all the responses was substituting technology and this applies across all occupational categories shown, no doubt reflecting both the costs of doing this and the limitations on what could be done.

But as already discussed in Section 2, productivity gains in the process industries have led to reductions in employment and are forecast to continue so. It is also likely that there will be further efforts to reduce the dependency on key labour.

Table 5.11
Response to SRHTF Vacancies by Major Occupational Groups
(England, Process industries selected occupations, percentage of workforce affected)

Response	Associated Professional	Craft & Related	Production & Process Operatives	All Occupations
Increased salaries	70.4	73.3	53.5	68.7
Increased training	60.5	59.7	40.8	54.3
Redefined existing jobs	26.9	34.2	24.4	32.3
Substituted technology	17.8	10.8	10.9	12.3
Increased recruitment adverts	80.8	46.6	60.0	60.2
Expanded trainee numbers	61.6	57.7	46.6	53.7
Expanded recruitment channels	83.2	75.8	57.3	70.2

Source: ESS 2001

5.4 Skill Gaps

The existence of skill gaps among the process industries is strongly verified in the various *Skills Foresight and Workforce Development Plans* for the constituent sub-sector. In Polymers, for example, it was suggested that six out of every ten companies have a skills gap, with the main problem areas as technical competence and communication. In chemicals, skill gaps have appeared in critical areas such as process plant operators, craft and technician level staff. In refractories the main gaps are also in craft and technician level jobs such as electricians, maintenance and production, sales and drawing office skills.

However, there are also clear signs that the problem of inadequate basic skills among current workforces is being recognised as a potential problem. For example, in Paper the *Workforce Development Plan* suggested that adult numeracy and literacy were a 'significant' problem for some 10 per cent of the current workforce. In Ceramics lack of key and basic skills was also identified as a problem having some effect on business efficiency.

Turning to the statistics, according to the ESS 2001 inquiry, skill gaps affected substantial parts of the workforce with, for example, 42.7 per cent of managerial jobs affected in the process industries, 25 per cent of skills & related and 22.4 per cent of clerical jobs (Table 5.12). Industries such as Pulp and Paper were more affected, particularly for managerial jobs but also for sales jobs. In Metals and Pulp and Paper, processing and machine operatives recorded high incidences of skills gaps. The lowest incidences across the process industries were for professional and personal & protective jobs.

Table 5.12
Substantial Skill Gaps in Current Workforce Occupation
(England, Process industries selected occupations)

Percentage of workforce affected

Occupation	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Managerial	40.0	45.8	36.3	49.5	68.8	36.0	42.7
Professional	8.6	6.2	5.3	6.6	6.2	8.5	6.6
Associated Professional	17.8	9.1	19.9	10.9	11.4	1.5	12.0
Clerical	31.9	15.4	23.6	21.0	18.6	35.1	22.4
Skilled & Related	25.3	34.5	27.7	16.2	4.2	4.6	25.0
Personal & Protective	0.3	1.1	4.3	4.1	2.7	5.5	2.8
Sales	7.8	2.4	32.5	15.7	31.8	11.2	13.6
Processing & Machine Ops	44.9	6.5	8.5	31.9	47.7	33.3	19.0

Source: ESS 2001

According to the size of firm in employment terms (Table 5.13), skill gaps were evident across the different categories for managerial jobs and to a lesser extent for clerical jobs (the exception being in the smallest firms). Overall the largest firms (i.e. with 1000 or more employees) in the process industries were more affected which may suggest that they have problems dealing with the scale of the problem.

Table 5.13
Substantial Skill Gaps in Current Workforce by Size of Establishment
(England, Process industries selected occupations)

Percentage of workforce affected

Occupation	1-4 Emps	25-49 Emps	100-199 Emps	1000 & Over
Managerial	48.8	35.5	44.2	59.3
Professional	1.5	4.8	14.4	59.3
Associated Professional	17.7	8.3	13.3	43.4
Clerical	9.4	27.3	30.0	43.4
Skilled & Related	20.7	27.1	19.2	
Personal & Protective	1.3	2.2	1.9	
Sales	2.2	11.5	14.8	77.1
Processing & Machine Ops	0.8	31.1	35.8	

Source: ESS 2001

The incidence of skill gaps in the current process industries workforce across the English regions is shown in Table 5.14. Taking managerial jobs, for example, the incidence varied from a high of 62.9 per cent in the South West, to a low of just 4.3 per cent in the North West. For skilled and related the differences were less pronounced with variations from a high of 48.4 per cent (Yorkshire & Humberside) to a low of 13.8 per cent in the North West. All regions with the exception of the North East had few problems with personal and protective service jobs.

Table 5.14
Substantial Skill Gaps in Current Workforce by Region
(England, Process industries selected occupations)

Percentage of workforce affected

Occupation/Region	E	EM	LON	NE	NW	SE	SW	WM	YH
Managerial	38.7	32.8	51.9	22.3	4.3	30.7	62.9	47.4	33.9
Professional	5.8	6.2	10.5	13.0	7.6	4.8	3.4	7.8	7.2
Associated Professional	12.9	8.7	5.2	5.4	6.9	29.4	7.5	9.6	10.5
Clerical	21.9	23.9	41.1	33.5	18.5	16.6	14.3	23.2	22.9
Skilled & Related	24.0	19.6	24.3	24.8	13.8	26.7	17.3	34.8	48.4
Personal & Protective	1.1	6.4		16.8	0.3	0.2	0.6	2.8	9.7
Sales	4.3	26.6	19.8	6.9	20.3	6.6	10.2	14.2	15.4
Processing & Machine Ops	20.0	20.3	12.7	20.6	29.2	13.2	10.8	33.8	19.7
Other	16.4	17.0	10.7	9.8	30.8	8.4	8.1	10.8	10.1

Source: ESS 2001

Looking in more detail at the sorts of skills lacking and contributing to the reported skill gaps, Table 5.15 shows that for the process industries as a whole, the main needs were in communication, management, and advanced IT/software development. To a certain extent these were replicated across the industries, though with some differences. For example, Metals had particular problems with basic computer literacy and management skills, while Pulp and Paper was particularly affected by communication and team working skills. Technical/practical skill needs were particularly evident in Chemicals, etc, which also had a higher than average need for communication skills development.

The skills lacking are further examined in Table 5.16 for the three main occupational groups affected. It shows that other technical/practical skills were mostly needed in the craft and related group, though they were not without their importance to the other two groups.

Table 5.15
Substantial Skill Gaps in Current Workforce - Skills Lacking by Industry
(England, Process industries sub-sectors, all occupations)

Percentage of industry workforce affected

Skills Lacking	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Basic computer literacy	50.4	14.8	13.7	21.2	22.4	36.7	21.8
Advanced IT/ software	47.9	23.9	25.6	28.5	24.2	36.4	28.8
Other technical/ practical	34.6	13.9	25.1	51.7	7.1	28.3	26.4
Communication	50.2	19.8	38.2	47.9	64.3	32.4	33.6
Customer handling	26.9	13.6	10.3	14.8	2.7	18.2	14.8
Team working	30.4	12.6	14.6	20.4	58.9	34.2	19.4
Foreign languages	12.1	1.9		31.1	5.2	11.7	9.2
Problem solving	17.8	8.2	23.8	10.9	12.3	14.4	13.1
Management	48.6	22.4	39.3	24.7	38.6	35.8	30.2

Source: ESS 2001

Table 5.16
Substantial Skill Gaps in Current Workforce - Skills Lacking by Major Occupational Groups
(England, Process industries, major occupational groups affected)

Percentage of workforce affected

Skills Lacking	Managerial	Clerical	Craft & Related
Basic computer literacy	21.8	32.1	6.3
Advanced IT/software	28.8	30.3	4.5
Other technical/practical	26.4	25.3	45.9
Communication	33.6	33.6	23.4
Customer handling	14.8	18.5	20.4
Team working	19.4	12.9	21.0
Foreign languages	9.2	10.2	3.0
Problem solving	13.1	28.4	21.8
Management	30.2	24.3	15.9

Source: ESS 2001

The effects of these skill gaps are identified in Table 5.17. For the process industries as a whole, for 41.5 per cent there was no problem, a figure that was exceeded in the Non-metallics industry and to a lesser extent Fuel. However, 23.2 per cent were affected by a loss of business (46 per cent in Transport) and 30.3 per cent had difficulty meeting service needs which presumably contributed to the loss of business. Increased operating costs were an important result across the industry, as was the introduction of new working practices, presumably to cope with the skill shortfall.

Table 5.17
Substantial Skill Gaps in Current Workforce - Implications
(England, Process industries, all occupations)

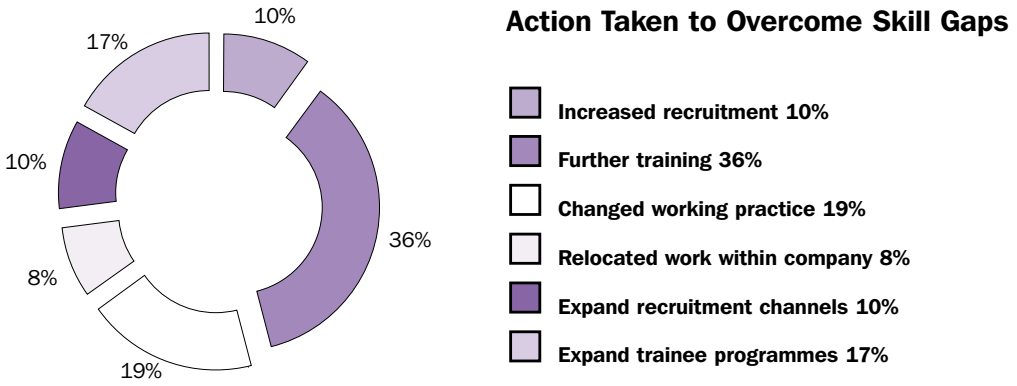
Percentage of industry workforce affected

Effect of Skill Gaps	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Loss of business	19.5	19.6	26.8	12.5	15.7	46.0	23.2
Delay in developing new products	30.1	17.5	18.1	30.0	35.1	34.7	23.3
Withdrawal of products	18.9	16.6	15.3	12.9	3.6	15.9	15.7
Difficulty meeting service needs	38.9	22.5	35.2	30.7	30.7	36.1	30.3
Difficulty meeting quality standards	27.4	20.2	17.2	24.1	36.0	31.0	22.4
Increased operating costs	41.4	30.2	43.8	33.0	62.6	41.8	36.8
Problems introducing new technology	29.4	18.7	27.4	27.0	36.5	29.0	24.7
Problems introducing new work practices	39.1	24.7	41.5	33.7	46.9	36.0	33.3
No problem	34.6	53.7	41.8	34.7	32.5	20.6	41.5

Source: ESS 2001

Training is the obvious way to address skill gaps and this is evidenced by the information in Table 5.18 that shows over 60 per cent were affected by further training and this was higher than average in Metals, Fuel, Chemicals, etc, and Pulp and Paper. Changing working practices to accommodate the skill gaps was another response affecting around one third, though the opportunities for doing this seemed to be greater in the Metals and Chemicals, etc. industry. This is further illustrated in Figure 5.3 which shows further training was particularly popular in craft and related occupations, as was increased recruitment.

Figure 5.2:
Substantial Skill Gaps in Current Workforce-Action Taken
(England, Process Industries)



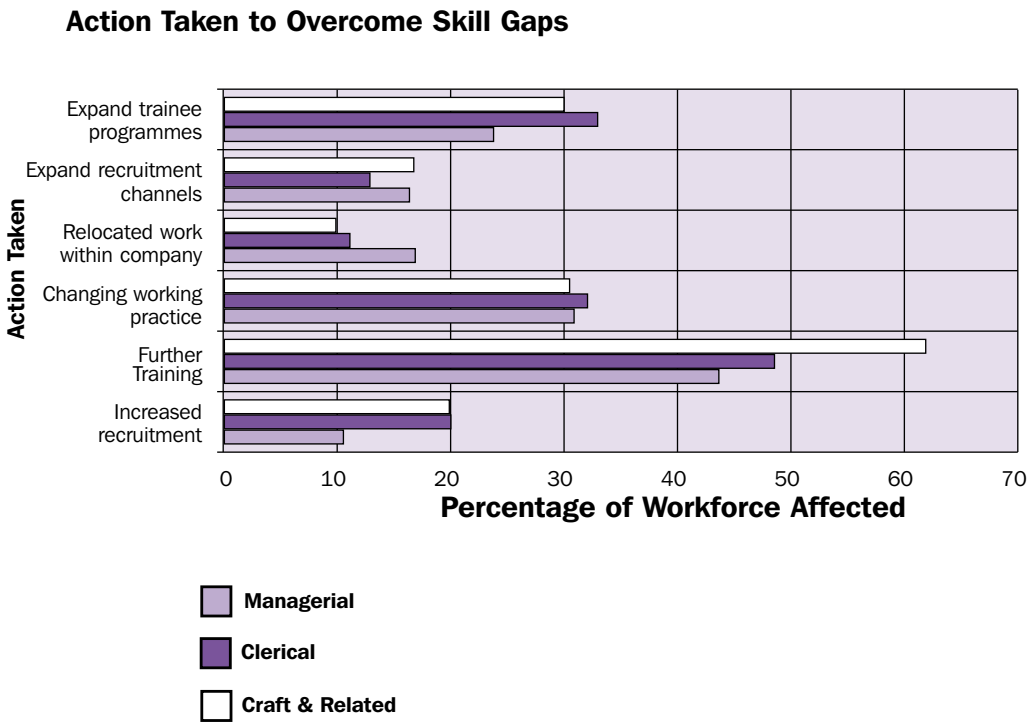
Source: ESS 2001

Table 5.18
Substantial Skill Gaps in Current Workforce - Action taken to overcome them
(England, Process industries, all occupations, percentage of industry workforce affected)

Action Taken	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans-port	Process Industries
Increased recruitment	23.1	14.7	14.1	23.2	1.9	21.5	17.5
Further training	70.8	50.3	64.2	71.5	70.8	57.9	60.4
Changed working practice	42.1	19.8	28.1	56.3	26.0	37.2	32.2
Relocated work within company	25.1	10.1	13.2	11.8	32.6	12.7	13.3
Expand recruitment channels	19.1	15.4	11.4	26.1	2.7	20.6	17.0
Expand trainee programmes	38.2	17.9	27.0	43.1	27.4	33.0	28.3

Source: ESS 2001

Figure 5.3:
Action Taken to Overcome Substantial Skill Gaps in Current Workforce - Main Occupational Groups
(England, Process Industries, Main Occupational Groups)



Source: ESS 2001

Recognition of the problem and identification of the critical areas goes a substantial way towards being able to respond to skill gaps. However, the problem may be compounded by the attitude of some firms to staff development. For example, in the Fuel industry employers were more likely to try and recruit specialist skills from the labour market rather than invest in growing their own and this implies making individuals more responsible for their own development rather than relying on the employer. This would correspond with the finding in the Paper industry that around 45 per cent of firms had no planned process in place for identifying the learning and development needs of their staff or the situation in Refractories where the *Foresight Report* claimed that at least half the industry firms had no systematic and planned approach to training and development linked to business goals.

Some firms have had to look at tackling the skill gaps by internal measures such as creating more versatile workers, rewarding this versatility through the pay structure. However, this runs into problems some firms have with releasing staff for training, shouldering the cost and having to plan for the changes which are all real obstacles to staff development.

5.5 Summary of Key Issues

- The proportion of establishments in the process industries reporting hard-to-fill vacancies, skill shortages or skill gaps was relatively small. Skill shortages, were evident in just 3.6 per cent of establishments and skill gaps in 6 per cent;
- The incidence of skill related hard-to-fill vacancies were found most in craft and related occupations and operative/assembly jobs;
- The problem of skill shortages is not uniform across the country and in England overall, around 23 per cent of all vacancies were considered to be of the skill shortage variety, but this figure was exceeded in six regions, the highest being in the South West (28.2 per cent). Regions such as the North West and Yorkshire & Humberside had lower figures;
- In four of the industries most of the SRHTF vacancies were in craft and related occupations. In Chemicals, etc, the largest group was in the operative/assembly occupations and this was also the case in Transport;
- Despite the need to tackle key and basic skill gaps, employers tended to put job specific skills above all other requirements;
- Increasing the salaries on offer to attract new entrants and stepping up recruitment activity were the most popular ways to tackle skill shortages;
- There are clear signs that the problem of inadequate basic skills among current workforces is being recognised as a current and potential problem;
- Overall the largest firms (i.e. with 1000 or more employees) in the process industries were more affected by skill shortages which may suggest that they have problems dealing with the scale of the problem;
- The regional incidence of skill shortages varied from a high of 62.9 per cent in the South West, to a low of just 4.3 per cent in the North West. For skilled and related the differences were less pronounced with variations from a high of 48.4 per cent (Yorkshire & Humberside) to a low of 13.8 per cent in the North West;
- In the process industries as a whole, the main skill gaps were in communication, management, and advanced IT/software development and to a great extent these were replicated across the industries, though with some differences;
- Training is the obvious way to address skill gaps and changing working practices to accommodate the gaps was another response affecting around one third;
- Recognition of the problem and identification of the critical areas goes a substantial way towards being able to respond to skill gaps. However, the problem may be compounded by the negative attitude of some firms to structured staff development.

Annex B1

Industry definitions based on SIC92 as used in the major statistical sources

Manufacture of metal products (not including manufacture of machinery and equipment)

SIC 92	Description
27.1	Manufacture of basic iron and steel and ferro-alloys (ECSC)
27.2	Manufacture of tubes
27.3	Other first processing of iron and steel and production of non ECSC ferro-alloys
27.4	Manufacture of basic precious and other non-ferrous metals
27.5	Casting of metals
28.1	Manufacture of structured metal products
28.4	Forging, pressing, stamping and roll forming of metal; powder metallurgy
28.5	Treatment and coating of metals; general mechanical engineering
28.7	Manufacture of other fabricated metal products
37.1	Recycling of metal waste and scrap

Construction and manufacture of non-metallic products

SIC 92	Description
26.2	Manufacture of non-refractory ceramic goods other than for construction purposes; Manufacture of refractory ceramic products
26.3	Manufacture of ceramic tiles and flags
26.4	Manufacture of bricks, tiles and construction products, in baked clay
26.5	Manufacture of cement, lime and plaster
26.6	Manufacture of articles of concrete, plaster and cement
26.7	Cutting, shaping and finishing of stone
26.8	Manufacture of other non-metallic mineral products
45.2	Building of complete constructions or parts thereof; civil engineering
45.3	Building installation

Wholesale and retail trade and manufacture of coke, refined petroleum and nuclear fuel

SIC 92	Description
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and natural gas extraction excluding surveying
23.1	Manufacture of coke oven products
23.2	Manufacture of refined petroleum products
50.2	Maintenance and repair of motor vehicles
50.5	Retail sale of automotive fuel
51.1	Wholesale on a fee contract basis
51.5	Wholesale of non-agricultural intermediate products, waste and scrap

Manufacture of chemical products, rubber, plastic and other wood products, etc

SIC 92	Description
20.5	Manufacture of other products of wood, manufacture of articles of cork, straw and plaiting materials
24.1	Manufacture of basic chemicals
24.2	Manufacture of pesticides and other agro-chemical products
24.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
24.5	Manufacture of soap and detergents, cleaning and polishing preparations
24.6	Manufacture of other chemical products
25.1	Manufacture of rubber products
25.2	Manufacture of plastic products
26.1	Manufacture of glass and glass products
37.2	Recycling of non-metal waste and scrap
73.1	Research and experimental development on natural sciences and engineering
74.3	Technical testing and analysis

Manufacture of pulp and paper

SIC 92	Description
21.1	Manufacture of pulp, paper and paperboard
21.2	Manufacture of articles of paper and paperboard

Transport by land and by pipelines and cargo handling

SIC 92	Description
60.2	Other land transport
60.3	Transport via pipelines
63.1	Cargo handling and storage
63.2	Other supporting transport activities

Industry definitions based on SIC92 as used in the IER Projections statistics

Manufacture of metal products (not including manufacture of machinery and equipment)

SIC 92	Description
27	Manufacture of basic metals
28	Manufacture of fabricated metal products, except machinery and equipment

Construction and manufacture of non-metallic products

SIC 92	Description
26	Manufacture of other non-metallic mineral products

Wholesale and retail trade and manufacture of coke, refined petroleum and nuclear fuel

SIC 92	Description
23	Manufacture of coke, refined petroleum products and nuclear fuel

Manufacture of chemical products, rubber, plastic and other wood products, etc

SIC 92	Description
24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
25	Manufacture of rubber and plastic products

Annex B2

Further Statistical Tables

1. Industry Structure

Table 1.1
Employment by Industry

(Employees, UK, 1999)

Industry	Total	Percent
Metals	464662	13.5
Non-metallics	1026340	29.8
Fuel	567212	16.5
Chemicals, etc	636384	18.5
Pulp and Paper	99602	2.9
Transport	644846	18.8
Process Industries	3439048	100.0

Source: Annual Business Inquiry, 1999

Table 1.2
Employment by Industry and Size

(Number of employees in each size of establishment band, UK,1999)

Industry	0-49	50-99	100-999	1000+	Total
Metals	219,067	67,392	154,427	23,776	464,662
Non-metallics	583,560	116,195	290,735	35,850	1,026,340
Fuel	420,349	46,217	83,686	16,960	567,212
Chemicals, etc	158,750	78,321	333,218	66,095	636,384
Pulp and Paper	25,847	17,549	56,206		99,602
Transport	276,310	92,047	239,433	37,056	644,846
Process Industries	1,683,879	406,451	1,168,979	179,739	3,439,048

Source: Annual Business Inquiry, 1999

Table 1.3
Employment by Industry and Size

(Proportion of employees in each establishment size band, UK, 1999)

Industry	0-49	50-99	100-999	1000+	Total
Metals	47.1	14.5	33.2	5.2	100.0
Non-metallics	56.9	11.3	28.3	3.5	100.0
Fuel	74.1	8.1	14.8	3.0	100.0
Chemicals, etc	24.9	12.3	52.4	10.4	100.0
Pulp and Paper	26.0	17.6	56.4		100.0
Transport	42.8	14.3	37.1	5.8	100.0
Process Industries	49.0	11.8	34.0	5.2	100.0

Source: Annual Business Inquiry, 1999

Table 1.4a
Employment by Occupational Group - Metals

(UK, 1999, Manufacture of metal products, etc*)

Occupational Group	Number	% of Industry	% All Industry
Corporate Managers	57247	10.4	9.7
Managers and Proprietors	4251	0.8	3.5
Science/Technical Professionals	18072	3.3	3.2
Health Professionals	272	0.1	0.9
Teaching/Research Professionals	2053	0.4	4.4
Business/Public Service Professionals	9053	1.6	2.6
Science Associate Professionals	8141	1.5	1.5
Health Associate Professionals	835	0.2	3.2
Protective Service Occupations	2702	0.5	1.0
Culture/Media/Sport Occupations	979	0.2	1.8
Business/Public Service Assoc Prof	21067	3.8	5.1
Admin & Clerical Occupations	26675	4.8	10.5
Secretarial & Related Occupations	10745	1.9	4.1
Skilled Agricultural Trades	1850	0.3	1.2
Skilled Metal/Electrical Trades	135906	24.6	5.6
Skilled Construction Trades	36906	6.7	3.6
Other Skilled Trades	4906	0.9	3.3
Caring Personal Service Occupations	1384	0.3	3.8
Leisure/Other Personal Service Occs	4890	0.9	2.0
Sales Occupations	4190	0.8	6.2
Customer Service Occupations	1081	0.2	0.4
Process Plant & Machine Operatives	75570	13.7	5.4
Transport Drivers and Operatives	38979	7.1	3.4
Elementary: Trades/Plant/Machinery	52051	9.4	3.7
Elementary: Clerical/Service	32708	5.9	9.8
All Occupations	**552513**	**100.0**	**100.0**

** Includes IER groups 17 and 18 (SIC92: 27, 28)*
Source: IER

Table 1.4b
Employment by Occupational Group - Non-metallics

(UK, 1999, Construction and Manufacture of non-metallic products*)

Occupational Group	Number	% of Industry	% All Industry
Corporate Managers	14745	10.1	9.7
Managers and Proprietors	1088	0.7	3.5
Science/Technical Professionals	3430	2.4	3.2
Health Professionals	72	0.1	0.9
Teaching/Research Professionals	513	0.4	4.4
Business/Public Service Professionals	1771	1.2	2.6
Science Associate Professionals	2405	1.6	1.5
Health Associate Professionals	655	0.4	3.2
Protective Service Occupations	943	0.6	1.0
Culture/Media/Sport Occupations	393	0.3	1.8
Business/Public Service Assoc Prof	5781	4.0	5.1
Admin & Clerical Occupations	9271	6.4	10.5
Secretarial & Related Occupations	3085	2.1	4.1
Skilled Agricultural Trades	6674	4.6	1.2
Skilled Metal/Electrical Trades	13010	8.9	5.6
Skilled Construction Trades	5493	3.8	3.6
Other Skilled Trades	6200	4.3	3.3
Caring Personal Service Occupations	475	0.3	3.8
Leisure/Other Personal Service Occs	1762	1.2	2.0
Sales Occupations	1454	1.0	6.2
Customer Service Occupations	414	0.3	0.4
Process Plant & Machine Operatives	22055	15.1	5.4
Transport Drivers and Operatives	13082	9.0	3.4
Elementary: Trades/Plant/Machinery	22055	15.1	3.7
Elementary: Clerical/Service	9015	6.2	9.8
All Occupations	**145841**	**100.0**	**100.0**

** Includes IER group 16 (SIC92: 26)*
Source: IER

Table 1.4c
Employment by Occupational Group - Fuel

(UK, 1999, Wholesale & Retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	Number	% of Industry	% All Industry
Corporate Managers	3566	11.9	9.7
Managers and Proprietors	178	0.6	3.5
Science/Technical Professionals	2521	8.4	3.2
Health Professionals	40	0.1	0.9
Teaching/Research Professionals	245	0.8	4.4
Business/Public Service Professionals	794	2.7	2.6
Science Associate Professionals	1097	3.7	1.5
Health Associate Professionals	87	0.3	3.2
Protective Service Occupations	319	1.1	1.0
Culture/Media/Sport Occupations	264	0.9	1.8
Business/Public Service Assoc Prof	1422	4.7	5.1
Admin & Clerical Occupations	2111	7.0	10.5
Secretarial & Related Occupations	819	2.7	4.1
Skilled Agricultural Trades	13	0.1	1.2
Skilled Metal/Electrical Trades	4522	15.1	5.6
Skilled Construction Trades	1788	6.0	3.6
Other Skilled Trades	162	0.5	3.3
Caring Personal Service Occupations	117	0.4	3.8
Leisure/Other Personal Service Occs	333	1.1	2.0
Sales Occupations	432	1.4	6.2
Customer Service Occupations	101	0.3	0.4
Process Plant & Machine Operatives	2767	9.2	5.4
Transport Drivers and Operatives	2390	8.0	3.4
Elementary: Trades/Plant/Machinery	1159	3.9	3.7
Elementary: Clerical/Service	2706	9.0	9.8
All Occupations	**29953**	**100.0**	**100.0**

** Includes IER group 12 (SIC92: 23)*
Source: IER

Table 1.4d
Employment by Occupational Group - Chemicals, etc

(UK, 1999, Manufacture of chemical products, rubber, plastic and other wood products, etc*)

Occupational Group	Number	% of Industry	% All Industry
Corporate Managers	27298	11.2	9.7
Managers and Proprietors	2018	0.8	3.5
Science/Technical Professionals	7806	3.2	3.2
Health Professionals	158	0.1	0.9
Teaching/Research Professionals	1316	0.5	4.4
Business/Public Service Professionals	4011	1.6	2.6
Science Associate Professionals	4004	1.6	1.5
Health Associate Professionals	617	0.3	3.2
Protective Service Occupations	1132	0.5	1.0
Culture/Media/Sport Occupations	314	0.1	1.8
Business/Public Service Assoc Prof	11769	4.8	5.1
Admin & Clerical Occupations	13850	5.7	10.5
Secretarial & Related Occupations	5109	2.1	4.1
Skilled Agricultural Trades	3210	1.3	1.2
Skilled Metal/Electrical Trades	18605	7.7	5.6
Skilled Construction Trades	7592	3.1	3.6
Other Skilled Trades	7725	3.2	3.3
Caring Personal Service Occupations	1628	0.7	3.8
Leisure/Other Personal Service Occs	3217	1.3	2.0
Sales Occupations	2090	0.9	6.2
Customer Service Occupations	663	0.3	0.4
Process Plant & Machine Operatives	50359	20.7	5.4
Transport Drivers and Operatives	23581	9.7	3.4
Elementary: Trades/Plant/Machinery	26675	11.0	3.7
Elementary: Clerical/Service	18403	7.6	9.8
All Occupations	**243150**	**100.0**	**100.0**

** Includes IER group 15 (SIC92: 25)*
Source: IER

Table 1.5
Employment by Gender

(UK, percentage of total workforce, Autumn figures)

Industry	Male		Female	
	1995	2001	1995	2001
Metals	85.5	84.5	14.5	15.5
Non-metallics	75.6	79.4	24.4	20.6
Fuel	83.8	84.4	16.2	15.6
Chemicals, etc	70.9	70.8	29.1	29.2
Pulp and Paper	76.3	73.0	23.7	27.0
Transport	85.4	82.8	14.6	17.2
All Process industries	80.5	79.8	19.5	20.2
All industries	**55.2**	**55.2**	**44.8**	**44.8**

Source: LFS

Table 1.6
Employment Change 1995-2001

(UK, employment in thousands, men and women, Autumn figures)

Industry	Employment		Change 1995-2001	
	1995	2001	Number	Percent
Metals	532	490	-42	-7.9
Non-metallics	131	97	-34	-26.0
Fuel	469	488	19	4.1
Chemicals, etc	732	742	10	1.4
Pulp and Paper	118	100	-18	-15.3
Transport	820	944	124	15.1
All Process industries	2803	2859	56	2.0
All industries	**25935**	**28064**	**2129**	**8.2**

Source: LFS

2. Changing Demand for Skills

Table 2.1a
Projected Employment Change by Occupational Group - Metals

(1999-2010, manufacture of metal products, etc*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All
Corporate Managers	10.4	46667	10.9	-18.5	8.3
Managers and Proprietors	0.8	3243	0.8	-23.7	-15.4
Science/Technical Professionals	3.3	16654	3.9	-7.8	28.2
Health Professionals	0.1	242	0.1	-11.0	38.9
Teaching/Research Professionals	0.4	1941	0.5	-5.5	21.3
Business/Public Service Professionals	1.6	7847	1.8	-13.3	36.7
Science Associate Professionals	1.5	5891	1.4	-27.6	0.3
Health Associate Professionals	0.2	687	0.2	-17.7	25.0
Protective Service Occupations	0.5	2521	0.6	-6.7	20.3
Culture/Media/Sport Occupations	0.2	848	0.2	-13.4	29.9
Business/Public Service Assoc Prof	3.8	17969	4.2	-14.7	26.1
Admin & Clerical Occupations	4.8	19352	4.5	-27.5	5.5
Secretarial & Related Occupations	1.9	6287	1.5	-41.5	-9.0
Skilled Agricultural Trades	0.3	1274	0.3	-31.1	-11.7
Skilled Metal/Electrical Trades	24.6	102697	23.9	-24.4	-7.4
Skilled Construction Trades	6.7	26921	6.3	-27.1	-6.5
Other Skilled Trades	0.9	4028	0.9	-17.9	2.3
Caring Personal Service Occupations	0.3	1221	0.3	-11.8	45.5
Leisure/Other Personal Service Occs	0.9	4106	1.0	-16.0	31.1
Sales Occupations	0.8	3006	0.7	-28.3	10.1
Customer Service Occupations	0.2	739	0.2	-31.6	5.6
Process Plant & Machine Operatives	13.7	57629	13.4	-23.7	-8.4
Transport Drivers and Operatives	7.1	31194	7.3	-20.0	2.4
Elementary: Trades/Plant/Machinery	9.4	44210	10.3	-15.1	-2.2
Elementary: Clerical/Service	5.9	21653	5.0	-33.8	-5.7
All Occupations	**100.0**	**428827**	**100.0**	**-22.4**	**7.7**

** Includes IER groups 17 and 18 (SIC92: 27,28)*
Source: IER

Table 2.1b
Projected Employment Change by Occupational Group - Non-metallics

(1999-2010, construction and manufacture of non-metallic products*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All
Corporate Managers	10.1	11710	10.6	-20.6	8.3
Managers and Proprietors	0.7	777	0.7	-28.6	-15.4
Science/Technical Professionals	2.4	2905	2.6	-15.3	28.2
Health Professionals	0.1	67	0.1	-6.9	38.9
Teaching/Research Professionals	0.4	492	0.4	-4.1	21.3
Business/Public Service Professionals	1.2	1583	1.4	-10.6	36.7
Science Associate Professionals	1.6	1947	1.8	-19.0	0.3
Health Associate Professionals	0.4	463	0.4	-29.3	25.0
Protective Service Occupations	0.6	905	0.8	-4.0	20.3
Culture/Media/Sport Occupations	0.3	278	0.3	-29.3	29.9
Business/Public Service Assoc Prof	4.0	4833	4.4	-16.4	26.1
Admin & Clerical Occupations	6.4	6603	6.0	-28.8	5.5
Secretarial & Related Occupations	2.1	1720	1.6	-44.2	-9.0
Skilled Agricultural Trades	4.6	4405	4.0	-34.0	-11.7
Skilled Metal/Electrical Trades	8.9	9782	8.8	-24.8	-7.4
Skilled Construction Trades	3.8	4225	3.8	-23.1	-6.5
Other Skilled Trades	4.3	3799	3.4	-38.7	2.3
Caring Personal Service Occupations	0.3	396	0.4	-16.6	45.5
Leisure/Other Personal Service Occs	1.2	1863	1.7	5.7	31.1
Sales Occupations	1.0	974	0.9	-33.0	10.1
Customer Service Occupations	0.3	275	0.2	-33.6	5.6
Process Plant & Machine Operatives	15.1	16987	15.4	-23.0	-8.4
Transport Drivers and Operatives	9.0	10272	9.3	-21.5	2.4
Elementary: Trades/Plant/Machinery	15.1	17283	15.6	-21.6	-2.2
Elementary: Clerical/Service	6.2	6013	5.4	-33.3	-5.7
All Occupations	**100.0**	**110557**	**100.0**	**-24.2**	**7.7**

** Includes IER group 16 (SIC92: 26)*
Source: IER

Table 2.1c
Projected Employment Change by Occupational Group - Fuel

(1999-2010, wholesale & retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All
Corporate Managers	11.9	3099	12.3	-13.1	8.3
Managers and Proprietors	0.6	140	0.6	-21.3	-15.4
Science/Technical Professionals	8.4	2445	9.7	-3.0	28.2
Health Professionals	0.1	39	0.2	-2.5	38.9
Teaching/Research Professionals	0.8	246	1.0	0.4	21.3
Business/Public Service Professionals	2.7	788	3.1	-0.8	36.7
Science Associate Professionals	3.7	904	3.4	-17.6	0.3
Health Associate Professionals	0.3	79	0.3	-9.2	25.0
Protective Service Occupations	1.1	341	1.4	6.9	20.3
Culture/Media/Sport Occupations	0.9	277	1.1	4.9	29.9
Business/Public Service Assoc Prof	4.7	1294	5.1	-9.0	26.1
Admin & Clerical Occupations	7.0	1374	5.5	-34.9	5.5
Secretarial & Related Occupations	2.7	437	1.7	-46.6	-9.0
Skilled Agricultural Trades	0.1	11	0.1	-15.4	-11.7
Skilled Metal/Electrical Trades	15.1	3704	14.7	-18.1	-7.4
Skilled Construction Trades	6.0	1378	5.5	-22.9	-6.5
Other Skilled Trades	0.5	113	0.4	-30.2	2.3
Caring Personal Service Occupations	0.4	99	0.4	-15.4	45.5
Leisure/Other Personal Service Occs	1.1	315	1.3	-5.4	31.1
Sales Occupations	1.4	325	1.3	-24.6	10.1
Customer Service Occupations	0.3	61	0.2	-39.6	5.6
Process Plant & Machine Operatives	9.2	2351	9.3	-15.0	-8.4
Transport Drivers and Operatives	8.0	2112	8.4	-11.6	2.4
Elementary: Trades/Plant/Machinery	3.9	1205	4.8	4.0	-2.2
Elementary: Clerical/Service	9.0	2026	8.1	-25.1	-5.7
All Occupations	**100.0**	**25163**	**100.0**	**-16.0**	**7.7**

** Includes IER group12 (SIC92: 23)*
Source: IER

Table 2.1d
Projected Employment Change by Occupational Group Chemicals, etc

(1999-2010, manufacture of chemical products, rubber, plastic and other wood products*)

Occupational Group	% 1999	Number 2010	% 2010	% Change	% All
Corporate Managers	11.2	24507	11.5	-10.2	8.3
Managers and Proprietors	0.8	1651	0.8	-18.2	-15.4
Science/Technical Professionals	3.2	7791	3.7	-0.2	28.2
Health Professionals	0.1	168	0.1	6.3	38.9
Teaching/Research Professionals	0.5	1442	0.7	9.6	21.3
Business/Public Service Professionals	1.6	3953	1.9	-1.4	36.7
Science Associate Professionals	1.6	3339	1.6	-16.6	0.3
Health Associate Professionals	0.3	581	0.3	-5.8	25.0
Protective Service Occupations	0.5	1216	0.6	7.4	20.3
Culture/Media/Sport Occupations	0.1	308	0.1	-1.9	29.9
Business/Public Service Assoc Prof	4.8	11274	5.3	-4.2	26.1
Admin & Clerical Occupations	5.7	11905	5.6	-14.0	5.5
Secretarial & Related Occupations	2.1	3652	1.7	-28.5	-9.0
Skilled Agricultural Trades	1.3	2545	1.2	-20.7	-11.7
Skilled Metal/Electrical Trades	7.7	15626	7.3	-16.0	-7.4
Skilled Construction Trades	3.1	6070	2.9	-20.0	-6.5
Other Skilled Trades	3.2	6129	2.9	-20.7	2.3
Caring Personal Service Occupations	0.7	1733	0.8	-6.4	45.5
Leisure/Other Personal Service Occs	1.3	3402	1.6	5.8	31.1
Sales Occupations	0.9	1740	0.8	-16.7	10.1
Customer Service Occupations	0.3	551	0.3	-16.9	5.6
Process Plant & Machine Operatives	20.7	42614	20.0	-15.4	-8.4
Transport Drivers and Operatives	9.7	20688	9.7	-12.3	2.4
Elementary: Trades/Plant/Machinery	11.0	24323	11.4	-8.8	-2.2
Elementary: Clerical/Service	7.6	15601	7.3	-15.2	-5.7
All Occupations	**100.0**	**212809**	**100.0**	**-12.5**	**7.7**

** Includes IER group 15 (SIC92: 25)*
Source: IER

Table 2.2a
Projected New Entrants by Main Occupational Groups - Metals

(UK, 1999-2010, manufacture of metal products,etc*)

Occupational Group	Empt 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	57247	-10580	5270	-5310
Managers and Proprietors	4251	-1008	-9021	-10029
Science/Technical Professionals	18072	-1418	5186	3768
Health Professionals	272	-30	-165	-195
Teaching/Research Professionals	2053	-112	-2530	-2642
Business/Public Service Professionals	9053	-1206	-47	-1253
Science Associate Professionals	8141	-2250	-4736	-5601
Health Associate Professionals	835	-148	-829	-977
Protective Service Occupations	2702	-181	-4512	-4693
Culture/Media/Sport Occupations	979	-131	-5021	-5152
Business/Public Service Assoc Prof	21067	-3098	14265	11167
Admin & Clerical Occupations	26675	-7323	4027	-3296
Secretarial & Related Occupations	10745	-4458	6930	2472
Skilled Agricultural Trades	1850	-576	987	411
Skilled Metal/Electrical Trades	135906	-33209	116991	83782
Skilled Construction Trades	36906	-9985	18631	8646
Other Skilled Trades	4906	-878	-12320	-13198
Caring Personal Service Occupations	1384	-163	-5518	-5681
Leisure/Other Personal Service Occs	4890	-784	-2145	-2929
Sales Occupations	4190	-1184	-3042	-4226
Customer Service Occupations	1081	-342	-11028	-11370
Process Plant & Machine Operatives	75570	-17941	47804	29863
Transport Drivers and Operatives	38979	-7785	17753	9968
Elementary: Trades/Plant/Machinery	52051	-7841	46859	39018
Elementary: Clerical/Service	32708	-11055	16644	5589
All Occupations	**552513**	**-123686**	**240429**	**116743**

** Includes IER Groups 17 and 18 (SIC92: 27, 28)*
Source: IER

Table 2.2b
Projected Replacement Demand by Occupational Group - Non-metallics

(1999-2010, construction and manufacture of non-metallic products*)

Occupational Group	Empt 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	14745	-3035	1521	1514
Managers and Proprietors	1088	-311	-2283	-2594
Science/Technical Professionals	3430	-525	496	-29
Health Professionals	72	-5	-55	-60
Teaching/Research Professionals	513	-21	-1061	-1082
Business/Public Service Professionals	1771	-188	-405	-593
Science Associate Professionals	2405	-458	-637	-1095
Health Associate Professionals	655	-192	15	-177
Protective Service Occupations	943	-38	-894	-932
Culture/Media/Sport Occupations	393	-115	-1528	-1643
Business/Public Service Assoc Prof	5781	-948	3602	2654
Admin & Clerical Occupations	9271	-2668	2827	159
Secretarial & Related Occupations	3085	-1365	1782	417
Skilled Agricultural Trades	6674	-2269	6324	4055
Skilled Metal/Electrical Trades	13010	-3228	8888	5660
Skilled Construction Trades	5493	-1268	1870	602
Other Skilled Trades	6200	-2401	1168	-1233
Caring Personal Service Occupations	475	-79	-1560	-1639
Leisure/Other Personal Service Occs	1762	101	-314	-213
Sales Occupations	1454	-480	-614	-1094
Customer Service Occupations	414	-139	-3289	-3428
Process Plant & Machine Operatives	22055	-5068	13328	8260
Transport Drivers and Operatives	13082	-2810	7124	4314
Elementary: Trades/Plant/Machinery	22055	-4772	20482	15710
Elementary: Clerical/Service	9015	-3002	3886	884
All Occupations	**145841**	**-35284**	**60671**	**25387**

** Includes IER Group 16 (SIC92: 26)*
Source: IER

Table 2.2c
Projected Replacement Demand by Occupational Group - Fuel

(1999-2010, wholesale & retail trade and manufacture of coke, refined petrol and nuclear fuel*)

Occupational Group	Empt 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	3566	-467	384	-83
Managers and Proprietors	178	-38	-542	-580
Science/Technical Professionals	2521	-76	1486	1410
Health Professionals	40	-1	-7	-8
Teaching/Research Professionals	245	-1	-95	-96
Business/Public Service Professionals	794	-6	151	145
Science Associate Professionals	1097	-193	397	204
Health Associate Professionals	87	-8	-45	-53
Protective Service Occupations	319	-22	-38	-16
Culture/Media/Sport Occupations	264	13	-83	-70
Business/Public Service Assoc Prof	1422	-128	1051	923
Admin & Clerical Occupations	2111	-737	816	79
Secretarial & Related Occupations	819	-382	503	121
Skilled Agricultural Trades	13	-2	-33	-35
Skilled Metal/Electrical Trades	4522	-818	3663	2845
Skilled Construction Trades	1788	-410	880	470
Other Skilled Trades	162	-49	-705	-754
Caring Personal Service Occupations	117	-18	-252	-270
Leisure/Other Personal Service Occs	333	-18	-44	-62
Sales Occupations	432	-107	75	-32
Customer Service Occupations	101	-40	-524	-564
Process Plant & Machine Operatives	2767	-416	1287	871
Transport Drivers and Operatives	2390	-278	1327	1049
Elementary: Trades/Plant/Machinery	1159	46	992	1038
Elementary: Clerical/Service	2706	-680	2171	1491
All Occupations	**29953**	**-4790**	**12814**	**8024**

** Includes IER Group 12 (SIC92: 23)*
Source: IER

Table 2.2d
Projected Replacement Demand by Occupational Group - Chemicals, etc

(1999-2010, manufacture of chemical products, rubber, plastic and other wood products, etc*)

Occupational Group	Empt 1999	Expansion Demand	Replace-ment Demand	Net New Entrant Needs
Corporate Managers	27298	-2791	4744	1953
Managers and Proprietors	2018	-367	-3842	-4209
Science/Technical Professionals	7806	-15	2347	2332
Health Professionals	158	10	-72	-62
Teaching/Research Professionals	1316	126	-1089	-963
Business/Public Service Professionals	4011	-58	-32	-90
Science Associate Professionals	4004	-665	-595	-1260
Health Associate Professionals	617	-36	-367	-403
Protective Service Occupations	1132	84	-2034	-1950
Culture/Media/Sport Occupations	314	-6	-2491	-2497
Business/Public Service Assoc Prof	11769	-495	8566	8071
Admin & Clerical Occupations	13850	-1945	1888	-57
Secretarial & Related Occupations	5109	-1457	2543	1086
Skilled Agricultural Trades	3210	-665	2719	2054
Skilled Metal/Electrical Trades	18605	-2979	12240	9261
Skilled Construction Trades	7592	-1522	2247	725
Other Skilled Trades	7725	-1596	-878	-2474
Caring Personal Service Occupations	1628	105	-2256	-2151
Leisure/Other Personal Service Occs	3217	185	-724	-539
Sales Occupations	2090	-350	-1259	-1609
Customer Service Occupations	663	-112	-6314	-6426
Process Plant & Machine Operatives	50359	-7745	39312	31567
Transport Drivers and Operatives	23581	-2893	14718	11825
Elementary: Trades/Plant/Machinery	26675	-2352	24279	21927
Elementary: Clerical/Service	18403	-2802	9955	7153
All Occupations	**243150**	**-30341**	**103604**	**73263**

** Includes IER Group 15 (SIC92: 25)*
Source: IER

3. Supply of Skills

Table 3.1
Students in Higher Education

(UK, selected subjects of study)

Subject of Study	Students 1996/1997	Students 1999/2000	Change Number	Change %
Chemistry	22679	20910	-1769	-7.8
Materials Science	687	340	-347	-50.5
Physics	14366	13150	-1216	-8.5
Geology	6636	6200	-436	-6.6
Environmental Science & Other physical sciences	15296	12940	-2356	-15.4
Mechanical Engineering	21900	22110	210	1.0
Chemical Engineering	6243	5650	-593	-9.5
Minerals Technology	867	680	-187	-21.6
Metallurgy	979	700	-279	-28.5
Ceramics and Glass	320	110	-210	-65.6
Polymers and Textiles	4733	3830	-903	-19.1
Other Materials Technology	2896	2370	-526	-18.2
All Subjects	**1756179**	**1856330**	**100151**	**5.7**

Source: HESA

Table 3.2
Students in FEFC Funded Provision - Enrolments

Selected Subjects

Subject	1996/97	1999/00	Change No	% Change
Physics	17520	19160	1640	9.4
Chemistry	23106	25865	2759	11.9
Environmental technology	3486	4526	1040	29.8
Mechanical, etc, engineering	63399	50284	-13115	-20.7
Materials technology	3072	3245	173	5.6
Other engineering	90672	69683	-20989	-23.1

Source: LSC (FEFC ISR)

Table 3.3
Barriers to Maintaining a Fully Proficient Workforce - Most significant Factors
(UK, Process Industries)

Percentage of workforce affected

Barrier/ Industry	Metals	Non-metallics	Fuel	Chemicals etc	Pulp & Paper	Trans port	All Process
Lack of funding	25.5	25.0	20.8	19.2	10.5	22.8	23.1
Lack of suitable courses relevant to grade	14.3	11.1	9.7	25.1	4.9	11.6	12.3
Lack of time for training	32.0	30.4	23.4	40.5	18.5	27.0	29.3
Lack of suitable course locally	11.6	9.2	19.0	18.8	5.4	9.3	12.3
No barriers	64.6	54.4	61.5	50.6	81.3	58.9	57.3

Source: ESS 2001

Table 3.4
Numbers in Employment Receiving Training

(UK, percentages of total employment receiving any training in the previous 13 weeks, men and women, Autumn figures)

Industry	1995	2001
Metals	13.9	16.8
Non-metallics	14.4	15.3
Fuel	17.3	21.7
Chemicals, etc	24.5	27.6
Pulp and Paper	16.9	20.0
Transport	12.2	16.4
All Process industries	16.9	20.4
All sectors	**22.9**	**28.1**

Source: LFS

Table 3.5
Off-the-job Training: Funding/Arranging for Employees
(England, Process Industries)

Percentage of all employees in the industry

Industry	% Reporting Yes	% Reporting No
Metals	38.7	61.3
Non-metallics	33.0	67.0
Fuel	30.0	70.0
Chemicals, etc	30.1	69.9
Pulp and Paper	23.8	76.2
Transport	21.1	78.9
All Process industries	**30.5**	**69.5**

Source: ESS 2001

Table 3.6
Off-the-job Training: Employees Participating
(England, Process Industries)

Percentage of all employees

Industry	None/DK	0-49%	50-100%	Total
A	62.8	26.2	11.0	100.0
B	68.7	9.7	21.6	100.0
C	71.2	15.0	13.8	100.0
D	72.1	17.7	10.2	100.0
E	76.9	17.8	5.3	100.0
F	80.1	9.4	10.5	100.0
All	**71.1**	**12.8**	**16.2**	**100.0**

Source: ESS 2001

4. Skill Imbalances

Table 4.1
Skill Related Hard-to-fill Vacancies by Region
(England, Process Industries)

SRHTF Vacancies as a percentage of all vacancies in firms reporting SRHTF vacancies

Region	SRHTF as % of All Vacancies
East Midlands	25.3
Eastern	26.6
London	24.6
North East	25.1
North West	15.4
South East	26.3
South West	28.2
West Midlands	20.6
Yorkshire & Humberside	15.3
England	**23.3**

Source: ESS 2001

Table 4.2
Substantial Skill Gaps in Current Workforce - Action taken to overcome skill gaps
(England, Process industries, Main occupation groups affected)

Percentage of workforce affected

Action Taken	Managerial	Clerical	Craft & Related
Increased recruitment	10.6	20.0	19.9
Further training	43.8	47.8	62.7
Changed working practice	31.2	32.3	30.8
Relocated work within company	16.5	11.4	10.0
Expand recruitment channels	16.3	12.8	16.8
Expand trainee programmes	24.8	32.3	30.0

Source: ESS 2001

Abbreviations

ABI	Annual Business Inquiry
ABPI	Association of the British Pharmaceutical Industry
DfES	Department for Education and Skills
DTI	Department for Trade and Industry
EEF	Engineering Employers' Federation
EFQM	European Foundation for Quality Management
EMDA	East Midlands Development Agency
EPIC	Extractive and Minerals Processing NTO
ES	Employment Service
ESS	Employers Skills Survey
FE	Further Education
FEFC	Further Education Funding Council
GCSE	General Certificate of Secondary Education
GDP	Gross Domestic Product
GNVQ	General National Vocational Qualification
HESA	Higher Education Statistics Agency
HTF	Hard-to-fill (Vacancies)
IER	Institute for Employment Research
ISR	Individual Student Record
IT	Information Technology
JSA	Job Seekers Allowance
LFS	Labour Force Survey
LSC	Learning and Skills Council
MICE	Metals Industry Competitive Enterprise
NTO	National Training Organisation
NVQ	National Vocational Qualification
OPITO	Oil and Gas Extraction NTO
PETC	Paper Education and Training Council
PINTO	Petroleum Industry National Training Organisation
PSG	Process Sectors Group - formally Process Industries NTO Group (PINTOG)
RBPTC	Refractories and Building Products Training Council
RDA	Regional Development Agency
SIC	Standard Industrial Classification
SME	Small and Medium Sized Enterprise
SOC	Standard Occupational Classification
SRHTF	Skills Related Hard-to-fill (Vacancies)
SSC	Sector Skills Council
SVQ	Scottish Vocational Qualification
TEC	Training and Enterprise Council

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