



SOLVING THE SKILLS GAP

Summary Report from the AIM/CIHE Management Research Forum



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1 Introduction

The fact that the UK has lower levels of productivity than some of our major competitors has been an issue for many years. The latest data suggest that we are not nearer a solution, but there is now a better appreciation of the multiple causes and recognition that skill deficiencies are but one factor. Employer decisions on investment in R&D, on products and processes and on where they position themselves in terms of their value added are all important. Nevertheless, skill gaps, skill shortages and latent skill shortages, at all levels, affect those decisions.

This report from The Advanced Institute of Management Research (AIM) and The Council for Industry and Higher Education (CIHE) seeks to contribute to our understanding of the issues. It reflects:

- an analysis by three AIM scholars of the key points they have found in the current academic literature;
- the discussion that took place at a joint Management Research Forum towards the end of 2003 between leaders from business and academia as well as practitioners and informed commentators from the USA, Germany and Scotland.

The report considers issues surrounding:

- the supply of skills
- the demand for skills
- the enablers and inhibitors to increasing the skill base
- the policy and research implications.

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2 Executive Summary

On 30th October 2003, at a joint Forum of the Advanced Institute of Management Research (AIM) and the Council for Industry and Higher Education (CIHE) academics, practitioners and policy makers discussed dimensions of the UK's skills challenge. This report, which summarises the discussions that took place at the Forum and grounds them in the academic literature, argues:

1. The skills challenge in Britain has persisted over the last three decades despite a raft of policies, suggesting that there is an inherent cultural or systemic problem.

- 8 million people in Britain lack basic skills, and nearly 7 million adults are functionally illiterate, with reading ages below that of the average 11 year old.
- International comparisons suggest that the UK is around the average for OECD countries with people qualified to NVQ level 2 and 3, but there are more older workers with these skills than younger workers (DTI, 2001; Campbell et al, 2001). The growth in the proportion of the workforce in the UK with level 2 or equivalent lags almost all the OECD countries (Campbell et al., 2001). The proportion of the 25-29 year olds who have completed secondary education is 64 percent compared to an OECD average of 72 percent. Out of the OECD countries the UK is ranked 16 out of 26 (OECD, 2001). Campbell et al. (2001) suggest that the UK's measure for (NVQ2) is lower than the French (baccalaureat), hence the UK's performance is even lower than it appears. Further, the UK performs poorly in terms of the literacy of those who have completed secondary education (OECD, 2001).
- A disparity with the US exists in terms of high level skills (23 percent in US v 15 percent in UK) and with Germany in terms of intermediate skills (55 percent in Germany v 30 percent in UK).
- This international disparity is particularly severe outside the South East of England – 21percent of employees are graduates in the South East versus 9 percent in the North East in 2000. The gap is also increasing – growth rates in terms of numbers of graduates between 2000 and 1993 were 7 percent in the South East, but only 2 percent in the North East.

2. In thinking about the skills challenge we need to distinguish between skills gaps, skills shortages and latent skills shortages. Skills gaps refer to skill deficiencies of employees, internal to a firm, hence working within the workplace. Skills shortages are defined as "a shortage of suitably skilled people available in the labour market" (p. 5 Skills Insight Annual Skills Review, 2001). Potentially the most significant problem is caused by latent skills shortages (Mayhew, 2003). These are unrecognised skills gaps because the organisation concerned has adapted to cope without the necessary skills (and potentially trapped itself in a low skills equilibrium). Some have argued that the phrase skills gap is misused, as for a gap to exist there has to be a mismatch between two things. Simply because the UK has 8 million people without basic skills does not mean there is a skills gap per se. Clearly there is a skill issue, but the question is whether this amounts to a gap. While this distinction is a valuable one this report seeks to reflect the discussion that took place at the Management Research Forum and, therefore, does not differentiate between skills gaps and skills issues.

3. The data suggest that particular skill gaps include:

- Basic skills (including literacy, language, numeracy and computer skills), which provide the foundation for further learning.
- Intermediate skills (associate professional, apprenticeship, technician, or skilled craft or trade level).
- Mathematics and other sciences – there is evidence that the skills mix may be wrong – physics, maths and chemistry A-levels have fallen by 30 percent, 10 percent and 10 percent respectively over the last decade, despite their link to IT. As a result the UK has increasingly relied on overseas workers – net importing 200,000 workers in 2002, many of whom have science and IT qualifications.
- Leadership and management skills.

4. There is also evidence of a generic skills gap (including wider personality traits, e.g. motivation, attitude to learning etc.,) - high demand from employers and potentially inadequate supply. The recent White Papers (e.g., "21st Century Skills – Realising Our Potential") and reports by CEML emphasise the importance of generic skills, especially leadership skills. The generic skills discussed in the CEML report include emotional intelligence, presentation and communication skills, prosocial behaviours (corporate citizenship), inter-personal and leadership skills. These have been found to relate to individual, unit and organisational performance.

5. The acquisition of generic skills may not be provided through traditional courses run by HE and FE institutions; they are most likely to be learnt through quality work experience and everyday interaction with work colleagues, such as informal learning and knowledge transfer. In addition it should be possible to modify the education methods adopted by HE and FE so that the development of appropriate generic skills increasingly becomes an integral part of the learning process.

6. All stakeholders have a role to play in meeting the skills problem, yet all parties are currently contributing to the problem and all parties appear to be blaming each other:

- HE and FE institutions express frustration regarding Government attempts to micro manage them.
- A mismatch is noticed between employers' and individuals' perceived skill needs, and the qualification offerings from publicly funded colleges and training providers.
- Data from the Learning and Sector Skills Council suggests that £23 billion is invested by businesses annually in education and training. Of this, £15 billion is spent externally, but less than £300 million is spent with HE and less than £50 million is spent with FE. Business leaders argue that the reason they spend so little with FE and HE is that these institutions are too slow and inflexible to satisfy their needs and are less able to offer short courses. Options for addressing this issue include technology, part-time and work-based learning and a national system for building learning credits.
- Some private and public sector organisations show a lack of understanding about why they should upgrade their products or processes to remain competitive and how a better skilled, trained and qualified workforce can improve their 'bottom line' performance; as a consequence, many head into a 'low skills equilibrium'.
- Some individuals show a lack of perception of how better skills, formal training and qualifications may support the achievement of their personal goals. Surveys reveal that the three most likely reasons as to why training is not taken up are: employees being too busy at work, believing that the training is not relevant to their job, and family/personal commitments outside work. In other words, employees report feeling too busy to attend training courses which are not seen as sufficiently relevant.

7. In developing policy it is important to distinguish between general, specific and transferable skills. General skills are those that are of value to everyone and it could therefore be argued that their provision should be funded by the state. Specific skills are of value to particular organizations in particular contexts and it could be argued that their provision should be funded by specific organisations. Transferable skills are of potential value to multiple employers and therefore make the employee more valuable. For this reason it could be argued that the individual should fund the provision of these skills.

8. The issue of return on skills is an important one to unpick. The traditional explanation for low skill levels in the British workforce was that there existed a set of cultural values: anti-education, anti-class, where the amateur was lauded and investment in skills discouraged (Wiener, 1981). However, a new paradox is emerging that whilst some significant skills deficiencies exist in the labour markets, there is increasing over-qualification in other areas, leading to a different set of concerns. In addition, Finegold and Soskice (1988) have argued that the decision of many British 16 year olds to leave school is perfectly rational in a system that offers little incentive for the many who do not qualify for higher education and where the increasing years of non-degree education result in no wage premium. Moreover, managers' decisions to adopt a "low road" to work organisation is perfectly rational given the short-term financial markets, adversarial industrial relations and poor supply of skills in the labour market (partly as a result of the decisions by the 16 year old school leavers). Hence, institutions within British society (government and non-government) reinforce a low demand for skills, where untrained managers run the majority of firms with workers who produce low quality goods and services. This is why Finegold and Soskice (1988) argued that Britain was trapped in a low skills equilibrium.

9. If you accept this argument then it becomes important to ask: do we want to escape from the low skills equilibrium and if so, how do we escape?

- The answer to the first question – do we want to escape – links back to the debate about the productivity gap debate. There is significant evidence that the UK lags behind its major competitors - the US, France and Germany in terms of productivity and that low skills contribute to this problem. Matched plant studies, for example, illustrate how in countries with higher skill (and productivity) levels firms are better able to adapt and exploit technology to boost productivity. In the UK, firms are reported to be more reluctant to invest in technology because UK workers lack the skills to maintain and upgrade it. Hence we are reported to have a greater reliance on low-tech (and low quality) methods of production. Macro evidence supports this by showing strong links between education and economic growth. Micro evidence also shows strong links between skills and firm level productivity (5 percent increase in skills raises firm productivity by 4 percent plus there are likely to be wider spillover benefits).
- The second question – how do we escape from the low skills equilibrium? – is therefore clearly a topic of great debate. Simply getting more people into higher education is inadequate. We need to focus on both holistic and specific issues, such as, moving firms up the value chain at the macro level to the specific skills needs of individuals and sectors at the micro level. The specific issues we need to consider:

Focusing on the supply of labour dimension (micro level issues)

- Age related dimension – research shows that younger, more highly motivated people tend also to be more willing to learn. There is a clear challenge in involving and motivating older workers.
- Early education – we need to find ways of instilling a love of learning into our children through their early education so they naturally become life-long learners.
- Social advantage – how to involve people from socially disadvantaged backgrounds (Community Colleges in the US have achieved a successful record of reaching out to disadvantaged groups, see the CIHE report, though they are currently suffering from high non-completion rates).
- Organisational dimension – organisations need to provide more and better quality training. The 1998 Workplace Employee Relations Survey, summarised by Cully et al (1999) highlight that training in Britain is at a low level. Four out of ten employees receive no training at all. According to the Adult Learning Inspectorate, 60 percent of work-based training in England is inadequate. Organisations also need to empower employees to use their skills. WERS 98 reveals that 27 percent of all employees have little or no influence over their work. In low skill occupations this rises to a staggering 80 percent.

Focusing on market and competitiveness dimensions (macro level issues)

- Regional dimension – data suggests that 7.2 percent of jobs in the North East require people with degrees compared with 23.3 percent in London for example.
- Sectoral dimension – clearly different sectors have different needs. Hence the establishment of Sector Skills Councils.
- There needs to be a clearer appreciation of the roles of universities, colleges and schools on the one hand and organisations on the other; it is not the role of the former to impart the work-specific learning and culture that the latter should provide.
- International competitiveness and value chain dimension – encouraging employers to compete globally, at a higher level in the value chain (i.e. on quality) requires changes in both product and market strategies. In time, this should result in a need for higher skills levels.
- Policy dimension – intervention from government on ways to encourage long-term R&D investment, bringing companies out of the short-term/quick return cycles.

10. We need to recognise that the skills required by firms are a function of other decisions they take. From an economics perspective, for example, it can be argued that firms have to choose where to position themselves on the high-low quality spectrum. This choice has implications for the kind of production and/or service delivery technologies they are likely to adopt, which in turn has implications for the levels of skills they will require (Mayhew, 2003).

11. One solution may be to increase the flow of students through more vocationally applied FE colleges. These have the advantages of being cheaper (sometimes apparently 50 percent less per student due to no/little research), more flexible, more local and there are more of them. They are better at reaching more disadvantaged students and so reducing inequality. Ways need to be found of providing them with more reliable labour market information and of engaging employers in a more integrated approach to work-based learning. Support is also essential to programmes such as the “Success for All” initiative aimed at improving and upgrading the standard of the HE product.

12. One concern is that recent evidence suggests that academic rather than vocational degrees have the greatest wage (and hence productivity) impact – potentially because academic skills provide the analytical capabilities and platform for ongoing learning of firm specific skills. However, this may be due to the lack of comparative evidence on the impact of vocational awards on wage levels. Since the same levels of retrospective data are not kept, comparisons of this kind should be interpreted with caution. One important feature of time series data, such as the link between academic degrees and wages, is that we cannot be sure this trend will continue in the future and whether employers will continue to demand academic over vocational qualifications. Deardon et al (2002) shows interesting data on wage returns for vocational training versus time needed to complete the qualifications. A key question therefore is not academic versus vocational, but rather how we equip people with learning strategies – learning how to learn. These learning strategies should not rule out the benefits of experiential learning within companies. Informal and work-based learning may be just as valid a learning method, even though it does not necessarily lead to accredited training and qualifications. It should be a priority to develop assessment systems for work-based learning and a coherent framework for qualifications and credits. All steps along the learning road have to be better recognised and valued.

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4 Preface

“The aim of this national Skills Strategy is to ensure that employers have the right skills to support the success of their businesses, and individuals have the skills they need to be both employable and personally fulfilled”.

Source: 21st Century Skills – Realising our Potential.

In October 2003 the Management Research Forum jointly organised by the Council for Industry and Higher Education (CIHE) and the Advanced Institute of Management Research (AIM) engaged more than 50 key players from all the different stakeholders of the envisioned Skills Alliance into a thoughtful and farsighted discussion on concrete actions, exemplars and experiences on “Solving the Skills Gap” from an international perspective (for a full list of delegates see Appendix 1).

A series of keynote presentations chaired by Richard Brown, Chief Executive of CIHE, provided insight in the nature of the UK skills and productivity gap and showed lessons learned and promising practices from an international perspective. Thus they set the scene for a farsighted and balanced discussion of key issues, chaired by Professor Anne S. Huff, Founding Director of the Advanced Institute of Management Research (For a detailed overview of the programme see Appendix 2).

4.1 Key Challenges

The key problems that were identified in the analysis of the skills challenge and published by the Department for Education and Skills in March 2003 can be summarised as follows (DfES, 2003a; 21st Century Skills, 2003):

- a. Employers feel they are not getting recruits with the right skills.
- b. Particular skills gaps are seen in:
 - i. Basic skills (including literacy, language, numeracy and computer skills), which provide the foundation for further learning.
 - ii. Intermediate skills (associate professional, apprenticeship, technician, or skilled craft or trade level).
 - iii. Mathematics.
 - iv. Leadership and management skills.
- c. A mismatch is noticed between employers’ and individuals’ perceived skill needs, and the qualification offerings from publicly funded colleges and training providers.
- d. Many private and public sector organisations show a lack of perception of how a better skilled, trained and qualified workforce can improve their ‘bottom line’ performance and, as a consequence, may head into a ‘low skills equilibrium’.
- e. Many individuals show a lack of perception of how better skills, training and qualifications may support the achievement of their personal goals.
- f. The way in which Government and its agencies approach skills and productivity issues are seen as incoherent by many employers and learners.
- g. The roles and responsibilities of the different stakeholders of the Skills Alliance are seen as unclear.

The issues are also recognized by the CBI and TUC, when in October 2001 they submitted their proposal “The UK Productivity Challenge” to the Productivity Initiative and stated the necessity of solving the skills gap, if the productivity gap was to be closed (CBI/TUC, 2001).

Figure 1 shows an attempt to quantify the perceived skills gap of the UK in comparison to the United States, France and Germany.

Figure 1: Labour force skills, total economy 1999 [Source: O’Mahony and De Boer, 2002]

<i>Labour force skills, total economy, 1999</i>			
<i>Percentage of the workforce with qualifications at levels:</i>			
	<i>Higher</i>	<i>Intermediate</i>	<i>Low</i>
<i>US</i>	<i>27.7</i>	<i>18.6</i>	<i>53.7</i>
<i>France</i>	<i>16.4</i>	<i>51.2</i>	<i>32.4</i>
<i>Germany</i>	<i>15.0</i>	<i>65.0</i>	<i>20.0</i>
<i>UK</i>	<i>15.4</i>	<i>27.7</i>	<i>56.9</i>

The UK shares the same position as France and Germany in terms of higher skills (relatively few people) and the same position as the US in terms of intermediate skills (relatively few people: see Figure 1).

4.2 How This Report was Devised

Three AIM Scholars from some of the leading UK’s Universities were selected to engage in the discussion at the Management Research Forum and subsequently to produce the report in collaboration with AIM staff. The people involved in the project include:

Dr. Nick Bloom, London School of Economics

Dr. Neil Conway, Birkbeck College

Dr. Kevin Mole, Warwick Business School

Dr. Kathrin Möslein, AIM Research Associate

Professor Andy Neely, AIM Deputy Director

Dr. Caitlin Frost, AIM Assistant Director

4.3 What The Report Contains

The overall objectives of the report are to:

Present additional research evidence on key issues concerning the skills gap in the UK.

Ground the discussion in current academic literature.

Present policy recommendations that could feed into the public discussion.

Present research recommendations that could feed into the deliberations of the ESRC’s research priorities board.

The report does not attempt to be a comprehensive nor systematic review of the literature in the field. However, it attempts to map the field in a way that gives a fresh perspective and moves forward the discussion on how to solve the skills gap.

5 Background to Skills and Productivity

Abstract

The term 'skills' is broad and all encompassing. Here a description of the various skills is given in order that the issues at hand may be discussed with clarity and accuracy.

The underlying link between economic growth and a skilled work force underlies any policy debate that can be had. If the link is clear, then the question to be asked is why do our competitors like the US and France, at times seemingly very different economic and social entities, both outperform the UK in terms of productivity. What is the missing ingredient? What is the skills mix? Is the UK setting itself up for further failure? A fairly technical exposition on the methods that can be used to measure productivity is included here. Two methods - the 'growth accounting' method and the direct estimation method - are discussed, along with their pros and cons. Boxed examples, anecdotes and background pieces are included to clarify and highlight ideas and provide further reference on the more difficult materials. This section considers successes also, albeit anecdotal, to give examples of what is being done well elsewhere as well as in the UK.

5.1 Defining Skills

5.1.1 Skills and Training

Much of the discussion about skills gaps assumes that training and skills are synonymous. For example the DfES report 'Developing a National Skills Strategy' suggests that the key to improving skills within work is through modern apprenticeships. Yet skills may be learnt through all sorts of avenues, students at Brunel University, for example, upon their arrival are given a list of skills and told which of these are likely to be imparted through their formal education and which they will have to find themselves.

Put simply skills are what an individual possesses and training refers to courses available to, if successful, impart skills to an individual. In a discussion of management training for example Deloitte, Haskins and Sells (1989) describe management training as 'the process by which managers acquire the knowledge and skills related to their work requirements by formal, structured or guided means' (1989: 3).

Many skills may be learnt informally and/or on-the-job; and it is often argued that this relates more to small firms (Wyn Griffiths, 2003). This is of course not always the case. Swindon's railway museum provides a striking example; the visitor is told how there was no formal training done in the making of steam engines by the Great Western Railway. It would appear that on-the-job, informal training is very much the tradition in the UK.

The work of the National Skills Task Force (NSTF) has done much to standardise skills terminology, seeking to differentiate between skills shortages and skills gaps.

Skills Shortages: a shortage of suitably skilled people available in the labour market (Skills Insight Annual Skills Review, 2001).

Skill shortages occur when firms cannot fill vacancies. Firms may declare skills shortages when in reality they are experiencing recruitment problems; through low wage offers, for example. Skill shortage vacancies are a sub-set of those vacancies that are hard-to-fill and one of three reasons for the difficulties to recruit were identified:

- Few applicants possess the right skills;
- Few applicants possess the experience that the company believes the position warrants; or
- Few applicants possess the qualifications that the company believes is needed (Campbell et al., 2001).

Hogarth et al. (2001) who undertook an Employer Skills Survey for the Department of Education suggest that 14 percent of employers had vacancies at the time of the survey and 8 percent had hard-to-fill vacancies, of those about half were related to skill. Thus 4 percent of firms faced skill shortages. Skill shortages affect a larger proportion of those firms that employ more than five people; however, with 6 percent of firms with more than five employees experiencing skill shortages at the time of the survey. Although these numbers seem small, skill shortages are present in one-in-five of all vacancies (Campbell et al., 2001).

Skills shortages should not therefore be confused with other recruitment difficulties, which are defined as:

Other recruitment difficulties: problems in filling advertised posts that are not related to skills but other factors such as: pay, conditions, and perceptions of and attitudes towards a particular industry or occupation.

Skills gaps refer to the situation where a firm has employees but they are not skilled enough to meet the organisations' objectives (Campbell et al., 2001).

Skills gaps: deficiencies between the skills of the current workforce and those required to meet business objectives.

These gaps are measured by asking employers about the expertise of their current staff. Hogarth et al., (2001) report that 7 percent of establishments reported a tightly defined measure of skills gaps where around one-third of the workforce in an occupation lacked skills. Skills gaps affect more employers than skill shortages and one-in-ten employers suffers either skills gaps or skill shortages (Campbell et al., 2001).

Latent skills gaps are the greatest worry according to Mayhew (2003). These are gaps that are not evident because the organisation has adjusted to living with low levels of skills in the workforce in a low skills equilibrium, and are unaware of what is holding them back. Finegold and Soskice (1988) popularised the low skills/low quality equilibrium where they argued that it is not enough to address the supply of skills because where employers perceive a low level of skills available in the workforce they will use technology that the lower skilled can utilise effectively. And, this technology is associated with lower specified products that are less differentiated and therefore result in greater price competition rather than competition on quality. There does appear to be a link between the organisation's ability to change and skills: for example Hogarth and Wilson (2001) report that those firms that had adopted new technologies or introduced new products were significantly less satisfied with the quality of their workforce.

Campbell (2001) believes that latent skills gaps can be measured with regard to three main elements, identified when a company tries to improve its position in terms of growth or market position. Their first two elements are "...skill levels needed to achieve 'best practice' and the perceived skill deficiency when best practice is achieved.". The third element is "...a range of skills are required in order to move from the existing situation to a high performance position i.e. there are 'transitional' skill requirements" (p. 187).

5.1.2 Generic Skills

Generic Skills: transferable employability skills used across a large number of different occupations.

'Generic' skills include work planning skills, problem-solving skills, communication and social skills, team working and computing. It is argued that because of the changes in the way that work is organised with more decisions taken lower down an organisation, these 'generic' skills are in greater demand (Institute for Employment Research 2001). Post-Fordist production, with greater complexity requires greater ('generic') skills throughout the organisation.

However, some of these 'generic' skills could be conceived of as personal characteristics (Stasz et al., 1996; Keep and Mayhew, 1999). The NSTF draw a distinction between generic and other types of skills, referring to 'personal attributes' rather than skills.

Personal attributes: the characteristics employers say they most often look for in an applicant when recruiting (e.g. motivation, judgement, leadership).

For example in a study of labour in stylish bars, hotels and retail in Glasgow, Nickson et al. (1998), found what was described as 'aesthetic' labour. The 'skills' that get you the jobs in this part of the labour market are physical appearance, a stylish haircut, good dress sense, appropriate accent and deportment, which within the UK at least may be related to class.

Cognitive skills, which may be another set of 'personal attributes', are again said to be growing in importance. Evidence from two longitudinal surveys of US high school students taken when they were twenty four years old matched students wages to their scores on a basic cognitive maths test taken when they were still at school. The results suggest that cognitive skills are of greater importance for the wages of the 1986 cohort than for the 1978 cohort, after controlling for qualifications (Murnane, Willett and Levy, 1995).

5.1.3 Recent Advances in the Study of Personal Attributes

Personal attributes include such things as emotional intelligence: an individual's ability to monitor their own and others' emotions, to discriminate between emotions, and to use this information to guide their thinking and action (Cacioppo and Gardner, 1999). It emerged as an area of investigation in the mid-90s as a contrasting idea to intelligence tests indexes, such as IQ, and several studies have now shown it to be an important determinant of occupational career and life success (Goleman, 1995; Mayer and Salovey, 1993). For example, Brackett and Mayer (2003) found emotional intelligence to significantly predict academic achievement.

There is an enormous literature relating to communication skills, documenting taxonomies of communication skills and texts on improving such skills. A communication skill with a long research tradition across a number of social sciences is that of perspective taking, or adopting another person's point of view. Perspective taking is likely to be important in modern organisations where the demand for flexibility from employees in terms of working cross-function and cross-project coupled with the expectation to work collaboratively in teams and understand the needs of clients and customers. Parker and Axtell (2001) demonstrate that perspective taking consists of the two important components of empathising with the other party, and making positive attributions about their behaviour (such as acknowledging the impact of external factor when things go wrong) and found that perspective taking positively influenced co-operative behaviours towards clients and customers in the UK manufacturing sector.

Finally, we turn to the skill of prosocial behaviours. Prosocial behaviours (also commonly referred to as organisational citizenship behaviours) have received a considerable amount of attention in organisational psychology and behaviour research in the last 20 years. Prosocial behaviours are defined as positive actions on the part of workers to improve their relationships with colleagues and organisational productivity that are above and beyond minimal contractual obligations and organisational requirements (Fields 2002). Prosocial behaviours are often seen as being discretionary on the part of the employee, not explicitly recognized by the organisation's formal reward system and, in aggregate, promote teamworking, and make the workplace easier to run.

The authoritative 1998 Workplace Employee Relations Survey (the survey results are summarised by Cully et al., 1999) is the largest survey of employee relations in Britain ever conducted including interviews with managers and worker representatives in over 3,000 workplaces and 30,000 employees. Data in Cully et al. (1999) study show 41 percent of organisations train employees in team-working, making team-working the fourth most likely type of training to be provided by organisations.

The range of prosocial behaviours, along with example items, is presented in Figure 2.

The evidence base for the effects of employee prosocial behaviour on individual, unit and organisational performance is impressive and increasing all the time (Organ and Payne, 1999). For example, prosocial behaviour has been found to relate to individual performance (Podsakoff, MacKenzie, Paine and Bachrach, 2000; Wang, Tsui, Zhang and Ma, 2003), unit performance (Karambaya, 1991) and organisational performance (Podsakoff, Ahearne and MacKenzie, 1997).

Figure 2: Types of Prosocial Behaviours [Source: adapted from Fields, 2002]

Loyalty (dedicated to serving the interests of the company as a whole and the values it embodies)

Representing the organisation favourably to outsiders

Defending the organisation against outside criticism

Participation (active and responsible involvement in the company)

Encouraging others to speak up at meetings

Cooperating well with others on projects

Altruism (helping a specific other person with an organisationally relevant task)

Helping others with heavy workloads

Helping other workers improve their productivity

Courtesy (aimed at preventing work-related problems with others occurring)

Respecting the rights and privileges of others

Trying to avoid creating problems for others

Voice (any attempt to change, rather than escape from, an objectionable state of affairs)

Making recommendations concerning issues that affect the employee's work group

Encouraging others to get involved in issues that affect the employee's work group

Taking Charge (challenging the present state of operations to bring about constructive change)

Trying to improve procedures for the work unit or department

Trying to change organisational rules or policies that are non-productive or counterproductive

5.1.4 General, Specific and Transferable Skills

Given that a person has skills then these may raise his or her potential productivity, if they are deployed in the 'right' way. But if one is to examine the factors surrounding who pays for skills then whether these skills are general, or specific to a particular firm is important. To take the capital analogy, some personal computers are fairly general, but a basic oxygen furnace is specific to steel-making. Consequently, the only buyers of this technology; should the firm hope to sell one, would be other steel firms; so the more specific the technology, the fewer the potential users of the technology with the most specific being useable only in one organisation. General skills are skills that are readily transferable between firms, for example basic maths. These may be useful for many employees. Stevens (1999) suggests that general skills include many of the occupational skills like managing a shop.

On the other hand, specific skills are only of value when you are employed with one firm. These would include the knowledge of the work setting, familiarity with one's co-workers, and know how of the particular production process that is unique to a firm. Informal learning plays an important role in this type of skill acquisition, and does not usually result in formal qualifications.

A third type of skill is the transferable skill (Stevens, 1994). These skills have value in more than one firm, but the number of firms where they are valuable may be small; the skills may be linked to a specialised technology; however, the distinction about these skills is that they are not valued in wages due to market imperfections and so it is unlikely that wage-earners would bear the costs of training. The NSTF identify these skills as vocational skills, which they define as:

Occupational or technical skills needed to work within an occupation or occupational group.

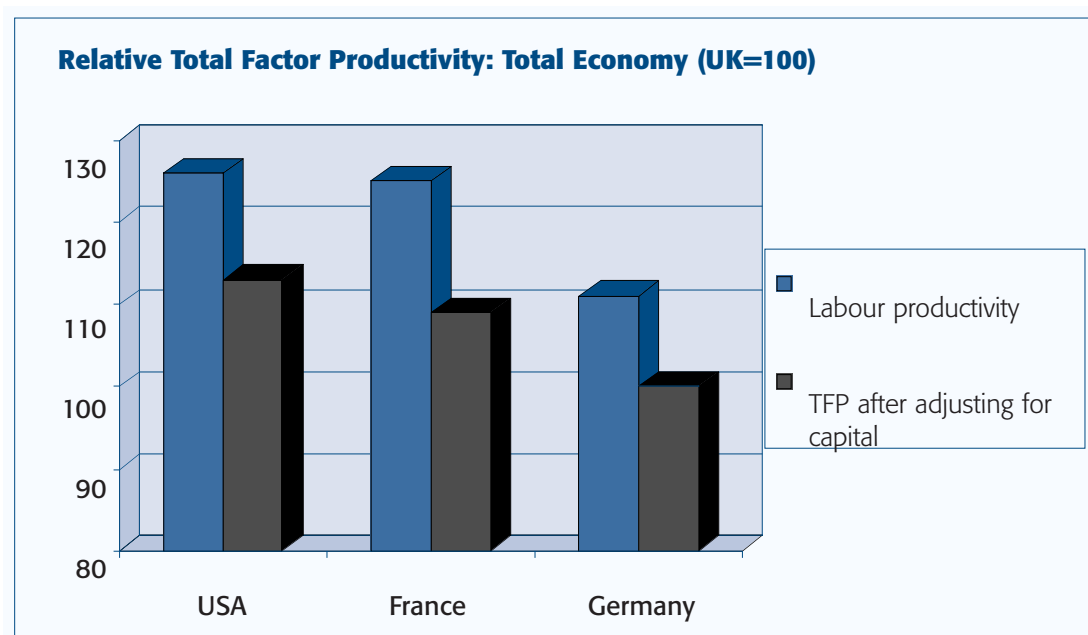
5.2 Skills and Productivity – The UK Context

5.2.1 Aggregate UK Comparisons

Better productivity is a key aspiration of the present UK government. As the Pre-Budget Report of 1998 put it *“Productivity...is a fundamental yardstick of economic performance. We are not as productive as our major partners and the extent of our under-performance is very substantial...tackling it must be a central national priority”* (HM Treasury, 1998, p.28).

Following this report is *“Productivity in the UK: The Evidence and the Governments Approach”*, (HM Treasury, 2000). One of the main conclusions of which is that the UK’s lower productivity is caused by a lack of skills.

Figure 3: TFP comparisons of UK, France, Germany and USA [Source: Crafts and O’Mahoney, 2001]



In their authoritative analysis of international productivity, Crafts and O’Mahoney (2001), note the Labour Productivity in the US, France and Germany were all significantly above the UK (see figure 3 above), of which the main contributor was capital intensity but skills shortages also played an important role. The indirect impact may be even larger as low skills in the UK have often been cited as a factor reducing capital investment since the returns are too low (Nickell and Nicolaitas 2000). Nickell and Nicolaitas (2000) show that a 10 percent rise in the number of companies in the firm’s industry that report a shortage of skilled labour cuts future investment by 10 percent. Unskilled workers are unable to use new machinery, so companies do not invest in modern equipment. So the contribution of low skills in the UK to the productivity gap versus her main G7 competitors is large.

Matched plant comparisons

The National Institute of Economic and Social Research (NIESR) have undertaken a series of highly informative UK, Europe and US matched plant studies. In this work they study productivity in a UK and an overseas factory within the same firm using the same production technique. This provides rich case study evidence on the drivers of low UK productivity.

In one study Mason et. al. cite the example of a biscuit manufacturer, producing both in the UK and in the Netherlands. The factory located in the Netherlands operated with high-tech multi linked conveyor belts. In the equivalent matched plant in the UK, this was not the case where instead, manual shifting of the product was the norm.

The reason given for the seemingly incongruous practise - the Dutch workers were generally higher skilled and hence able to use and repair the machinery in place whereas this was not the case in the UK. The biscuit producer hence continued with the manual methods in the UK factory rather than risk unnecessary downtime had they used the high-tech multi linked conveyor belts. Similar skills impacts are found in other studies by NIESR in the 1980's and 1990's on kitchen fixtures and engineering companies.

5.2.2 Opening the Black Box – Modelling Skills and Productivity

Robert Solow, the Nobel Prize winning economist, in his seminal 1956 paper, 'A contribution to the Theory of Economic Growth' (Solow, 1956) produced an elegant framework in which to think about productivity and economic growth.

Solow argued that in order for a country to increase it's output, and hence wealth, a possible measure that it could take was to increase it's savings rates as this would directly feed into investment and hence boost capital stock, hence increasing the country's wealth.

In fact, the crucial question that Solow's work highlighted was, not how we can increase the capital stock, but indeed how we can get more out of the stock of capital and people we already have. How can we increase the growth rate of the country? This difference may seem trivial, but the key point is that, an increase in capital stock implies a one-off increase in output, whereas an increase in the growth rate, implies a compound increase which carries on indefinitely.

Solow's view on this was that technological progress was given like 'manna from heaven'. This in effect meant that technology was 'out there' and countries had free and ready access to it. Hence the productivity levels were simply taken as given.

The break with this logic came somewhat later on, when economists began to notice persistent differences in growth rates in essentially similar countries (say within the OECD), even over long periods where Solow predicted convergence.

TWO WAYS OF MEASURING PRODUCTIVITY

What is Productivity?

In the skills context in which we are interested productivity can be defined as

$$\text{Productivity} = \text{Output} / \text{hours worked} \quad (1)$$

Or controlling for capital stock,

$$\text{Productivity} = (\text{Output} / \text{capital}) / \text{hours worked} \quad (2)$$

This is measuring the following:

Specification (1) measures how much output can be produced in a country for each hour worked. Hence a very productive workforce will produce more for each hour worked.

Specification (2) measures the same thing, but controls for capital. This means that if we could find two countries with the same ratio of output to capital (say perhaps Finland and Sweden), then we divide by hours worked we can determine how productive the workforce is.

The second specification allows one to remove the effects of capital. In the extreme consider a farmer with only a hoe and one with a tractor, clearly the one with a tractor will be more productive, regardless of who is more able or skilled. By removing the differences in capital stock, we then have a clearer measure of productivity.

How do we Measure Productivity?

Growth Accounting

When using Growth Accounting we assume that there is a production function of the form $Y=f(A,K,L)$, where A measures productivity, K the capital stock and L the labour force. All the components of the formula are found in national accounting data - except for the productivity measure A. Hence when comparing Y, K and L, there will typically be a discrepancy between the inputs (K and L) and the output (Y). This difference is classed as A, the productivity of the economy.

Direct Estimation

Again we used as a basis a production function, $Y=f(A,K,L)$. We typically assume what is called a Cobb-Douglas function (although this is not required for the result to hold) in the form $Y=AK^aL^b$. It has been found that the logarithm of this function fits well in the observed data, giving additionally a functional form that is easy to estimate. The new equation is then estimated as

$\log Y = \log(A) + b \log(K) + c \log(L)$. The residual of this econometric estimation is then the measure of productivity.

The new logic, which came to be known as endogenous growth theory, implied the following - although technology in a generic sense is out there, significant amounts of knowledge, skills and technology is not. It is bound up in people, systems, machinery, behaviour and indeed many other things.

Again this is intuitively sensible. We often seek out experienced people to work with us, we spend much time learning how to use technology (think computers for example) and we develop systems and codes that fit with our needs. In a generic sense it is all 'out there', implying that it can be bought or found. But from a practical point of view, it is not. The most advanced computer systems will be of no use in a third world country (where it would arguably do most good). It will fail because of lack of support systems, local know how, lack of other similar technologies and infrastructure.

This endogeneity of growth implied a number of things but the most relevant was that there was a role for policy in increasing growth rates. As with all things, the theory took on many facets of what the policy could be. There has been a multitude of ideas but many lead back to the necessary up-skilling of the workforce. The education of the workforce has come to be seen as the primary means by which governments can drive economic growth (Jones, 1998).

5.2.3 Impact of Education on Productivity – Macro Data

Studies from the 1990s (e.g. Jorgenson and Fraumeni, 1992 and Mankiw, Romer and Weil 1992) seem to point to the importance of factor intensities and accumulation, suggesting that prolonged accumulation of physical and human capital can play the major role in driving productivity. From the survey undertaken by Sianesi and Van Reenen (2002) the basic findings are that investments in human and physical capital account for most (83 percent) of US economic growth between 1948 and 1986. Growth in labour input in particular accounts for 61 percent of economic growth, of which less than half (42 percent) is due to increases in labour quality. Recent European Commission and OECD reports (1996), both claim that education and training are the principal means for dealing with current economic uncertainty, which will lead to the upgrading of the labour forces' skills level.

Focusing on the more homogeneous sample of OECD countries alone and using panel data, de la Fuente and Doménech (2000) find that the relative importance of human capital, via its impact on total factor productivity differences, is considerable and has been increasing over time to account for about one half of the observed productivity differentials.

It should be noted that these studies, however, focus on the macro role of education and human capital in explaining economic growth. The identification of this impact relies on levels estimation across countries relating levels of education with levels of productivity. There are two problems with this estimation approach as outlined by Ken Mayhew (2003):

Once country level fixed effects (idiosyncratic countries differences, i.e. work ethics, language, climate) are removed the impact of changes in education on changes in productivity weakens significantly. So once the country specific fixed effects are removed the relationship becomes far less clear – begging the question does human capital drive productivity or is some other variable correlated with both, like culture? To answer this question it is important to look at micro-data.

Estimations at the macro-level do not distinguish the gains going to firms and the gains accruing to workers. At one extreme wages fully reflect all skills so that workers fully benefit, leading to ample incentives to obtain education, but limited incentives for firms to train. At the other extreme wages do not provide any skills premium so that firms appropriate all the returns to human-capital, so the incentives are strong to train, but not to gain education. Again distinguishing this needs evidence from micro-data.

This last point also highlights a significant development caused by the trend of increasing levels of education on productivity. People with higher levels of education are holding jobs previously held by those with lower levels – such as school leavers. This phenomenon is known as 'Overeducation' (Borghans and de Grip, 2000). They believe there are two views used to explain this phenomenon, both resulting in pessimistic implications for the position of low-skilled workers. The first position is the 'overeducation' view, which sees people holding jobs where a lower level of education than their own is required. The second view is the upgrading view, where employers raise the entry levels required. Both views see low-skill workers as increasingly marginalised as their skill levels no longer meet the minimum requirement of the labour market.

There are other implications to overeducation than just marginalising low-skill workers, and these have serious implications for policy. Overeducation is known to affect worker turnover (Topel, 1986, Hersch, 1991), occupational choice (Viscusi, 1979), job satisfaction (Tsang and Levin, 1985), and mismatches in wages (Duncan and Hoffman, 1981; Hersch, 1991, Cohn and Khan, 1995; Van Smoorenburg and Van der Velden, 2000, Borghans and de Grip 2000). The wage effects of overeducation are usually stronger than the wage effects of undereducation (Stasz, 2001).

However, other authors point out that overeducation from both school leavers and graduates can be explained from the point of view of human capital theory, and reflects these workers' lack of work experience (Groot and Maassen van den Brink, 1996). This highlights the importance placed on work experience by employers and identifies other types of education – workplace learning and informal learning are important in this debate.

5.2.4 Estimated Impact of Skills on Productivity – Micro-Data

Impact of Skills on Wages

There is a huge literature examining the impact of skills and education on wages. Most of the studies looking at the private return to formal work-related training find that training results in workers receiving higher real wages. UK cross-sectional studies include Greenhalgh and Stewart (1987) who look at the 1975/76 National Training Survey, Booth (1991) who uses the 1987 British Social Attitudes Survey and Booth (1993) who looks at the 1987 British National Survey of 1980 graduates and diplomas.

Blundell et. al. (1996) use panel data from the British National Child Development Survey (NCDS) to look at the returns to different types of formal work-related training controlling for a host of individual and background characteristics. The authors find that formal work-related training has a significant impact on the earnings prospects of individuals, adding between 5 to 10 per cent to their real earnings over the ten years between 1981 and 1991. A recent example of a US study is that of Parent (1999) who uses NLSY panel data and finds significant returns to non-apprenticeship employer provided training of between 12 to 14 per cent. In both the Blundell et al (1996) study and the Parent (1999) study, more advanced statistical techniques are used to distinguish between cause and effect.

A recent paper by Jenkins, Vignoles, Wolf and Galindo-Rueda (2003) argues that despite the policy importance of lifelong learning, there is very little hard evidence from the UK on a) who undertakes lifelong learning, b) why, and c) the economic benefits of lifelong learning. They use a rich longitudinal panel data set to look at key factors that determine whether someone undertakes lifelong learning and then model the effect of the different qualifications acquired via lifelong learning on individuals' economic outcomes, namely wages and the likelihood of being employed. Those who left school with 'O' level qualifications or above were much more likely to undertake lifelong learning. Undertaking one episode of lifelong learning increased the probability of undertaking more lifelong learning. But they found little evidence of positive wage effects from lifelong learning. However, males who left school with only low-level qualifications do earn substantially more if they undertake a degree via lifelong learning. They also they found lifelong learning reduces the probability of being unemployed.

Although these studies are informative, they only tell half the story. The relationship between wage increases and productivity gains can vary according to the structure of the labour and product markets and according to whom actually pays the costs of training. In a simple neoclassical view of the labour market, where the market is perfectly competitive, wages will be equal to the value of marginal product. Thus the wage can be taken as a direct measure of productivity. However even in this case there can be a divergence between observed earnings and productivity if the employee receives an element of non-financial remuneration or, especially, if the employer is providing training but the employee is paying part or all of the costs of training. An employee may implicitly pay the costs of a training scheme to the employer in the form of lower wages whilst being trained, which then rise after training is completed. If this is the case, then we might see a greater increase in observed wages than in productivity due to training costs driving a wedge between (net) earnings and productivity.

Impact of Skills on Productivity

There is, however, very little empirical work on the impact of education, skills and training on directly measured productivity. The reason is that most datasets on these human capital variables are not matched up to firm level data, so that estimation is not possible. Instead micro studies typically concentrate on training and have found impacts of training on subjective measures of performance. In the US, Bartel (1995) found a significant relationship between formal on-the-job training and the subjective performance ratings of professional employees by using the 1986-1990 personnel records of a large US manufacturing company. Also on US data, Barron et al. (1989) find that a 10 per cent increase in training is associated with a 3 per cent increase in the growth of a subjective productivity scale, while Russel et al. (1985) find similar results for a sample of retail stores.

One general problem with these studies is that they use rather specific samples. Black and Lynch (1996, 1997 and 2001) have managed to construct a more representative sample of U.S. establishments matched to the LRD (Longitudinal Research Database, an administrative data source). In the cross section (Black and Lynch, 1996) they identified some effects of the type of training on productivity, but they found no effects at all when they controlled for plant specific effects (Black and Lynch, 1997 and 2001). Ichniowski et al. (1997) argue that training per se is likely to be less important than the overall combination of complementary human resource practices. They demonstrate this in their panel of steel finishing mills. Bartel (1995) does not find strong evidence of such interactions in his data, whilst Black and Lynch (2001) find that it is not whether a particular work practice is adopted, but how that practice is implemented, which is crucial to increasing productivity.

In very recent work Dearden, Reed and Van Reenen (2003) analyse a panel of British industries between 1983 and 1996. Training information, and other individual productivity indicators such as education, are derived from a question that has been asked consistently over time in the Labour Force Survey. This is combined with complementary industry-level data sources on value added, wages, labour and capital. They use a variety of panel data techniques to argue that training significantly boosts productivity, and that the existing literature has underestimated the full effects of training for two reasons. First, it has tended to treat training as exogenous whereas in reality firms may choose to re-allocate workers to training when demand (and therefore productivity) is low. Secondly, their estimates of the effects of training on wages are about half the size of the effects on industrial productivity. The effects are economically large. For example, they report that raising the proportion of workers trained in an industry by 5 percentage points (say from the average of 10 per cent to 15 per cent) is associated with a 4 per cent increase in value added per worker and a 1.6 per cent increase in wages!

Vocational skills – some early evidence

Perhaps surprisingly, the preliminary econometric evidence for the UK is that vocational skills have no significant impact on wages (and by presumption productivity) while academic skills have a significant effect. Studies by Sianesi (2003), McIntosh (2003) and Galindo-Rueda, Machin and Vignoles (2003) all report similar findings that vocational skills have no positive wage impact, although vocational training does help to reduce the probabilities of future unemployment.

One potential explanation is that vocational training is usually taken by (or perceived to be taken by) lower achievers, so that this may also be picking up a selection effect on unobserved ability. An alternative explanation is that employers want general 'flexible' skills that they can use as a base for future training. Either way this suggests caution in adopting a strongly vocational biased training program.

Dearden et al.'s work begins to highlight the problems with data generated using the economic perspective currently used as the norm for capturing data on skills acquisition, and the benefits of academic versus vocational training. The traditional unit of skills measurement is some indicator of educational attainment. Human capital models then search for patterns, relationships and links to economic performance. There are factors that impede the identification of links, and can be summarised as follows:

Equal investment in education can lead to different quantities of skills, and different values placed upon them – such as the difference between maths and art.

Mismatches in the labour market may lead to improper skills utilisation.

Education is an indicator of ability, rather than skills acquisition.

Both acquisition and depreciation of skills continues after formal schooling. Workplace learning, informal learning and apprenticeships lead to less easily codified skills acquisition.

These four factors alone cause noise in the links between education and economic performance, but this noise is greatly amplified if we try to generalise internationally and try to find comparable measures of education attainment. Thus, when using the economic perspective, there is a substantial gap in our knowledge of empirical relationships between education, skills and economic performance.

Some researchers are looking into these problems (Stasz, et al 1996, Elias and McKnight, 2001, Steedman and McIntosh (2001), and there seems to be some progress in identifying benefits of the sociocultural perspective (Greeno, 1998, Resnick, 1991, Scribner, 1984, Rogoff and Charajay, 1995) over the economic perspective. The problem with the sociocultural perspective lies in the nature of data collection (the unit of analysis is of interactive

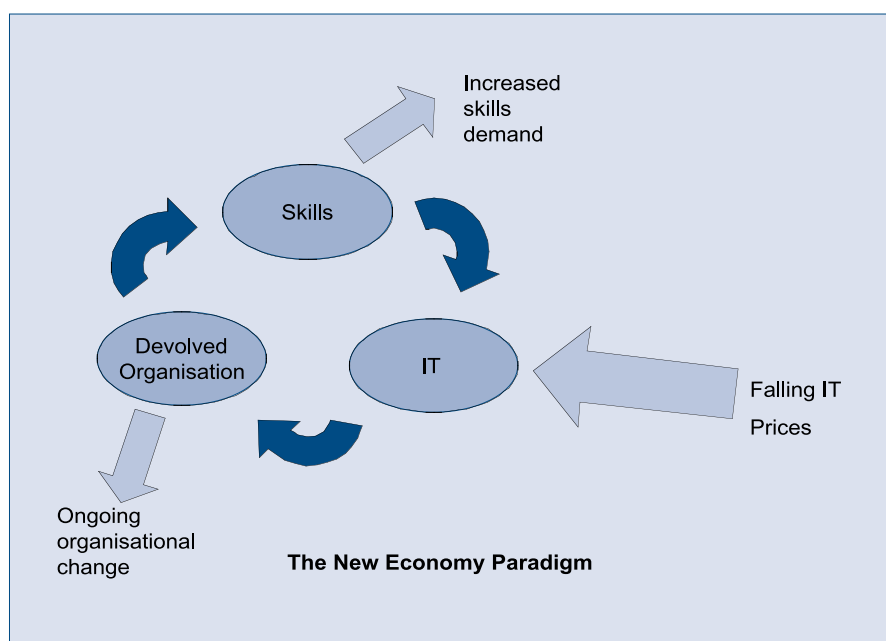
systems or social settings, and rarely rely on tests to measure skills – thus qualitative case study or ethnographic techniques are used to describe skill requirements). The sociocultural perspective does not attempt to assess direct relationships between skills and productivity. Faults with the economic perspective are that it uses one-dimensional quantitative indicators such as formal academic results as proxies for skills, and does not easily accommodate new concepts of skill requirement such as generic skills, work-related attitudes or even more formalised training (occupational and technical skills training).

The policy implications to these differences in research and data methods are that the merits of vocational over an academic training emphasis cannot be properly compared. Until such a time as the economic perspective can incorporate data on skills in a multidimensional format, or that sociocultural research is able to generalise out of the company level, data should be used with caution.

5.2.5 Organisation Structure, Management & ICT – An Emerging Hypothesis

Another recent strand of the literature emphasises the importance of complementary organisational changes and ICT for skills. Due to the rising importance of technology firms are increasing their demand for ICT, and to use this effectively they need to delayer and increase decision-making authority for lower level workers. The basic concept is that for workers to improve productivity using computers they need a greater extent of self-determination and less direct control (See Figure 4 below for a diagrammatic description of the above theory).

Figure 4: Effects of falling IT prices on organisational change and skills



Two influential studies (Bresnahan, Brynjolfsson and Hitt, 1999; Caroli and Van Reenen, 2000) examine the impact of ICT and organisational change in panels of US and UK & French firms respectively and confirm this hypothesis. In particular they find that organisational change, ICT and skills are all mutually complementary – when firms change one (typically investment in ICT), they tend to re-organize and upskill. The implications for the demand for skills are important in Europe as they suggest labour market flexibility is essential to use new technologies, and that these technologies are going to lead to an increasing demand for skills. Evidence also suggests that management skills are complementary with workforce skills, for example, in order to fully utilise highly trained graduates requires skilful management.

Other recent work between LSE and McKinsey's to evaluate the management practice of 100 firms in the UK, US, France and Germany finds management practice plays an important role in explaining productivity. A 10 percent increase in managerial practice is associated with a 5 percent increase in productivity. The US is significantly ahead of the UK on this measure of managerial skills, suggesting a 'managerial gap'. So this managerial practice variable may to some extent be capturing a managerial skills gap as well – suggesting multiple layer policy.

6 The Supply of Skills

Insight from the AIM Management Research Forum

The incentives gained from training are clearly a major factor affecting attending training programmes. Prospective trainees will inevitably ask "What's in it for me?" The case study of California Community Colleges highlighted value-for-money and the accreditation systems as two crucial factors.

Institutions can present the 'deal' offered to students in a number of ways. An approach used by Brunel University was to establish a teaching contract, setting out what the Brunel will offer students, and what it expects students to do in return.

6.1 The incentives and practicalities of training

As reflected in the observations above, when an individual seeks skills training with a supplier of skills they are essentially engaging in an exchange where they will provide such things as their time and money in exchange for a rewarding training experience. When entering such an exchange, likely questions both parties will ask are "What's in it for me?" and "What am I expected to do?"

One way of exploring this deal is through the concept of the psychological contract. The psychological contract has mainly been applied to the relationship between an employee and their employer. For example, it has been recently argued that one of the main ways to ensure skilled workers are retained by their organisations is to ensure careful management of employees' psychological contracts (Rousseau and Shperling, 2003). Psychological contract theory has also been applied to most types of exchange relationships, including the teacher-student relationship.

The psychological contract refers to the reciprocal expectations and obligations in the exchange between two parties. These obligations refer to both explicit written and verbal obligations and also to unwritten promises implied by the other party's behaviour or inferred from past practices and promises. For example, when an employee agrees to take part in a training programme, they might have expectations that the training will increase their employability, be relevant to their jobs, and indicate that the organisation values their contributions and is willing to invest in them. In return, the employee believes that he or she is expected to attend all parts of the training programme, be enthusiastic, apply what they have learnt to their jobs, not leave their positions immediately after training, and so on.

Research on the psychological contract has highlighted a number of important findings (e.g., Herriot and Pemberton, 1996; Robinson and Rousseau, 1994; Coyle-Shapiro, 2003; Rousseau, 2001) in terms of striking a good deal between parties to the contract:

- **Informing:** Each party informs the other of their needs and what they are prepared to offer.
- **Negotiating:** The employee and the organisation negotiate and agree what they are prepared to do for one another. In any negotiation, each party has the power to ask for terms deemed in one's interest without fear of negative repercussions from the other party and the right to consent or reject terms of the agreement.
- **Accuracy:** Accurate and agreed perceptions of the contract's terms and who is responsible for provided items.
- **Monitoring:** The parties to the contract monitor one another to ensure the contract is being kept and remains fair.
- **Renegotiating and exiting:** Successful renegotiations occur on an ongoing basis, or one of the parties decides to exit the relationship.
- **Openness:** The open sharing of information.
- **Justice and compensation:** If promises are broken for any reason, explanations should be provided and compensation offered.

The importance of consultation and negotiation should be emphasised. Findings from the 1998 Workplace Employee Relations Survey (Cully et al., 1999) show that the best way of securing training is through negotiations with their line manager or supervisor. For example, where such negotiations had taken place, 80 percent of employees had received some training in the past year, compared with 41 percent of employees who had not had discussions.

The Motivation to Train

Training motivation has been defined as the direction, effort, intensity, and persistence trainees apply to learning oriented activities before, during, and after training (Kanfer, 1991; Tannenbaum and Yukl, 1992). Trainees' motivation to learn and attend training affects skill acquisition and whether newly acquired skills, knowledge and abilities are applied on the job (Tannenbaum and Yukl, 1992).

Colquitt, LePine and Noe's (2000) review of 256 studies examining training motivation over the last 20 years demonstrated that training motivation is influenced by a set of individual, career and situational characteristics.

Individual characteristics positively influencing training motivation were high cognitive ability; a high internal locus of control (i.e., the extent to which a person believes events and outcomes are under their own control, as opposed to factors outside of their control); high self-efficacy (an individual's belief that that he or she is able to carry out a particular task successfully); high valence (i.e., the trainee places a high value on the training offered), low levels of anxiety; people who have a strong need to achieve generally in their lives; people who are generally conscientious; and younger individuals. Older workers consistently showed lower motivation.

Situational characteristics positively influencing training motivation were generally related to a supportive environment including supportive relationships with colleagues and line management.

Career related attitudes positively influencing training motivation were high organisational commitment, job involvement, career planning and career commitment.

Colquitt et al. (2000) and Salas and Cannon-Bowers (2001) derive a number of important implications from this integration of previous studies:

Evaluating trainee personality should become part of the person-analysis phase (i.e., an analysis of the strengths and limitations of the prospective trainee) of training needs assessment.

Trainers should aim to leverage trainee self-efficacy and the extent they value the training prior to the training. Suggested methods are demonstrating the behaviours and persuading trainees they can do it (i.e., modelling), and highlighting the benefits of training such as individual development and career prospects. For example, framing the training in desirable terms ('advanced' versus 'remedial') has been shown to influence trainee motivation (Quinones, 1995).

Greater sensitivity to the needs to older workers, especially when training content involves new technologies or methods (e.g., web-based training, virtual reality). There is a tremendous challenge posed by the two trends in organisations of an aging workforce and the increasing introduction of and reliance on new technology.

Measure the climate (i.e., is it supportive?) as part of the organisational analysis phase (i.e., how will the training facilitate the achievement of important organisational goals?) of the training needs assessment.

In addition to the issues raised above, a study of UK employees (CIPD, 2002) found that other commitments impacted training attendance, where the three most likely reasons provided as to why training was not taken up were being too busy at work, believing that the training was not relevant to their job, and family/personal commitments outside work. These findings emphasise a number of the factors highlighted by Colquitt, but also reveal that many employees report feeling simply too busy to attend training. Thus, it is also necessary to consider strategies that can release time for training (e.g., day-release).

6.2 Training for Generic Skills

A particularly relevant theoretical approach for training for generic skills is Bandura's model of social learning (1977, 1986). Bandura demonstrated that virtually all learning from first-hand experience can occur vicariously by observing how others behave. It is much more likely to be learned through organisational training programmes, and more likely still through everyday social interaction. There are a large number of studies that show support for social learning theories (for a recent example see Bommer, Miles and Grover, 2003). A recent survey by the UK's Chartered Institute of Personnel and Development (2002) of a sample of 793 employees showed that 65 percent of employees felt that being shown how to do things and then practicing them, especially from work colleagues, was rated as the best method of learning.

Two very important concepts in Bandura's (1996) social learning theory are firstly, modelling, where individuals develop their own patterns of behaviour by observing and copying the behaviour of others, and secondly, through self-regulation where individuals monitor their progress towards a goal, changing behaviour accordingly to ensure goals are met, and rewarding themselves when targets are met.

It is argued that if handled successfully social learning not only results in learning but also leads to increased self-efficacy (an individual's belief that that he or she is able to carry out a particular task successfully). Self-efficacy has been found to be a powerful predictor of performance in dozens of studies (e.g., Stajkovic and Luthans, 1998) and an extremely important concept in influencing motivation and performance.

Bandura has outlined a number of steps for increasing learning based on this theory including setting realistic goals which direct attention, sustain effort and provide milestones for success; ensuring effective role-modelling to teach people how to respond to a wide range of situations rather than specific scenarios; modelling to build self-confidence as well as to teach skills; ensuring newly acquired skills are tested in situations where there is little fear of mistakes, reprisal or appearing inadequate (role playing with instructive feedback is recommended); providing a 'transfer programme' so that acquired skills can be transferred to 'real-life' job situations; reward and positively reinforce learning back in the workplace. It is not clear as to the form in which informal skills are best acquired. This is explored in more detail in section 5.2.1.

Insight from the AIM Management Research Forum

Several of the case studies presented at the Forum highlighted how various ethnic, demographic, and economic factors were related with attending students and successful graduation/transfer. For example, considering California Community Colleges, while 32 percent of Californians are Chicano and Latino, only 13 percent of transfers to the University of California are Chicano and Latino. There are clearly many possible explanations for this, one that was raised was students motivation to attend and application towards courses.

6.2.1 Work-Based Learning - Applied and Informal Training

Work-based learning has long been recognised by the economics research perspective as an important way of generating more skilled workers (Rosen, 1972), but tends not to be reflected as a central driver in raising skills across the workforce. The academic and political debate concerning the development of human resource tends to focus almost exclusively on education and formal training. Researchers from the sociocultural perspective underscore the contextualised, situated nature of work as a social activity. They show that human choice, actions and other characteristics of the work all affect actual skill requirements, implying that some skills can only be learned on the job, and that these are taught in a different way (Stasz, 2001).

A growing body of research from labour economics, sociology, and management studies stress the indispensability of work-based learning. Streeck (1989) argued that work-based learning was necessary to provide socialisation of workers and the acquisition of skills that were hard or impossible to codify. Koike and Inoki (1990) argue that applied and informal learning are responsible for the high level of skill formation achieved by the Japanese, as over time, workers are able to acquire finer details of how technology operates in practice. Knowledge transfer takes the form of feedback and support from colleagues and supervisors. They are told when mistakes are made and given help to correct them. Over time, a worker moves on to more complex tasks, and in turn, mentors less experience employees.

Case studies have identified a series of processes utilised by workers perceived to have low levels of formal skills. Hirschhorn's 1984 study identified a diagnostic skill in operators of continuous processes where a 'fringe awareness' was needed by workers in order for them to remain aware of their environment and of any anomalous events within it, enabling them to take corrective action whilst still focusing on their primary objective. These findings were echoed in MacDuffie's 1995 study of the automobile industry, and internationally in the same industry Thompson et al. (1995), reported that new forms of production were creating demands for new skills, such as 'system skills' and behavioural or 'extra-functional' skills (p. 738).

Applied and informal learning occurs through many different processes such as job rotation, work experience and learning by doing. Apprenticeships are probably the UK's most common and traditional form of this type of learning, where the learner in a work setting, interacting with others who have already mastered the trade, acquires skills and knowledge through active participation. The learner internalised knowledge, which is 'discovered', 'transmitted' from others, or 'experienced' in interactions with others. Overall, applied and informal learning is distinct from formal training as the latter requires 'reproduction' of existing skills, and applied or informal learning is an 'expansion' of skills required to cope with the challenges in changing work environments (Green et al., 2001).

Many studies from the sociocultural perspective raise serious questions about the skill transfer assumption due to basic differences between formal knowledge and knowledge as applied in context (Lave, 1998, Rogoff and Lave, 1984, Scribner 1998). Scribner's (1984) study of mathematics at work within the context of dairy workers illustrates the point. The workers used their knowledge of the milk case size and physical space to make their work more efficient. Whilst the calculations they did were not recognisable as arithmetic, they still got reliable results. Her work highlighted the point that abstract and formal operations in taught mathematics are mediated by the instrument of physical objects of the environment (Alterman and Carpenter, 1998). Most importantly, the results of such studies raise questions about the validity of a 'mathematical toolbox' developed in school and taken into the workplace (Dowling, 1991).

These forms of skills acquisitions increase employability but do not have formal recognition and may go some way to explain the phenomenon of overeducation and its relation to low work experience. Many different activities involve a strong component of embedding tacit knowledge, picked up in everyday experience. Skills are developed in the context of day-to-day activities, but there must be the opportunity to practice them, and they must have the authority to make appropriate decisions. Forms of effective feedback need to be developed by both HR professionals, and line managers so that employees may develop these skills. Osterman (1994) points out that currently, it is only in workplaces where employees have the opportunity to practice and build these skills that we are likely to see their emergence (OECD, 1999).

An important question for policy makers is whether more educated workers acquire extra skills faster than less educated workers. In fact, recent research has found that with the exception of computing skills, there is some indication that less educated workers were indeed making up for this lower level by more work-based learning (Green et al., 2001).

"An implication for policy is that incentives and encouragement is needed to be given to employers to pay more attention to providing the opportunities for employees to develop these crucial skills in the workplace." (Green, Ashton and Felstead, 2001; p. 428).

6.3 Management Skills Shortage – Especially SMEs

Sutcliffe (1994) suggests that for firm resources to translate into high performance the managers must comprehend the sources of their competitive advantage. Zvobgo and Wensley (1999) found that managerial comprehension, defined as knowledge of a range of strategic management concepts and their fit with the manager’s business unit, moderated the link between superior factors and business growth. It seems possible that the role of managerial knowledge and expertise may dominate the skills levels of the workforce, notwithstanding any impact on the demand for skills.

Moreover, manager’s abilities are amongst the most problematic of employer’s internal skills gaps, with over one-in-four employers reporting insufficient management skills (Hogarth and Wilson, 2002).

Management skills therefore are important as a way to improve the competitiveness and the use of the skills in a way that benefits the UK economy. However, there is little data on the quality of the stock of UK managers, hence research has to use the training and education of UK managers as a proxy, which shows that managers were only marginally better qualified than the average for all occupations (Bosworth, 1999).

Figure 5: Education and Training of British management [Source: Keep and Westwood, 2002]

Item	UK	USA	Japan	Germany	France
Average terminal education age (1999, years)	19.5	22	21	21	22
Graduate (%)	49	74	78	72	61
Days off-the-job training (1998)	4	7	5.5	5.5	6
Days on-the-job training (1998)	4.5	8	6.5	6.5	6

Respondents to the Workplace Employee Relations Survey conducted in 1998 found that

- 24 percent of managers were poor at ‘dealing with work problems’
- 30 percent of managers were poor at ‘keeping everyone up to date about proposed changes’
- 34 percent of managers were poor at ‘responding to suggestions from employees’
- 38.5 percent of managers were poor at ‘providing everyone with a chance to comment on proposals’.

One-in-five managers have no qualifications or qualified to NVQ level 1 (Bosworth, 1999). Added to the increased demands for managers and the increases in the complexity of management (Campbell et al., 2001) there has been some cause for concern where over half the firms making no formal provision for management education, training and development (Mangham and Silvers, 1986; Constable and McCormick 1987). This picture has improved since then (Management Charter Initiative, 1992; Thomson et al., 1997). The most innovative forms of management training are available to the elite causing greater inequality in management training provisions (Hirsch and Carter, 2002). There has been a marked increase in the number of qualifications given by business schools but Bosworth (1999) points out at the present rate to equip today’s number of managers with MBAs would take over 500 years. Moreover the challenges that the modern managers face are changing (Institute of Management, 1994; Prahalad, 1997; Ghoshal and Bartlett, 1999). The task is to create a workforce that adds value; which requires changes to the strategy, structure and processes within the firm (Guile and Fonda, 1998, 1999). In turn, this changes the focus of the managerial task from sources of wisdom and order givers to facilitators and ‘servants’ of the team (Keep and Westwood, 2002). Evidence suggests that UK managers are likely to be stuck in the old model, where very limited discretion is built in work design, and managers do the thinking (Dench et al., 1998). The people management skills of UK managers appear particularly weak.

Figure 6: Projected employment by qualification by region 1999-2010 [Source: Wilson, 2001]

Region	Level 5 1999 000s	% ch	Level 4 1999 000s	% ch	Level 3 1999 000s	% ch	Level 2 1999 000s	% ch	Level 1 1999 000s	% ch	None 1999 000s	% ch
London	328	36.9	1123	42.4	615	-1.0	834	-9.7	802	-8.4	433	-25.4
South East	173	34.1	866	38.9	750	14.1	906	62.1	844	10.9	405	-17.8
East	100	34.0	468	38.5	445	8.8	592	5.1	564	9.6	271	-10.3
South West	92	33.7	499	33.1	440	13.6	533	4.1	511	12.9	236	-30.9
West Mids	86	19.8	438	30.1	433	4.4	558	-0.7	541	10.2	390	-41.3
East Mids	59	30.5	344	30.8	387	5.4	410	0.7	433	13.6	262	-26.0
Yorks & Humbs	86	20.9	436	26.2	402	6.7	496	-2.0	505	13.9	307	-25.4
North West	107	29.0	603	28.2	586	2.7	683	-1.8	618	7.6	383	-36.0
North East	29	20.7	184	22.8	204	40.5	237	0.0	230	11.3	141	-34.0
UK	1237	30.8	5864	33.2	5099	5.4	6172	-0.9	5778	8.2	3388	-26.5

The tale that this table tells is of the high proportion of NVQ5 concentrated in London and the South East. The projections of level 5 and level 4 are for large increases, particularly for London and the South East. One of the ways in which these regions might find the graduates they require is from the other regions of the UK. Migration within the UK towards London and the South East eases the difficulty in skill shortages. The highest level of supply of students into higher education is in Scotland, but the greatest demand for their skills is in London and the South East, given the wage premium given to people with higher education one would expect a large migration of workers from Scotland to the South East.

The way in which firms in different regions in the same sector compete and their reach in terms of how local their customers are significantly different. For example, new business service firms in the Tees Valley in the 1990's were more likely to view their competitive advantage in terms of price and relied more heavily on local demand than their counterparts in more prosperous Buckinghamshire (Mole, Greene and Storey, 2002). In terms of regional competitiveness the supply of skills is an important part of the mix for high skilled regional economies. Best (2001) argues that a region that can institute processes for skill formation has a comparative advantage over one that cannot.

There are wide differences in the degree of skills in the learning and skills areas within the UK: the percentage of the working age population with NVQ level 3 and above ranges from 54 percent in Central London to 32 percent in the Black Country (West Midlands). In terms of the new business firms referred to earlier in the paragraph we find that the proportion of the workforce in the Tees Valley with NVQ level 3 and above is 1-in-3 and in Buckinghamshire it is 1-in-2: again the price-sensitive, locally-focussed firms operate in areas with lower skills. In discussing the high skilled eco-systems in California, Finegold (1999) attributes a large role to high skill formation although he conceded that in California the very highly skilled rubbed shoulders with the low skills to create a very wide distribution of both skills and income. Arguably within the UK there are 'skill rich' and 'skill poor' districts and even sub-districts e.g. specific boroughs within London. Campbell et al., (2001) warn of a potential for a vicious circle of weak skill provision and low demand for skills that leads to a (relative) downward pressure on skill levels.

7 The Demand for Skills

This section develops the theme of demand for skills. It looks closely at the organisational demand for skills in the UK workforce. This theme highlights a low skill equilibrium that inhibits both individuals and firms from training, leading to a low specification of British products compared to other industrialised countries, notably the USA, France and Germany. It then examines some of the international comparisons of the UK skills.

7.1 Low Skills Equilibrium?

The traditional explanation for low skill levels in the British workforce was that there existed a set of cultural values: anti-education, anti-class, where the amateur was lauded and which discouraged investment in skills (Wiener, 1981). Instead, Finegold and Soskice (1988) described how the decision of many British 16 year old school leavers was perfectly rational in a system that offered little incentive for the many who did not qualify for higher education and where the increasing years of non-degree education resulted in no wage premium. Moreover, managers decisions to adopt a low road to work organisation was perfectly rational given the short-term financial markets, adversarial industrial relations and poor supply of skills in the labour market (as a result of the 16 year old school leavers). The institutions within British society (government and non-government) reinforced a low demand for skills, where untrained managers ran the majority of firms and workers, who produced low quality goods and services. Britain was trapped in a low – skills equilibrium.

Today there is still no wage premium for lower level NVQ's below level 3, providing a serious disincentive to undertake lower level vocational training, see Figure 7 below (Dearden et al., 2000, 2001). There may be selection bias within these results because people self-select to go to university. For example, Murnane, Willett and Levy (1995) controlled for cognitive skills in a sample of US wage earners and this control reduced the college premium for men from 100 percent to 62 percent and eliminated the college premium for women entirely.

Figure 7: Additive Wage Premia (percent) for Obtaining Qualifications [Dearden et al.,2001]

Qualification ²	Men	Women
CSE/lower GCSEs	9	5
O Level/higher GCSEs	21	19
A level	17	19
First degree	28	25
Higher degree	8	18
Professional qualifications	35	41
Nursing	13	21
Teaching	Nil	27
Level 1 / 2 NVQs	Nil	Nil
BTEC First	Nil	Nil
Level 3-5 NVQs	6	5
RSA higher	4	12
City and Guilds Craft	7	Nil
City and Guilds Advanced	7	Nil
ONC/ONC BTEC National	10	8
HND/HNC	15	9

² Note that you can have more than one qualification; hence the return to a man with 'O' levels, 'A' levels and a first degree is 66 percent more than one with no qualifications.

The advantage of an explanation based on incentives rather than one based on deep-seated cultural values is in time. Changing cultural values is not something done overnight whereas changes to a set of incentives might be. (Finegold, 1999). However, Britain's corporatist institutions have been traditionally weak in comparison to, say, Germany. Since the institutions that might help to persuade employers to take on more training were lacking, in separate articles Finegold et al. (1992), and Soskice (1993) argued that increasing the participation of school leavers in further and higher education was the first step in the process of shifting Britain towards a high-skill economy (Finegold, 1999).

In economic theory the demand for labour is a derived demand. It is second order after the demand for the good and service. Similarly, the demand for skills is derived from the way in which the production process is organised. Thus, as Keep and Mayhew (1999) suggest, the demand for skills is a third-order decision. First, the firm sets out its product market and competitive strategy. Second, the decisions about job design are made. Third, the firm demands skills from the labour market.

A current good example of this is the partnership between Cranfield University and BAE Systems for the development of skilled people to build the new Airbus 380 (the largest aircraft people carrier). Once the strategy had been determined, BAE Systems immediately put in place the programmes to ensure it has the necessary skills in its staff. Developing the one without the other would have made the strategy unrealisable.

Industry Conducted Training

CBI estimates that industry spends over £20bn per year on training (FT, 31/10/03) but less than £0.5bn is spent within the Higher-Education sector. Much of this training will cover health and safety skills, customer sales skills and firm specific training, and so would fall outside the HE sector. Without any good data on the breakdown of this spend it is hard to make progress on analysis and this leaves several questions outstanding:

- 1) What does the distribution of in-house training look like by sector, size of firm, region and type of employee? Even the basic data on this is very limited.*
- 2) What is the impact of industry training on productivity and wages – is there any evidence of spillovers and externalities?*
- 3) What share of industry training should go towards the HE sector – and is the current share of 2 percent too low? If so how should the HE sector act to increase this?*

The firm has a choice about whether to specify a high-quality good (or service) or a low-quality good. The specification of the good in terms of quality in this instance is to do with the number of characteristics that it possesses. Low-spec goods have relatively few characteristics which change infrequently, and are unlikely to be genuinely customised. These features allow Fordist production methods and Taylorised work design and relatively unskilled labour (Keep and Mayhew, 1999). But note that companies may deliver to their specification very well. Keep and Mayhew (1999) discuss personal banking where the quality of service may have increased in terms of phone banking, out-of-hours banking, cash dispensers and so on. The delivery to specification has increased but the specification, with ATMs, credit scoring and so on has become lower spec, and therefore the demands for the bank manager's skills have declined.

To accept this low skills equilibrium one has to accept that a myriad set of qualities of a brand can be specified along one continuum, from high to low. Specifying quality in terms of one number is often done by industrial economists (Shy, 1995) but that does mean that something of the order of 30 attributes are conflated into a single index. Wensley (1999) examines whether the link between skill and the perceived value of a product can be broken through sophisticated marketing strategies, and 'managerial technology'. On the way he argues that the competitive positioning that appears ex post can be represented rather sparingly. Wensley (1999) suggests that there is a continuum where there are two groups of brands, one intermediate brand and an outlier and the demand is multi-modal. Indeed, the outcomes of these strategies seem similar to the three-strategy model of Porter (differentiation, cost and focus). Wensley (1999) does indicate that the use of a single continuum, though a simplified model, can be justified.

Is this where the UK is stuck – low skills equilibrium?

The evidence that British firms specify lower than foreign counterparts is still in dispute. One approach has been to match sets of firms but it is always difficult to match the pairs. Mason et al (2000) found the Germany banks were more productive in part due to the increased skills within the clerical side of the bank. Instead of matching the firms one can match the goods, a second approach is to examine the long run price of specific UK produced goods compared with their foreign counterparts (Oulton 1996; Buxton et al, 1998). Since price signals quality or at least shows product differentiation. These results tend to support the limited presence of the UK firms in the high-value-added traded goods, but their results are far from clear (Keep and Mayhew, 1999). The second point to make about the international price comparisons is that this takes it as axiomatic that goods that are low spec compete on price.

Low spec, low wages... High spec, high wages... If you low spec you are condemned to compete on price...

Price competitiveness in international trade is only possible if unit costs are low. And unless we improve productivity then that ultimately means that we may be competing on low wages. Outrata (1998) mentions this for the competitiveness of Slovak industry, but the UK is not recovering from communism. Moreno (1997) studied Spanish industrial exports to other European Union countries with sector-based panel data. The findings indicated that own-price elasticities of export demand differed widely among sectors. More importantly, they demonstrated that non-price factors influence international competitiveness significantly. Technological and advertising efforts have a significant effect not only on the evolution of exports but also on price elasticity. Thus, competing on price is not something that will boost the long-term future of the British economy. If you want to minimise risk you would go low spec, low skills to manage your investment risk.

In a study of new firms in Maryland, USA, Haltiwanger, Lane and Speltzer (1999, 2000) examined the skill mix of new firms. The technology, capital, organisational structure and the ability of managers that they begin with are critical (Haltiwanger, Lane and Speltzer, 2000). However, as they begin, new firms make mistakes in estimating their ability as managers (Jovanovic, 1982). They may adjust their workforce as they learn about their firm type; or they may exit (Haltiwanger, Lane and Speltzer, 2000).

In the industrial organisation literature this issue of quality is tied in with signalling. One method that firms can use to signal their quality is to insure the consumer against defects using a warranty. Higher quality firms are likely to offer a longer warranty than lower quality firms to signal their quality, (Spence, 1977) although in this case quality is in the form of reliability. Another method to signal quality is through price, certainly where a product is diversified and the quality is higher this would be reflected in the price. However, it seems that although price may be higher for quality products the costs of signalling (advertising and some restraint on price) may actually make it more profitable to be a low quality producer than a high quality producer (Shy, 1995; Milgrom and Roberts, 1986). Again, this may return us to the low skills equilibrium.

7.2 International Comparisons of Skills in the UK Workforce

In terms of the international comparisons, which is where we started discussing the need for skills, the UK is around the average for OECD countries with people qualified to NVQ level 2 and 3, but there are more older workers with these skills than younger workers (DTI, 2001; Campbell et al., 2001). This may reflect the reduction in apprenticeship in the 1980s. The growth in the proportion of the workforce in the UK with level 2 or equivalent lags almost all the OECD countries (Campbell et al., 2001). The proportion of the 25-29 year olds who have completed secondary education is 64 percent compared to an OECD average of 72 percent. Out of the OECD countries the UK is ranked 16 out of 26 (OECD, 2001). Moreover, Campbell et al. (2001) suggest that the UK's measure for (NVQ2) is lower than the French (baccalaureat), which should flatter the UK's position. Further, the UK performs poorly in terms of the literacy of those who had completed secondary education (OECD, 2001).

The UK has now the highest rate of graduation from degrees in the OECD but the stock of people with degrees is lower (Campbell et al., 2001). In this the UK appears to be going through a period of 'catch-up'. Compared to the average OECD country the UK produces more art/humanities graduates (19 percent compared to 14 percent), more computing (4 percent compared to 2 percent) and the physical sciences (5 percent compared to 3 percent) but fewer social sciences and law (28 percent compared to 32 percent), and fewer graduates in engineering, manufacturing and construction (12 percent compared to 14 percent) (OECD, 2000).

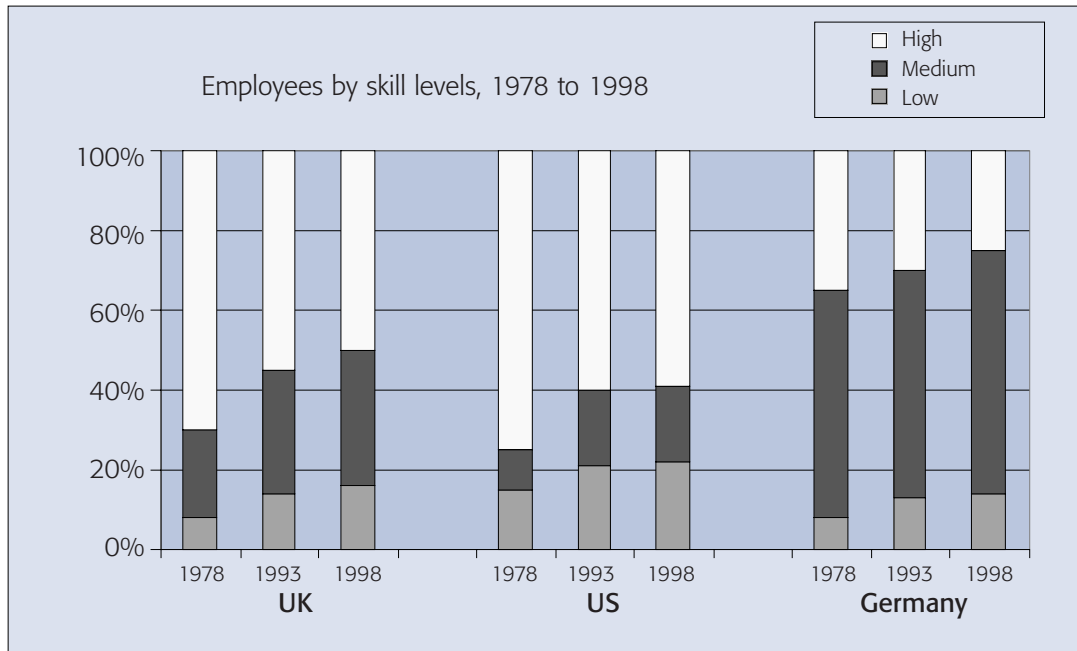
Education and Skills - The Scottish Context

The Scottish education system has always been held up as an example for the rest of the UK with over 70 percent of the population with Levels 2, 3 and 4 education. One explanation is the higher share of spending on education in relation to GDP. This is partly driven by the somewhat controversial Barnett formula, by which central taxation is collected and redistributed across the UK, which provides a generous allowance for Scotland.

This does suggest a clear link between education spending and the levels of educational achievement, pointing the way towards higher educational spending in the England as the first step towards addressing the skills gap.

Participation rates in training are amongst the highest in the OECD; however, compared with other OECD countries, fewer hours are spent by each person in training (Campbell et al., 2001). Yet in terms of training effort, a combination of participation and hours the UK ranks amongst the highest in the OECD (O'Connell, 1999). However, training tends to increase the skills differences because the participation rate and the average number of hours in training are higher for those with higher levels of training. This process of training increasing skill inequality is common to most industrial countries but not in France or Germany, where the low skilled are just as likely to receive training (McIntosh and Steedman, 2001). Workers in lower skill levels seem to be less interested in undertaking training, and particularly for those at the lowest levels workers do not perceive the relevance of training because they do not use the skills at work (McIntosh and Steedman, 2001).

Figure 8: Skills variations across UK, US and Germany [Source: O'Mahoney and De Boer, 2002]



The UK is just below the average industrial countries in literacy and numeracy but the UK shows weaknesses in the one-in-five members of the workforce who are not proficient at the lowest level. (Campbell et al., 2001). A recent international study of literacy and numeracy finds that the UK has high proportions at both levels 1 and levels 5. The area where the UK is weakest internationally is in craft/machine workers, where the UK was worse than all but Canada and USA (OECD and Statistics Canada, 2000). In addition, numeracy is becoming more important for employers (Murnane, Willett and Levy, 1995).

Internationally then, the UK has a wider distribution of skills than the average OECD country. It is catching up in terms of graduates but has some way to go and educates fewer engineering, manufacturing and construction graduates than the OECD average. The UK has a high proportion at the lowest levels of literacy and numeracy (see cognitive skills and wages) and is falling behind in terms of craft skills at level NVQ3.

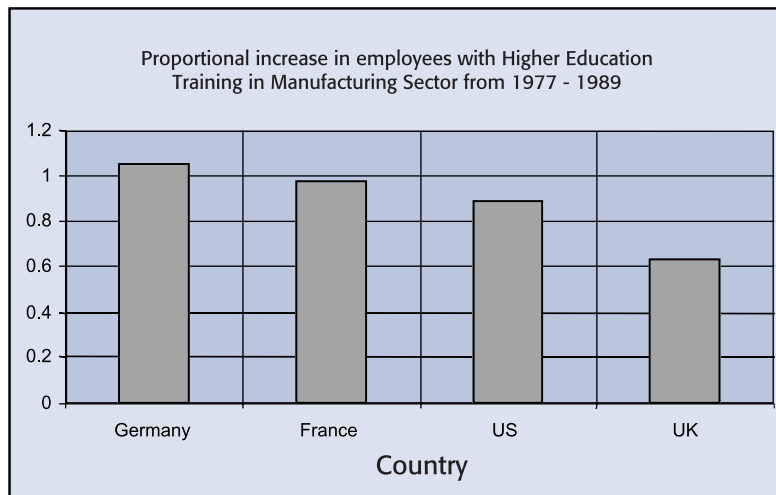
Figure 8 compares labour quality in the UK workforce with those of the US and Germany according to whether they have higher skills (a degree or above), or intermediate skills (a vocational qualification above high school but below degree level). The chart shows a big difference between the UK and Germany in terms of intermediate skills. Germany has far more workers with intermediate skills and fewer low skilled workers than the UK. This difference has been persistent over the last two decades. Compared to the US the UK's shortfall is in highly skilled workers, where again the difference has been persistent.

Examples from manufacturing

The concept that the move away from low end manufacturing towards the higher end of the spectrum, is one that is necessary and crucial towards competing with other developed countries is well established. Indeed it is the higher end technology and science that drives the creation of wealth. The table below shows a breakdown of the higher education employment shares in the manufacturing sector.

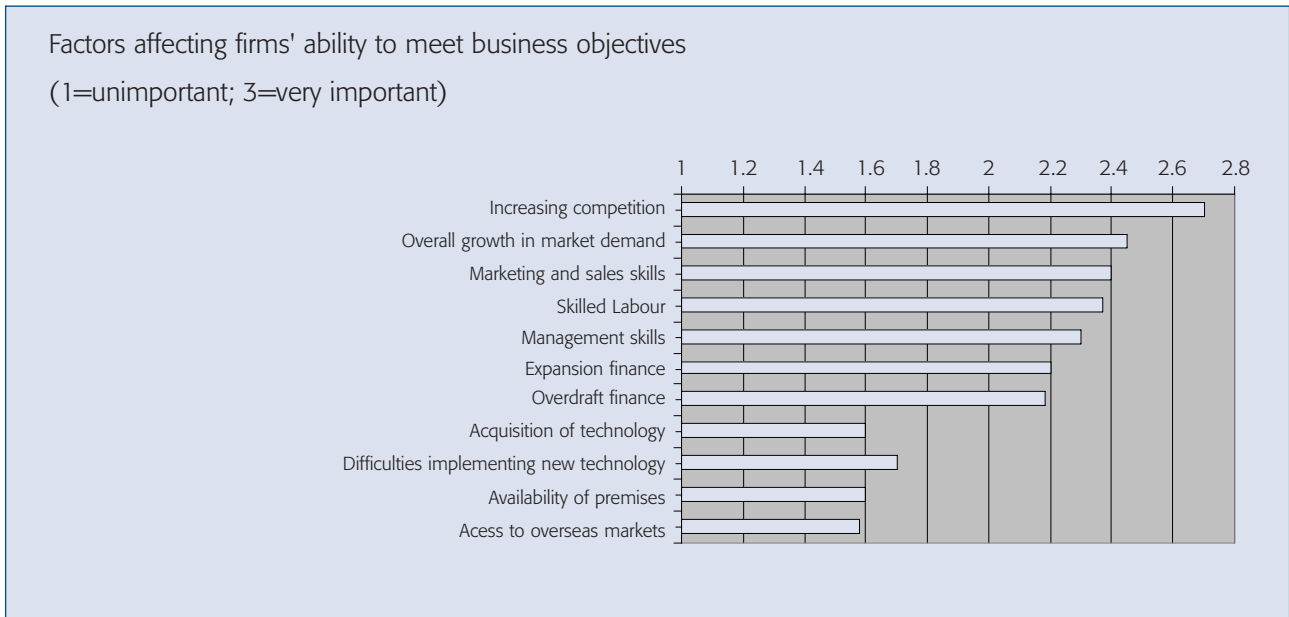
Figure 9 highlights the trend in the UK where graduates in the technical disciplines are snapped up by the financial and service industries that pay higher wages and tend to appear more 'glamorous'. The opposite is the case on the continent where the status and prestige of technical talent, is much greater, this is also reflected in the wages to these people. This problem is acknowledged at the highest levels, where in a lecture at the LSE in March 2003, MPC member Steve Nickell acknowledged that it was his personal belief that part of the productivity problem could be explained by the fact the 'Britain's best and brightest go into the financial services and not the technology sectors.'

Figure 9: Proportion of staff at degree level in the manufacturing sector [Source: Nickell 2003]



This lack of skills is also confirmed with direct survey evidence on small and medium-sized enterprises (SMEs) from Cosh and Hughes (2000) which give some illustrative indications of which of these factors may be important for productivity. The surveyed firms were most concerned about increasing competition, but interestingly the third to fourth most important factors were marketing skills, skilled labour and management skills respectively. Adding these three skills categories together suggests that a general lack of skills is one of the major factors facing firms (see Figure 10 below).

Figure 10: The factors affecting firms [Cosh and Hughes, 2000]



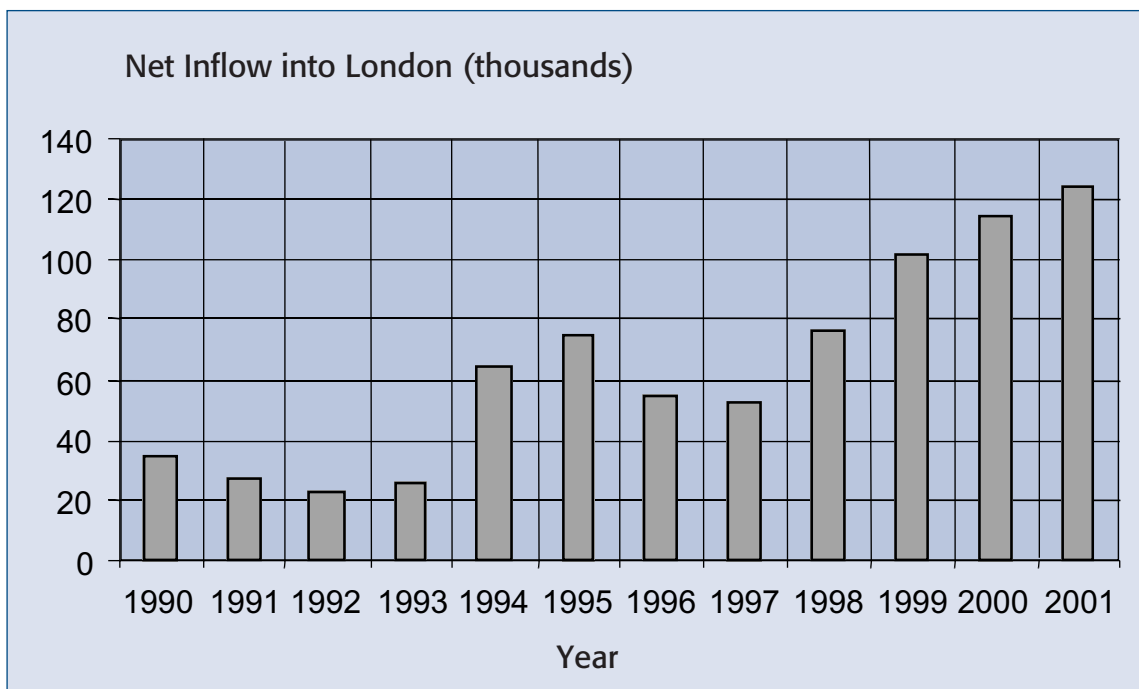
7.3 Role of Immigration in Meeting Excess Demand?

The debate about immigration into the UK rages on, and it is a rare indeed to not see anything written in the popular press about it. It should be noted that there is a mass immigration occurring into the UK, primarily into the greater London area, by highly skilled and well-educated Europeans and those from other OECD countries. This represents the large majority of the 170,000 immigrants occurring into the UK per year.

A Home Office report published in 2003 confirmed this with figures showing that 67 percent of migrants to the UK came from 'high income countries'. Even a cursory look into many research establishments (of which the Centre for Economic Performance at the LSE is but one) will reveal a staggering proportion of the work being done by foreigners, and mainly European ones. At the CEP, this figure is around 60 percent, while in many London Banks and Consultancies it is often even higher. This to an extent reflects the skills shortage in the UK, but also reflects the tremendous opportunities available here (see Figure 11 below).

Whether this is sustainable is a different question. Many of these highly skilled people will choose to leave the UK, largely for personal reasons, taking with them much knowledge and experience. (We note that at the Forum we were informed that the position is at least as worrying in the USA and especially in a state such as California, which relies on retaining its influx of overseas students and researchers to underpin the research and high-tech base of its economy.)

Figure 11: Net inflow of foreign workers into the capital [Source: The Economist, 2003]



8 Enablers

At the management research forum we benefited from three international perspectives: the US community colleges, the German Fachhochschule, and the Scottish experience.

8.1 Fachhochschulen (Universities of Applied Sciences) in Germany

"Fachhochschulen (universities of applied sciences) occupy an established position in the modern German university system. Since their establishment, they have received praise from both the political and public arena for the practical orientation that has become their trademark. Within the German system, the educational mission and profile of the Fachhochschulen are especially adapted to the requirements and needs of professional life.

An increasing number of young people interested in receiving higher education are choosing this type of university. The Fachhochschulen are gaining in popularity. This is why the federal government and the federal states – supported by recommendations from the Science Council – decided to gradually increase the admission capacity of the universities of applied sciences to 35 percent and later 40 percent of all first-year students.

In addition to practice-oriented instruction, other hallmarks of the Fachhochschulen are applied research and development, the quality and quantity of which have risen perceptibly since the mid-1980s. Supported by programmes from the Federal Ministry of Education and Research, willingness and qualifications for applied research and development have been increased, which has been of great benefit to small-scale industry and trade.

The Fachhochschulen have established partnerships with universities in other European countries. European degree programmes in which universities from various EU member countries work together were first developed at Fachhochschulen. Young people need forms of education that consistently and purposefully both provide professional qualifications and take into account the types of qualifications needed by the economy. The Fachhochschulen have made great progress toward this goal".

Edelgard Bulmahn

Federal Minister for Education and Research

Germany

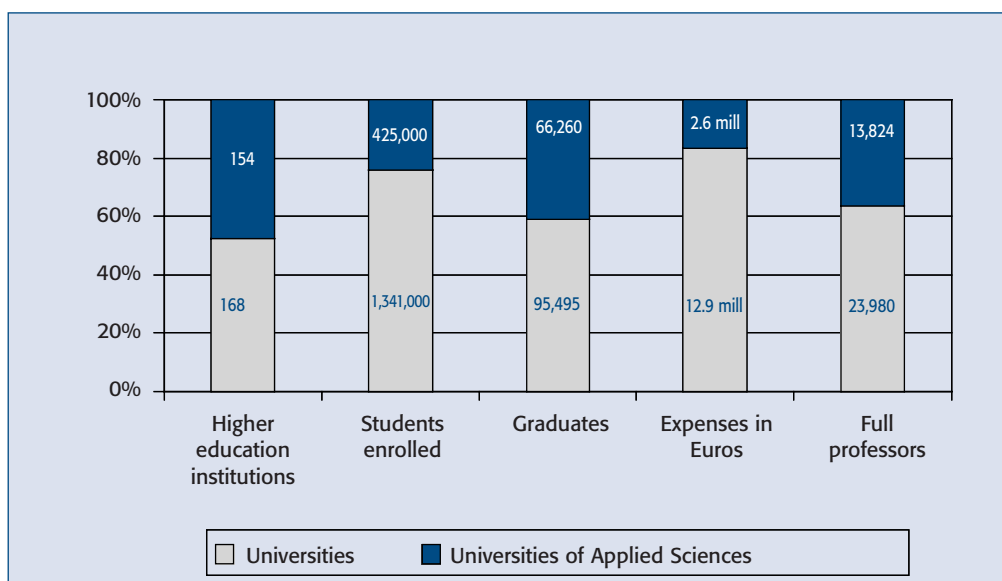
[Source: Federal Ministry of Education and Research (2002)]

In the Federal Republic of Germany institutions of higher education can be divided in the following categories: Universities, Fachhochschulen, Teacher training colleges, and Kunsthochschulen. Fachhochschulen are a German speciality. In addition they are a relatively new form of higher education in this educational system. As there is no exact equivalent of this type of institution, in the British or in the American educational system, the term "Fachhochschule" cannot be readily translated. Considering their distinct profile, German Fachhochschulen are generally described as "Universities of Applied Sciences" (DAAD, 2003). Within Europe, similar institutions can be found primarily in the Netherlands and in Flanders, in Austria and in Switzerland. In recent years, reform in the higher education systems of other Central and Eastern European countries has led to institutions similar to Fachhochschulen, e.g. in Hungary and Poland.

While often small in size (60 percent enrol < 3,000 students, only 2 percent enrol > 10,000 students), Fachhochschulen are quite large by number (158 by 2003) representing almost 50 percent of all higher education institutions in Germany.

Figure 12 shows the profile of Fachhochschulen in comparison to universities in the German system of higher education (Meyer, 2003).

Figure 12: Universities of Applied Sciences (“Fachhochschulen”) as a part of the German HE system [Source: Meyer, 2003]³



In general, the characteristic profile of Fachhochschulen in the German system of higher education can be summarised as follows (Federal Ministry of Education and Research, 2002):

- A close link between science and practice in classroom instruction and studies.
- Efficient organisation of studies and examinations.
- Briefer periods of study.
- Applied research and development.

In addition, Fachhochschulen are seen as an important factor of regional development. They are expected to (Wissenschaftsrat, 2002):

- Contribute significantly to the economic development of their region.
- Foster technology-transfer because of their practice-orientation.
- Support the skills development of the academically qualified workforce in their region.

³ CIHE is publishing a report on *The Universities of Applied Sciences: the German experience* by Professor Helga Meyer who spoke at our joint Forum.

Fachhochschulen in Germany don't have a standardised profile. They vary highly with regard to institutional structure and breadth of their offerings. In order to get a more detailed view, on how Fachhochschulen operate within the overall system of higher education in Germany it therefore makes sense to look at specific examples. Awarded with the first best practice award in 2000 by CHE (www.che.de) as well as 'ReformFachhochschule' by the Wissenschaftsrat in 2001, the Fachhochschule Bremen (University of Applied Science Bremen, <http://www.hs-bremen.de/>) can be seen as a good case study that shows:

- A broad range of practice-orientated study programs in Engineering and Applied Science as well as Business, Economics, Social Science, Cultural Studies, Languages and Law.
- A strong commitment to internationalisation and the international mobility of its students.
- A clear focus on applied research and technology transfer, and
- Early attempts to provide continuing education.

In terms of the structure, breadth and differentiation of its subject areas, the German system of higher education is still unique. Within this system the Fachhochschulen play an important role and find a fruitful environment that allows their distinctive structure and characteristic profile.

Faculty at a German Fachhochschule has to combine experience in research as well as practical occupation, while students at a German Fachhochschule have to learn to combine a broad content knowledge of their discipline with its practical application.

8.2 San Diego Community Colleges

California Community Colleges are the largest college system in the world comprising 10 percent of all US college students, 1.7 million students each semester, 108 colleges. According to the California Education Code (Sec. 66010.4.3) their primary mission is to advance California's economic growth and global competitiveness through, education, training and services.

CIHE has published a report from the Chancellor of the San Diego Community College Network, Augi Gallego; **Community Colleges: the United States experience.** San Diego Community College District (SDCCD) consists of 3 colleges, 6 non-credit adult education centres with 130,000 students enrolled and 5,600 employees. Their occupational programs have the reputation to lead directly to employment. The colleges, like the Center for Applied Competitive Technologies (CACT) located at San Diego City College are seen as technology leaders that provide students with access to latest technology. They respond directly to industry's needs and successfully develop partnerships with industry committed to mutual exchange:

- Faculty work as interns in partner companies.
- Boards of Trustees and CEOs develop strategies for legislative solutions to funding and other issues.
- Customised programs are jointly developed.
- Joint research efforts lead to marketable products.
- Partnerships build the basis for the development of curriculum and career ladders for graduates.

This success, however, does not result from single partnerships but obviously builds upon a broad and stable network of balanced interaction. Thus, it builds on:

- A transparent transfer system between institutions.
- Matching funds from industry that leverage state support for SDCCD.
- Rapid response from the SDCCD to changing workforce needs from industry.
- Strategic partnerships between complementary institutions of FE and HE.

Recent evidence from these community colleges shows that they suffer from high non-completion rates, which may be attributable to other factors within their social communities. This effect needs further study to identify what these factors are, and whether they may be factors in the UK. Other forms of study such as home study or part-time study may be better suited (such as Open University).

8.3 The Scottish Experience

CIHE published a report: **Higher Education in Further Education Colleges: the Scottish experience.** Further education (FE) colleges are now the major providers of higher education (HE) at undergraduate level in Scotland. In 2000-01 34 percent of all HE students in Scotland were enrolled in FE colleges (Scottish National Executive, 2002). Much of this is provided through Higher National Certificates (HNCs) and Higher National Diplomas (HNDs) programmes. During the last fifteen years the FE colleges have emerged as a much larger and stronger feature of the post compulsory education system in Scotland. A particular strength of the Scottish system, which mirrors the San Diego Community Colleges, is that the FE system is distinct and employer focused while, nevertheless, the links between FE and HE are extremely strong, and this facilitates student progression.

Insight from the AIM Management Research Forum:

Part-time study at certain HE/FE institutions is the norm. The case study of Glasgow Caledonian University presented at the Forum revealed that 61 percent of undergraduate students in Scotland were enrolled in FE Colleges on a part-time basis. There is considerable variation across courses. For example, 47 percent of HNCs are studied on part-time, compared with 12 percent of HNDs.

The above example illustrates the high demand from students for part-time study at HE/FE institutions. Allied to this is the high demand organisations have for short-term courses and training, as evidenced by data from the 1998 Workplace Employee Relations Survey (Cully et al., 1999) showing that over 80 percent of all employees (N=27,000) receive less than 5 days training per year. It seems likely that this demand for part-time or short-term study affords opportunities for suppliers of training for expanding the modes of study currently available. This expansion could occur along many dimensions such as time (e.g., part-time), distance and location (e.g., training delivered at a distance electronically; trainers entering organisations to train employees on the job).

8.4 Enabling the Individual

8.4.1 Individual performance as a function of skills, motivation, and opportunity

It is widely acknowledged that skills alone will not result in high performance and that high performance is some kind of function of an employee's skills, motivation, and the opportunity to deploy skills. In other words, in order for skills to result in increased performance, individuals need to feel motivated to attend to the task, and obviously be provided with the opportunity to perform the task.

Providing the opportunity to perform will depend to a large extent on the way jobs are designed. There is an extensive literature on job design (see Parker, Wall and Cordery, 2001, for a recent review), here we shall focus on one particular aspect of job design in the form of autonomy. Autonomy refers to the extent to which employees can decide how to go about getting their job done, plan their own work and choose their own methods. In addition to the consistent links between performance, employee well-being and autonomy, autonomy has also been found to promote employee development and learning (Wall, Jackson and Davids, 1992).

The 1998 Workplace Employee Relations Survey results relating to job autonomy showed that, overall, 30 percent of employees have a lot of influence over their jobs, 43 percent have some, and the remaining 27 percent have little or no influence (Cully et al., 1999). Levels of job autonomy differ enormously by occupation. For example, nearly 6 out of 10 managers have a lot of autonomy in their jobs, compared about 3 out of 10 clerical and secretarial positions and just over 2 out of 10 plant and machine operatives. It was also found that workplace management is less willing to devolve responsibility to employees that constitute the core of the workforce. Given the importance of autonomy and self-efficacy to enhancing motivation and successful skill acquisition, the findings from the 1998 Workplace Employee Relations Survey demonstrate clearly the considerable opportunities for employers to improve the skills of the existing stock of employees through leveraging autonomy.

8.4.2 Learning how to learn

A key issue addressed recently in organisational research is the features of a learner that influence the acquisition of new knowledge and skills. An important factor explaining variations in learning success is the individual's application of various learning strategies (Warr and Allan, 1998). In other words, learning success is strongly predicted by an individual's ability in learning how to learn. Educational psychologists have conducted considerable research in this area, but as yet there has been little attention from occupational training researchers.

Figure 13: Warr and Allan's (1998) Learning Strategy Typology

Learning Strategy Typology

Following a review of existing learning strategy taxonomies, Warr and Allan (1998) offer a nine-category framework for learning strategies.

1. Cognitive learning strategies

Rehearsal: *Applying various methods to repeat material being learned (e.g. note-taking, pictures, etc.).*

Organisation: *Identifying key issues, creating mental structures, interrelating concepts (e.g. mental model diagrams, top-level text structures, means of comparisons).*

Elaboration: *Procedures to explore implications, make mental connections between new and existing knowledge.*

2. Behavioural learning strategies

Interpersonal help-seeking: *procedures/proactive behaviour to seek help from other people.*

Seeking help from written material.

Practical applications.

3. Self-regulation strategies

Emotion control: *Strategies aimed at warding off anxiety and sustaining concentration (e.g. positive self-talk, self-initiated relaxation, self-coaching).*

Motivation control: *Sustaining interest and attention despite only having a limited interest.*

Comprehension monitoring: Strategies to evaluate what has been learnt and modifying behaviour if discrepancies are detected.

The strategies identified by Warr and Allan above, facilitate learners' direct engagement and long-term acquisition of materials to be learned. Furthermore, the strategies also assist in the process of learning through maintaining motivation, controlling anxieties, and monitoring progress. In each case, empirical support has been found for each strategy in terms of increasing learning success, albeit in the vast majority of cases in school or college settings, rather than occupational settings. Dansereau (1985) claims that learning strategies can increase learning and skill acquisition by 30 to 40 percent.

Evidence exists that the effects of the different learning strategies vary according to the learner's ability and the stage in the learning cycle. For example, emotional control particularly helps lower-ability trainees; emotional control is more important during early stages in learning, motivation control is more important at later-on (Kanfer and Ackerman, 1996). Finally, of relevance to the Government's White Paper: **21st Century Skills: Realising our Potential** which proposes among other things that free tuition should be provided for adults without a level 2 qualification, people with little experience of learning are expected to benefit most from learning-to-learn strategies (Warr and Allan, 1998). Note that recent Treasury statistics reveal that 8 million people in Britain lack basic skills, and nearly 7 million adults are functionally illiterate, with reading ages below that of the average 11 year old (The Daily Telegraph, 10th November 2003). It is these groups that will receive the greatest benefits from training in learning strategies.

8.5 Enabling the Organisation

There are three very important means by which the organisation can enable skill development through the role of training the existing stock of employees, developing knowledge management systems, and more generally establishing a set of progressive human resource management practices.

8.5.1 The Role of Training

In addition to new technology constituting the content of training courses, technology is also shaping how training is delivered in universities and organisations (Alavi and Gallupe, 2003). The application of novel teaching technologies such as video conferencing, electronic performance support systems, simulation and virtual-reality training and web-based training is expanding and has many attractions over more traditional modes of learning, for example in terms of potential cost-effectiveness and reach. The CIPD survey (2002) revealed that about 1 in 5 employees in the UK receive electronically delivered training. However, the theoretical understanding for how these technologies affect learning and empirical evidence base lag behind the development of these new technologies (Brower, 2003). Many pressing research questions need to be addressed, such as how to best teach knowledge, skills and abilities using different modes of technology, the roles to be played by the trainee and the trainer, how to evaluate the effectiveness of such programmes, how such training programmes affect trainees willingness to participate in training, and so on.

8.5.2 Knowledge Management Systems

There is rapidly growing interest and insight into organisational learning, and knowledge, creation, sharing, retention, and management at the organisational level (e.g., Rousseau, 1997; Cross, Parker, Prusak and Borgatti, 2001; McEvily, Das and McCabe, 2000; Hansen, 2002). The established benefits of effective knowledge management are avoiding competence substitution, quicker project completion, and general superior performance.

A key concept is networks, both inside and outside of firms, between individuals and institutions, leading Rousseau to conclude that "knowing who is becoming as important as knowing how" (Rousseau, 1997, p. 533). Rousseau discusses various intra and extra-organisational examples of networks have been discussed, along with flexible career and job initiatives that can facilitate sharing across and within organisations, such as transfers, international assignments, horizontal and vertical moves, and so on.

Within any network, a second vital issue is how to ensure effective knowledge dissemination, where important factors are knowing the expertise of network members, having easy access to experts, active knowledge engagement upon contact with the expert (rather than information dumping), and a feeling of safe disclosure between network members (Cross, Parker, Prusak and Borgatti, 2001).

Knowledge retention strategies include methods of externalising what an organisation's members know (writing down, databases, etc), capturing knowledge transfer across shifts, and other means of avoiding knowledge loss or organisational 'forgetting' through, for example, employee turnover (Rousseau, 1997).

8.5.3 Human Resource Management

Broadening out from training and knowledge management systems is to consider the entire system of human resource policies and practices and how these may affect employee learning, skills and more general personal development. A relatively recent and expanding area of inquiry has been the effect of HRM on employee attitudes, skills and behaviour. HR policies and practices have been argued to be important because they set out at a systemic level to shape, among other things, an employee's experience of work.

Figure 14: Key Human Resource Practices and their Adoption in the UK [Source: HM Treasury 2000]

<i>Human Resource Practice</i>	<i>% of workplaces</i>
<i>Use of performance or competency tests when filling vacancies</i>	<i>44%</i>
<i>Preference given to internal applicants over external applicants when filling vacancies</i>	<i>28%</i>
<i>Have standard induction programme new employees *</i>	<i>76%</i>
<i>40% or more of employees have received formal off-the-job training in the last 12 months *</i>	<i>37%</i>
<i>Extent employees have "a lot" of variety in their work *</i>	<i>41%</i>
<i>40% or more of employees work in formally designated teams and jointly decide how work is to be done *</i>	<i>40%</i>
<i>40% or more have quality circles for the majority of non-managerial employees</i>	<i>16%</i>
<i>Formal employee attitude survey</i>	<i>40%</i>
<i>All non-managerial employees receive a formal performance appraisal</i>	<i>51%</i>
<i>Formal grievance procedures exist for non-managerial employees</i>	<i>90%</i>
<i>All employees have standard employment contracts *</i>	<i>79%</i>
<i>Formal written policy on equal opportunities or managing diversity</i>	<i>66%</i>
<i>Family friendly policy entitlements for non-managerial employees</i>	<i>18%</i>
<i>Job security guarantee for non-managerial/professional employees</i>	<i>5%</i>
<i>Performance related pay</i>	<i>38%</i>
<i>Employee share ownership schemes</i>	<i>25%</i>

Notes: * Applies to largest occupational group in workplace

The data is taken from the 1998 Workplace Employee Relations Survey as summarised by Guest, Michie, Sheehan, Conway, and Metochi (2001) and includes data from private sector establishments employing 25 or more (base=1278 UK workplaces). Data is obtained from a senior manager within the workplace responsible for personnel matters.

A wide range of HR practices exist and those considered vary across studies and, of course, organisations. A list of practices that are typically measured, and their incidence in UK organisations, is presented in Figure 19.

Studies examining the relationship between HRM have taken the form of looking at the effects of a single practice on organisational commitment, or a cluster of practices aggregated together.

There is now a fairly large number of studies, mainly conducted in the US and the UK, that find support for aggregated systems – referred to as bundles – of HR practices and their relationships with employee attitudes and behaviour, and also organisational performance. The approach of these studies (see Huselid, 1995; Guest, Michie, Conway and Sheehan, 2003; Appelbaum et al., 2000), is to create a bundle from a number of practices, such as the practices presented in Figure 14, and examine the effect of this bundle on outcomes. The rationale for using bundles is that HR policies and practices need to complement and mutually reinforce one another so that an effective synergy among practices is achieved (i.e., the overall effect is more than the sum of the effects of the individual practices); investing in specific HR policies is not seen as valuable (MacDuffie, 1995). Furthermore, the extent to which the practices are integrated with the company's business strategy is also believed to be important.

A key question for our purposes is whether a bundle of HR practices have been identified that relates to skills acquisition. At present there is insufficient theoretical or empirical work to answer this question. Suggested possibilities for a high-competency bundle appears likely to involve such practices aimed at selection and assessment, training and development, self-managed teams, and teamworking (Guest, 1997; Green, Mayhew and Molloy, 2003).

There is some evidence that Investors in People (IIP) accreditation impacts positively on human resource policies and practices aimed increasing training and skills. Cully et al. (1999), reporting data from the 1998 Workplace Employee Relations Survey, found that 64 percent of employees in organisations with IIP had received training on an annual basis, compared with 58 percent in other organisations.

8.6 Enabling Individual Organisational Interfaces

Insight from the Management Research Forum

It was generally believed that being over-qualified for a job led to retention problems. Setting realistic recruitment policies and expectations is therefore important. There can be other tensions between employees versus organisational requirements. Employees often desire accreditation and certificates for training as proof of the learning they have acquired. However this can be costly for management and produce little benefit for the firm. It can also create employee expectations relating to further training, advancement and career progress that management may have difficulties in delivering. Accreditation certificates can also makes staff more likely to be poached.

The 'fit' between an individual and their organisation has been examined in several ways. Person-job fit refers to refers to the fit between an employee's skills and job tasks; person-group fit is how compatible an employee is with their co-workers; person-organisation fit relates to the match between the employee and the organisation's values (Kristof-Brown, Jansen and Colbert, 2002).

Under-employment has been considered from three main perspectives. A person can be under-employed to the extent that occupy a low position in the organisational hierarchy, are under-paid, or do not have sufficient opportunity to utilise their skills (i.e., over-qualified) (Feldman, Leana and Bolino, 2002).

A lack of fit (especially person-job fit) and under-employment are clearly relevant to any discussion of skills. Both have most commonly been found to be associated with job dissatisfaction and the increased likelihood that the employee will quit their job.

The incidence of under-employment in the UK is not widely known. In the US Feldman estimates that about 25 percent of the workforce is under-employed. To the extent that under-employment exists in the UK, this problem poses a potential opportunity to reduce the skills gap. Several obvious avenues are open for policy makers and practitioners for finding ways of relocating under-employed individuals into more suitable jobs either inside or outside the organisation, redesigning jobs, and selection and assessment practices.

A poor fit could also occur where the employee is under-qualified for their job. Means of rectifying this type of mismatch are similar to being overqualified; however, the role of additional training is likely to be more effective in this case.

The CIHE report The Value of Higher Education notes current work from Elias and Purcell that suggests that even graduates in so-called non-graduate jobs, still consider that they are using the capabilities they developed while in higher education. It may well be that they are therefore growing their jobs. How far an "overeducated" workforce can be the stimulus for upgrading products and services is an issue that warrants further study.

8.7 Enabling via University-Industry-Partnerships

A broad and stable network of relationships between the institutions that try to form a skills alliance in order to bridge the gap between the perceived skills demand and supply seems to be a necessary prerequisite for the success of any national skills strategy. What role, however, does the university play in this context and what can we really expect from university-industry partnerships? In their book "The Social Life of Information" (2000) John Seely Brown and Paul Duguid give us an optimistic look beyond simplistic models. They provide a profound understanding of the contribution that communities, organisations, and institutions make to learning, working and innovating. For implementing fruitful university-industry-partnerships and for establishing an overall "skills alliance" their analysis gives important insight, as it shows the importance of respecting the roles specific institutions have to play:

"University research ... is at its most effective when it conducts research that the private sector is unable or unwilling to pursue. (Much early Internet research falls into this category.) ... Conversely, it is at its weakest when it merely duplicates research going on elsewhere." (Brown and Duguid, 2000, p. 236).

The starting point for building a skills alliance does not seem to be a balanced equation that easily allows for open co-operation between equal players. The situation is more complex: While companies, traditionally seen as 'demand-side' institutions can still decide to build their own skills supply channels (thus make a classical 'make instead of buy' decision), higher education institutions, traditionally seen as 'supply-side' institutions are double-dependent from the corporate sector as 'distribution channel' for their education products and services as well as supply channel for practice-orientated knowledge in people, products and processes.

Higher Education - Lessons from UCL and LBS

The Centre for Scientific Enterprise's mission is to create a new generation of scientists and managers to inspire and lead tomorrow's high technology companies. The Centre was formed between two established and well-regarded UK institutions, University College London (UCL) and London Business School (LBS).

The centre has amongst its aims:

- *Provide world-class technology entrepreneurship training to scientists and business people.*
- *Foster the creation of new high-growth technology companies.*

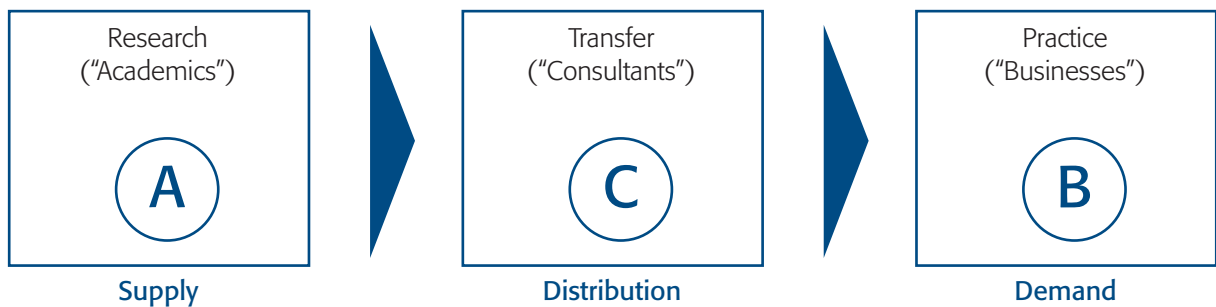
Given the well-known dearth of entrepreneurs, particularly in high-tech industries in the UK as compared to the US, this is a welcome initiative that is winning plaudits.

In a further effort, the centre has launched an initiative to bring foreigners into the country in an effort to boost the creation of technology companies. This is being done in collaboration with the Foreign and Commonwealth Office and aims to attract the very highest calibre men and women from around the world.

Therefore, to analyse how institutions of both sectors engage in interaction, which strategies, models and instruments they apply and which experiences they make is an important foundation for any strategy.

The most common model to describe knowledge transfer processes between academics (A), businesses (B) and intermediary institutions like consultants (C) looks at knowledge transfer from a value chain perspective and assigns clear roles: institutions of the research and education sector are seen as suppliers, businesses represent the demand side and intermediaries have to bridge the gap between supply and demand (see Figure 15).

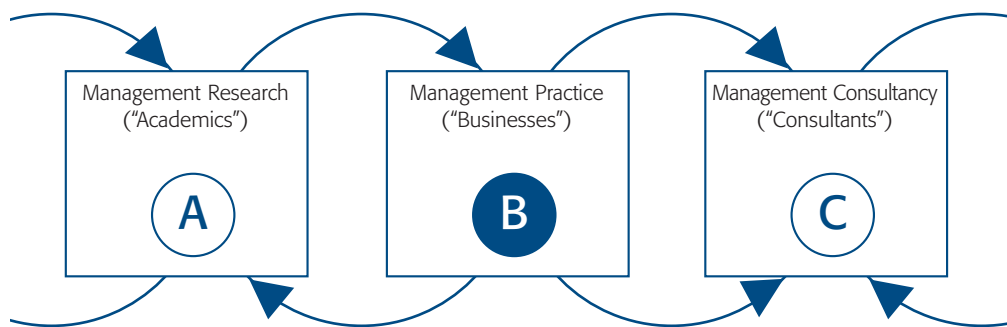
Figure 15: The traditional value-chain model of knowledge production: Applied Science Fiction? [Source: adapted from Moeslein, 2003]



While appealing because of its convincing simplicity and value chain metaphor, this model is mostly referred to as the “naïve value chain model”, “traditional waterfall model” or “the applied science fiction model” of knowledge transfer in current research literature (Whitley, 1984a; 1984b; Mazza, Alvarez, Comas, 2001, Nicolai 2002) as neither the roles that are assigned to the institutional players nor the causal relationships implied hold true when having a closer look at empiric reality.

As research with respect to knowledge transfer processes in the field of management knowledge shows (Lindvall and Pahlberg, 1998; Engwall, 1999; Huff, 2000; van de Ven, 2000; Byrkjeflot, 2001; Mazza, Alvarez, and Comas, 2001; Huff 2002), a model that looks at the institutional players as nodes of a network providing interaction and tries to find the drivers and barriers for balanced interaction seems to be much more adequate as a starting point for building up fruitful relationships between the institutions as partners of a skills alliance.

Figure 16: The interaction model of knowledge and skills creation [Source: adapted from Huff 2002, Moeslein 2003]



From the perspective of an interaction model the relationship between the players in the market of knowledge and skills can be described as a relationship of incentives and contributions that works best when balanced.

Westwood and Jones (2003) stress as a “primary challenge ... the fact that employers tend not to demand these skills if it means paying for them. They seem to be unwilling to bridge the gap between the low quality supply of skills in the UK workforce and their skills requirements”. Maybe, to switch from simplistic supply-demand orientated value-chain models of skills creation to more adequate models of interactive value creation could help to develop a better understanding of the perceived incentives and contributions that guide the actions of the different players of a skills alliance. Promising practice exemplars may give rise to the development of new models and concepts that aim at a more balanced concept of interactive value creation (e.g. VDI 2003).

Knowledge Transfer Partnerships, successor of the TCS programme and managed under contract to the Government's Department of Trade and Industry (DTI) by TTI, provide an example of a successful facilitator of balanced interaction. KTP aims at facilitating networks between research organisations, higher education institutions, further education colleges, companies as well as graduates. The objectives of Knowledge Transfer Partnerships are "to facilitate the transfer of knowledge and the spread of technical and management skills and encourage investment in training, research and development, to provide business based training, supervised jointly by personnel in the knowledge base and in business, for high calibre graduates intending to pursue a career in industry, to enhance the levels of research and training in the knowledge base that is relevant to business by stimulating collaborative research and development projects and forging lasting partnerships." (<http://www.ktponline.org.uk/>). By clearly specifying the advantage for each of the partners involved, they follow the vision of a balanced network. "What's in for me?" is the guiding question that precedes the discussion of participation and contribution not just on an institutional level but also for the individual within each of the target institutions.



9 Barriers

The fact that barriers exist between academia and business is widely recognised and well documented. The UK Government commissioned Richard Lambert, former editor of the Financial Times, to conduct a review of University-Industry links in the UK. He reported in mid-December 2003 (www.lambertreview.org.uk). The question of how to increase academic and business collaboration is not a new one and importantly not specifically a UK one. Research reported in 1981, for example, explored how to stimulate technology transfer between academic institutions and small businesses in the United States. Through visits and questionnaires to several hundred businesses in the Western Pennsylvania region, the authors were able to establish that the greatest barriers to collaboration were (i) perceptions of problem importance, (ii) time required to solve problems and (iii) appropriateness of cost factors (Dean, 1981). As a result the authors concluded, "...improved communication and cooperation between small business and academic institutions are only likely to happen through the re-education of pertinent attitudes and perceptions".

9.1 Financing Constraints

Firms invest when they have the finance to do so. Younger firms have fewer funds to invest with. The argument over financial constraints begins with the paper by Evans and Jovanovic (1982) that tried to explain why younger workers, who generally take up more risky jobs, do not take up entrepreneurship? They conclude that wealth is a critical influence on the decision to found a new firm. Almost all their firms found that they faced some cash limits. De Meza (2002) argues that there is "abundant evidence that personal wealth and membership of social groups play a major role in determine the identity of entrepreneurs and the scale at which they operate" (2002:F17).

In an investigation of the relationship between new firm performance and the skill mix, Haltiwanger, Lane and Spletzer (1999) found that owners' choices concerning different types of workers and efficiency persist over time. Haltiwanger, Lane and Spletzer (2000) show that the workers of similar skills match flock together across different units within firms. Sales staff with high productivity will match with high productivity engineers, for example. Complements to these high productivity workforces are new employment practices (Ichniowski, Shaw and Prennushi, 1997) and IT (Bresnahan, Brynjolfsson and Hitt, 1999). Ultimately, firms locate on a productivity/earnings/skill scale from low to high. Thus, some firms have low productivity, low wages and low skills, whereas others have high productivity, high wages, and high skills. The ability of the owner-manager makes the difference.

Consider the new firm founder who sets up in business. S/he has to decide at what level they are going to invest, where investment involves the set-up costs and all the costs until they get a stream of income to cover this (Evans and Jovanovic, 1995). The greater the amount of wealth you can access the higher your initial level of investment may be. However, if the new business is in an uncertain area, because it introduces a new product, or service for example, then the most risk averse entry is to start small. Although being small and new is a predictor of exit from an industry (Lieberman, 1990; Boeri and Bellman, 1995; Doms et al, 1995); starting small but growing is significantly associated with survival and the number of jobs that are added can be as few as two to make a great deal of difference to the likelihood of surviving the next few years (Phillips and Kirchoff, 1988; Disney, Haskel and Heden, 2003a).

Haltiwanger, Lane and Spletzer (2000) find that firms with low levels of efficiency are more likely to exit, in line with previous studies (Foster, Haltiwanger and Kriznan, 1998). Those firms that overestimate their 'firm type' are more likely to exit. Thus many firms start off with a belief in their ability to employ high wage, high skills workforce and find that the market opportunity that they identified does not enable them to do so, or the managerial ability that they supposed they had was not as good as they previously believed; however, there was no penalty for underestimating one's ability or type. Moreover, those firms that underestimated their type had similar chances of survival as those who correctly estimated their chances. So, starting small and starting with fewer and lower skilled workers is a more risk-averse way to enter an industry.

Moreover, recent research in the UK suggests that for the majority of single plant firms the productivity, once established, changes little (Disney, Haskel and Heden, 2003b). Hence, the decisions made at the early stage of the firm's life may become 'locked-in' (Stinchcombe, 1965; Carroll and Hannan, 2000); it would appear that where to position oneself on a productivity continuum from high to low is one of these decisions. Also if 40 percent of firms go bust every year, why invest significantly (especially if there are low barriers to entry).

Thesmar and Theonig (2000) explore the trade-off between efficiency and flexibility that firm's face in order to keep pace with changes in the product market. In Thesmar and Theonig's (2000) model, multiple equilibria occur. Their story begins with a new method, and a 'patent race' in the laboratory. Each laboratory engages in research and, when it is successful in the technology race, it puts its new technology into practice. Then, it faces a choice. It can choose a constant-returns technology (low technology option with no R&D costs but no productivity gains from R&D) or an increasing-returns technology (high technology option with R&D costs but productivity gains from R&D). It makes this choice based on its perception of the rate of creative-destruction (churning). If the firm believes that the churning rate to be high it chooses the constant-returns technology. This is because it does not want to undertake the sunk costs associated with the continuing R&D. The market is too volatile and the risks too high for the firm to pay these sunk costs, but the lower costs add to the firm's value. The high value increases the incentives to win the technology race, more innovation occurs, and then the high rate of churning becomes self-fulfilling. On the other hand, if the firm believes that the churning rate is low, it chooses the increasing-returns technology, lowers its value, and the churning rate remains low. High and low rates of churning can be self-fulfilling. The firm and industry may find themselves locked into path-dependent actions that create multiple equilibria. The greater the speed of change, the greater the risk of high level of turnover of firms and the less favoured is innovation. Thesmar and Theonig (2000) argue that there is a dilemma between a rigid organisational structure and innovation. Their model demonstrates that the views of the market are likely to colour the firm's choice of technology and thus these two elements interact.

9.2 The Academic Practitioner Divide

These same themes were explored in a report published in *Issues in Accounting Education* in the mid 1990s. This time a group involving accounting faculty and practitioners met to discuss their mutual concerns. They summarised their conversation in terms of a "persistent schism" and in doing so identified the perceptions held by each party about the other (Anonymous, 1995).

Figure 17: The Persistent Schism [Source: *Issues in Accounting Education*, 1995]

The Persistent Schism: Perceptions from Accounting

Perceptions held by faculty regarding practitioners:

- *Practitioners are interested only in recruiting.*
- *Practitioners are unable to understand research, and sometimes don't even realise that we do research.*
- *Firms and organisations often have a "leave it to human resources" attitude towards faculty relations.*
- *In public accounting, what is said at a national level often does not carry through to the local level.*
- *Firms' salaries are too low, and insufficient time and money are invested in developing staff.*
- *Practice experiences in the first two or three years are boring and are causing the smarter students to chose other majors.*
- *Practitioners are too focused on short-term results.*
- *There's not a lot to talk about with them.*

Perceptions held by practitioners regarding faculty:

- *Faculty are interested only in our money.*
- *Faculty are out of touch with what's going on in practice.*
- *Faculty have an easy life with few work demands.*
- *The only faculty mission is to teach; research is irrelevant to practice or education.*
- *Researchers are not interested in teaching.*
- *Researchers are not interested in students.*
- *Faculty are too focused on the long-term and are slow to produce results.*
- *There's not a lot to talk about with them.*

This piece made a particularly important point by recognising that practitioners and faculty are subject to different reward schemes and structures. Faculty at Universities are rewarded on the basis of peer acclimation, largely through their research although occasionally based on teaching materials they have developed. Today it could be argued that this schism is being further reinforced by the extensive use of Research Assessment and League Tables in the University sector, which require publication in academically excellent, but largely practitioner irrelevant journals.

9.3 Attitudinal Barriers

The barriers that exist between education and practice are not only cultural (Stokes, 2001). There is evidence, for example, that there are also significant attitudinal barriers. Lange et al. (1999) report that SMEs cite time and financial constraints as major reasons for lack of training. They argue that many SMEs do not have sufficient spare capacity to allow owner-managers (or other managers) time off to undertake training. Pettigrew et al. (1989) argue that this, couple with the cost of external training and/or consultants means that training is often perceived as “a luxury in small firms”.

A common complaint is that the labour market also influences the propensity of organisations to train. Given the increase in part time work and job mobility, many companies, particularly SMEs, claim that it is not worth investing in training. A phenomenon that is now conceptualised as a training deficit (Tregaskis and Brewster, 1998) and is said to be resulting in organisations taking a short-term, immediate payback stance, rather than a lifelong learning view (Westhead and Storey, 1999). Some senior managers in SMEs go as far as claiming that there is no point in training their people as when they train them they just make them more attractive to the competition (Neely et al., 1997).

As Stokes (2001) points out, however, “other research has challenged this so called “training deficit”, by claiming that small firms take a different approach to skills development”. Evidence suggests that while SMEs recognise the importance of training they tend to rely on on-the-job training with a focus on practical rather than theoretical skills (Tregaskis and Brewster, 1998; Vinten, 2000). Evidence also suggests that SMEs “prefer to use their own network of business contacts to acquire knowledge” (Stokes, 2001). Curran et al. (1996), for example, “report for low levels of formal training within UK SMEs, but high use of suppliers, trade bodies and professional associations as sources of knowledge”.

9.4 Individual Barriers

As highlighted earlier in the report, the basic literacy and innumeracy skills of the British population lags that of competitor countries. This prevents further upskilling and hence traps the individual.

Further to this is there is an engagement issues with individuals. At the owner-manager level evidence suggests that there are significant cultural barriers with many owner-managers viewing training as a waste of time with few promotional prospects (Jones, 1995). Frequently cost of training is identified as a barrier to engagement of the individual and certainly the current debate about University tuition fees and their likely impact on the individual's propensity to study is concerned with this. However, research by the Institute of Employment Studies (IES) suggests that cost is but one barrier that individuals are concerned with (Connor and Dewson, 2001). IES director Richard Pearson is quoted as saying “a lot of attention has focused on the perceived cost of higher-education participation as a barrier to entry for people from poorer backgrounds. This research reveals a wider range of influences in the decision-making process. Some young people prefer to start working sooner, begin earning, and become independent. Others do not see a degree as guaranteeing a better job at the end, or they have in mind a particular job or career that does not require a higher-education qualification”.

The gaps in participation rates vary significantly by social class. The IES study found 45 percent participation in higher education by people from high social class and only 17 percent by people from low social class. The reasons for this differential participation were identified as:

- “Expectations of the positive benefits and the longer-term value of higher-education study, especially labour-market outcomes;
- Perceptions of the costs likely to be incurred and how they might be met;
- Access to timely and relevant information about higher-education options, and also information on costs and available student support;

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- Encouragement given to developing their capabilities and confidence by teachers, further-education tutors and other mentors such as student friends and family;
 - Attitudes in parts of higher education towards their varying needs and aspirations" (Connor and Dewson, 2001).

9.5 Interface Barriers

As outlined in the opening paragraphs of this section there are also deep-seated cultural barriers between academia and practice. Some people argue that organisations want training that matches their precise business needs, while Further and Higher Education providers offer courses that are too academic and theoretical in nature (Curran, 1988). Others describe the cultures in terms of a "learning" versus a "teaching" orientation (Lave and Wenger, 1991), where "the former approaches learning from the perspective of the learner and is therefore embedded in everyday practice, whilst the latter tends to be prescribed by the provider and defines the resources for and access to learning" (Stokes, 2001).

Comments made at the Management Research Forum covered issues such as the lack of flexibility of Higher and Further Education providers. One participant commented that the higher up the academic pecking order the less willing the institution appeared to be to be flexible. With changing labour market practices this lack of flexibility is becoming an ever-increasing problem for organisations. Another participant at the Management Research Forum explained how they had refused to award a contract for a training programme to a university when it became apparent that the University could only deliver the course during term-time and never on Friday afternoons!

Increasingly, as technology develops and materials are developed, these shortcomings in flexibility will have to be addressed. Already there is growing evidence that companies are moving away from traditional forms of classroom based learning to distance and e-learning. "According to a leading market study (Xebec McGraw-Hill, 2001), 87 percent of surveyed organisations possess an intranet, and 28 percent of these organisations presently use it to deliver training, although this is anticipated to increase to 54 percent in the next three years" (Xebec McGraw/Hill, 2001) and research suggests that employers like e-learning because of its cost-effectiveness, operational effectiveness and flexibility (Beamish et al., 2002).

These interface barriers are particularly significant for England, not least because of the multitude of providers of education and the multiple (and apparently competing programmes). Clearly, this morass of programmes results in confusion for employers and can also result in progression barriers for individuals. For example, there is evidence that ancient universities are less inclined to accept people with HNCs and HNDs.

9.6 The Need for Partnership

It is clear from the comments above and from those made at the Management Research Forum that there is real need for partnership if we are to close the skills gaps that undoubtedly exist in the UK. The first area that partnership is needed is to identify and articulate these skill gaps, particularly because of the time lags inherent in the education process. One of the important messages from the Management Research Forum for Higher Education is that the people that they will be training will not enter the workplace for two to five years. How can Higher Education Institutions seek to fill skills gaps and shortages that will exist in two to five years time and not simply focusing on today's skills gaps and shortages?

How do training providers identify such skills gaps and shortages? Well clearly they need an excellent understand of how today's markets will evolve. Information on political, social, economic and technological trends will all provide useful input and much of it can be gleaned from employers. But, as John Healey, Economic Secretary to the Treasury in 2002 says it is not just employers and providers that have to provide input. "Employees and unions need to identify the gaps in their skills that throw up barriers to progression in the workplace and they, too, must be committed to addressing those shortfalls. It is no use suppliers and businesses investing in designing flexible courses that meet a range of skills and learning needs if the workforce does not add its own investment of commitment" (Healey, 2002).

10 Policy Implications

- To achieve any notable impact on productivity policy will need to address the stock of skills gap (lack of skills across the workforce) in addition to focusing on improvements to the flow of skills, from new entrants to the labour market.
- At a regional level there is a wide degree of skill inequality and it is recognised that skill inequality is a driver of income inequality. One way of addressing regional income inequality is to regionally differentiate investments in skills – e.g. additional funding for HE links with businesses in the North East to increase graduate retention in the region given there are relatively few graduates, etc.
- The sectoral dimension is also important. Both the Sector Skills Councils and the LSC have roles to play in better identifying sector needs and seeing how funding (as least within the LSC sector) can be directed to meeting those needs. Engaging with employers will be vital so they can articulate their requirements and get involved in the curriculum and in particular the work-based element.
- Developing policy simply at regional level, however, is dangerous for there are significant within-region differences – e.g. differences between the various London Boroughs, etc.
- Attention needs to be paid to the interfaces between the stakeholders, who between them could help address the skills gap. In particular, better links are required between organisations and higher/further education – so that both parties better understand the needs and capabilities of the other. There is a need for effective regional high-level forum for senior university and business representatives and tax breaks to encourage business to take more students on placements, develop and migrate business case studies into the curriculum, etc.
- Consideration should be given to a national qualifications and credit framework, encompassing the entire UK education system. Such a system would support work based learning and ease progression for individuals throughout lifelong learning.
- Policy needs to recognise the different missions and varied international aspirations of HE institutions. These aspirations may conflict with the regional and sectoral development agendas of the Regional Development Agencies (RDAs) and the Sector Skills Councils. It may be that the Scottish, USA and German experience of a more distinct sector focused on meeting vocational needs warrants more attention.
- Employers' value 'generic' skills, such as team-work and interpersonal skills, but it appears that our education process is not sufficiently focused on the development of these skills. How can the process of education best incorporate teaching and practice of these skills?



11 Research Implications

- In the report we discuss barriers that hinder co-operation amongst stakeholders. There is a need to research further these barriers and understand them in detail at both sectoral and regional levels.
- Amongst the barriers that prevent co-operation between businesses and HE/FE are cultural differences, flexibility and responsiveness. However, there are some good examples of collaboration. More research is needed so that we understand better how these collaborations function. Specific issues to be explored include risk-sharing, the use of technology and work-based learning, and the potential of skills and knowledge transfer through collaborative work and research.
- There is evidence that the national minimum wage has driven up skill levels as it has forced companies to move up the value chain. There is, however, conflicting evidence that the national minimum wage has driven more companies “underground” and forced them to adopt evasive practices. Further research is needed on the question of how policy decisions impact company positioning and value-adding strategies.
- While the research team was able to uncover some data on the strengths or otherwise of UK management, there is a relatively limited set of data on this issue. Further research on the comparative strengths and weaknesses of UK management and leadership is required. An element of this research should be to explore the extent to which managerial ability explains the residual productivity gap.
- A number of participants in the Forum expressed the view that the lack of individual aspiration and willingness to take risks in the UK means that people are less likely to engage in skill upgrades, life-long learning and entrepreneurial activity. Is this rhetoric or a real issue for the UK?
- One of the challenges for the future that was identified by participants in the Forum was the rapid growth and adoption of information technology. This has a role to play in the education and learning process, but also imposes demands in terms of skills. Further research is required to explore the relationship between IT investment and skills. Are they complementary? If so is rapidly rising IT intensity leading to a rapidly increasing demand for skills? Is there a ‘digital divide’ in IT investment by region? If so, what is its relationship with the regional skills gap?
- Are skills complementary with investment? The primary reason for the UK’s productivity gap with Europe and the US is underinvestment in capital in all its forms (physical, R&D and human capital). NIESER matched plant studies from the 1990s suggested this may be driven by the lack of skills in the UK to use higher tech investment. Beyond the suggestive results from these matched plant studies, very little general evidence exists. So are skills and investment complementary — and is it intermediate or higher and/or both that are important (i.e. need skilled workers, skilled managers and/or both)? Will solving our skills gap close the productivity gap by also encouraging more investment?



12 References

- 21st Century Skills (2003). 21st Century Skills: Realising Our Potential. Individuals, Employers, Nation, Presented to Parliament by the Secretary of State for Education and Skills by Command of Her Majesty, July 2003.*
- Alavi, M., and Gallupe, R.B. (2003). Using Information Technology in Learning: Case Studies in Business and Management Education. Academy of Management Learning & Education, 2(2), pp. 139-154.*
- Alterman, R., Wolf, Z., and Carpenter, T. (1998). 'Pragmatic Action', Cognitive Science, 22, pp. 53-105.*
- Anonymous (1995). Accounting faculty/practitioners partnership to address mutual education concerns, Issues in Accounting Education, 10, 1, pp. 197.*
- Appelbaum, E., Bailey, T., Berg, P., and Kalleberg, A. (2000). Manufacturing Advantage. Ithaca, NY: ILR Press.*
- Bandura, A. (1977). Social learning theory. Englewood Cliffs: Prentice Hall.*
- Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs: Prentice Hall.*
- Barron, J. M., Black, D. A. and Loewenstein, M. A. (1989). Job Matching and On-the-Job Training, Journal of Labor Economics, 7, 1, pp. 1-19.*
- Bartel, A. P. (1995). Training, Wage Growth, and Job Performance: Evidence from a Company Database, Journal of Labor Economics, 13, 3, 401-425.*
- Bass, B.M. (1996). From transactional to transformational leadership. In: Steers, R.M., Porter, L.W. and Bigley, G.A. (Eds.). Motivation and Leadership at Work, pp. 628-640.*
- Beamish, N., Armistead, C., Watkinson, M. and Armfield, G. (2002). The deployment of e-learning in UK/European corporate organisations, European Business Journal, London, 2002, 14, 3, pp. 1051-1116.*
- Best, M.H. (2001). The new Competitive Advantage: The renewal of American industry, Oxford University Press, Oxford.*
- Birley, S. and Westhead, P. (1990). Growth and Performance Contrasts between 'types' of small firms, Strategic Management Journal, 11, pp. 535-557.*
- Black, S. E. and Lynch, L.M. (1996). Human-Capital Investments and Productivity, American Economic Review, 86, 2, pp. 263-267.*
- Black, S. E. and Lynch, L.M. (1997). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity', National Bureau of Economic Research, Working Paper no. 6120.*
- Black, S. E. and Lynch, L.M. (2001). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity', Review of Economics and Statistics, Vol. 83, no. 3, pp. 434-445.*
- Blundell, R., Dearden, L. and Meghir, C. (1996). The Determinants of Work Related Training in Britain, London: Institute of Fiscal Studies.*
- Boeri, T. and Bellman, L. (1995). Post-entry Behaviours and the Cycle: Evidence from Germany, International Journal of Industrial Organisation, Vol. 13, pp. 483-500.*
- Bommer, W.H., Miles, E.W. and Grover, S.L. (2003). Does one good turn deserve another? Coworkers influences on employee citizenship. Journal of Organisational Behavior, 24, pp. 181-196.*
- Booth, A. (1991). Job-related formal training: who receives it and what is it worth?, Oxford Bulletin of Economics and Statistics, 53, pp. 281-294.*
- Booth, A. (1993). Private sector training and graduate earnings, Review of Economics and Statistics, 75, pp. 164-170.*
- Borghans, L., de Grip, A., (2000). Skills and Low Pay: Upgrading or Over-education? In: M. Gregory, W. Salverda and S. Bazen (eds.) Labour Market Inequalities: Problems and Policies in International Perspective, Oxford University Press, Oxford, pp. 198-223.*
- Bosworth, D. (1999). Empirical evidence on management skills in the UK. Paper presented to the DfEE workshop on Management Skills 5th July, Manchester.*
- Bound, J. and Johnson, G. (1992). Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations, American Economic Review, 82, pp. 371-92.*

-
- Brackett, M.A. and Mayer, J.D. (2003). *Convergent, Discriminant, and Incremental Validity of Competing Measures of Emotional Intelligence*. *Personality-and-Social-Psychology-Bulletin*, 29(9): pp. 1147-1158.
- Bresnahan, T.F., Brynjolfsson, E. and Hitt, L.M. (1999). *Information technology, workplace organisation, and the demand for skilled labour*, NBER WP 7136, May 1999.
- Brower, H.H. (2003). *On Emulating Classroom Discussion in a Distance-Delivered OBHR Course: Creating an On-Line Learning Community*. *Academy of Management Learning & Education*, 2(1), pp. 22-37.
- Brown, J.S. and Duguid, P. (2000). *The Social Life of Information*, Harvard Business School Press: Boston MA 2000.
- Buxton, A., Chapman, P., and Temple, P. (eds.) (1998). *Britain's Economic Performance*, (2nd. Ed.) Routledge, London.
- Byrkjeflot, H. (2001). *The Structure of Management Education in Europe*, CEMP – The Creation of European Management Practice, Report No. 8, Uppsala, Sweden, October 2001.
- Cacioppo, J.T. and Gardner, W.L. (1999). *Emotion*. *Annual Review of Psychology*, 50, pp. 191-214.
- Campbell, M. (2001). *Skills in England 2001: The Research Report*, Department for Education and Skills, UK, November.
- Campbell, M., Baldwin, S., Johnson, S., Chapman, R., Upton, A. and Walton, F. (2001). *Skills in England 2001*, DFES, Nottingham.
- Caroli, E. and Van Reenen, J. (2000). *Organisation, skills and technology: evidence from a panel of British and French establishments*, IFS working paper.
- Carroll, G., and Hannen, M.T. (2000). *The Demography of Corporations and Industries*, Princeton University Press, New Jersey.
- CBI/TUC (2001). *The UK Productivity Challenge*. CBI/TUC submission to the Productivity Initiative.
- CEML (2002). *Managers and Leaders: Raising our game*, Council for Excellence in Management and Leadership, London.
- CIPD (2002). *Who learns at work?* London: Chartered Institute of Personnel Development.
- Cohn, E. and Khan, S.P. (1995). *The Wage Effects of Overschooling Revisited*, *Labour Economics*, 2, pp. 67-76.
- Colquitt, J.A., LePine, J.A. and Noe, R.A. (2000). *Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research*. *Journal of Applied Psychology*, 85(5), pp. 678-707.
- Connor, H., and Dewson, S. (2001). *Social gap in higher education 'not only a matter of cost'*, *Education & Training*, London, 2001, 43, 8/9, pp. 451-452.
- Constable, J. and McCormick, R. (1987). *The Making of Managers*, British Institute for Management, London.
- Cosh, A. and Hughes, A. (eds.) (2000). *British Enterprise in Transition*, Centre for Business Research, Cambridge.
- Cosh, A., and Hughes, A. (1994). *Size, Financial Structure and Profitability: UK Companies in the 1980s*. In: Hughes, A. and Storey, D.J. (eds). *Finance and the Small Firm*, Routledge, London, pp. 18-63.
- Coyle-Shapiro, J.A.M. (2003). *A psychological contract perspective on organisational citizenship behavior*. *Journal-of-Organisational-Behavior*, 23(8), pp. 927-946.
- Crafts and O'Mahoney (2001). *A perspective on UK Productivity performance*, *Fiscal studies*.
- Cross, R., Parker, A., Prusak, L., and Borgatti, S.P. (2001). *Knowing what we know: Supporting knowledge creation and sharing in social networks*. *Organisational Dynamics*, 30(2), pp. 100-120.
- Cully, M., Woodland, S., O'Reilly, A. and Dix, G. (1999). *Britain at Work: As depicted by the 1998 Workplace Employee Relations Survey*. London: Routledge.
- Curran, J. (1988). *Training and research strategies for small firms*. *Journal of General Management*, Vol. 13.
- Curran, J., Blackburn, R.A., Kitching, J., and North, J. (1996). *Establishing Small Firms' Training Practices, Needs, Difficulties, and Use of Industry Training Organisations*, HMSO, DfEE Research studies RS17 quoted in Stokes, A. (2001). *Using telementoring to deliver training to SMEs: A pilot study*, *Education & Training*, 43, 6, pp. 317-324.

DAAD (2003): *Study, Research and Teaching in Germany: Fachhochschulen*, <http://www.daad.de/deutschland/en/2.1.1.1.html>.

Dansereau, D.F. (1985). *Learning strategy research*. In Segal, J.W., Chipman, S.F., and Glaser, R. (eds). *Thinking and Learning Skills*, 1, pp. 209-239, NJ: Lawrence Erlbaum.

De la Fuente, A. and Domenech, R. (2000). *Human Capital in Growth Regressions: How much difference does data quality make?*, mimeo, Universidad Autonoma de Barcelona, Jan 2002.

De Meza, D. (2002). *Overlending*, *Economic Journal*, 112, pp. F17-F31.

Dean, C.W. (1981). *A Study of University/Small Business Interaction for Technology Transfer*, *Technovation*, Aug, pp. 109-134.

Dearden, L., McIntosh, L., Myck, M., and Vignoles, A. (2000). *The Returns to Academics, Vocational and Basic Skills in Britain*, DFEE research report no. 192, DFEE, Nottingham.

Dearden, L., McIntosh, L., Myck, M., and Vignoles, A. (2001). *Basic Skills, Soft Skills and Labour Market Outcomes*, DfES research report no. 250, DfES, Nottingham.

Dearden, L., Reed, H. and Van Reenen, J. (2003). *Who Gains when Workers Train? Training and Corporate Productivity in a Panel of British Industries*, IFS Working Paper No. W00/04, March.

Deloitte, Haskins and Sells (1989). *Management Challenge for the 1990s: The Current Education, Training and Development Debate*, Department for Employment, Sheffield.

Dench, S., Perryman, S., and Giles, L. (1998). *Employers Perceptions of Key Skills*, IES Report no. 349, Institute of Employment Studies, Sussex.

DfES (2003a). *Developing a National Skills Strategy and Delivery Plan: Underlying Evidence*, Dfes Publications, Nottingham.

DfES (2003b). *Skills for Success - What the Skills Strategy Means for Business*, Department for Education and Skills.

Disney, R., Haskel, J., and Heden, Y. (2003a). *Entry, exit and establishment survival in UK manufacturing*, *Journal of Industrial Economics*, 51(1), pp. 91-112.

Disney, R., Haskel, J., and Heden, Y. (2003b). *Restructuring and Productivity Growth in UK manufacturing*, *Economic Journal*, 113, pp. 666-694.

Doms, M., Dunne, T., and Roberts, M.J. (1995). *The Role of Technology use in the Survival and Growth of Manufacturing Plants*, *International Journal of Industrial Organisation*, Vol. 13, pp. 523-542.

Dowling, P. (1991). *The Contextualizing of Mathematics: Toward a Theoretical Map*, in M. Harris (ed.), *Schools, Mathematics, and Work*, The Palmer Press, London.

DTI (2001). *UK Competitiveness Indicators*, 2nd ed. DTI, London.

Duncan, G. and Hoffman, S. (1981). *The Incidence and Wage Effects of Overeducation*, *Economics of Education Review*, 1, pp. 75-86.

Elias, P., and McKnight, A. (2001) *Skill measurement in official statistics: Recent developments in the UK and the rest of Europe* *Oxford Economic Papers* Vol. 53 Issue 3, pp. 508-540.

Engwall, L. (1999). *The Carriers of European Management Ideas*, CEMP – *The Creation of European Management Practice*, Report No. 7, Uppsala, Sweden, December.

Evans, D., and Jovanovic B. (1989). *An Estimated Model of Entrepreneurial Choice under Liquidity Constraints*, *Journal of Political Economy*, Vol.97, No. 4, pp. 808-827.

Federal Ministry of Education and Research (2002). *Fachhochschulen in Germany*, 3rd revised edition, Federal Ministry of Education and Research (BMBF), January.

Feldman, D.C., Leana, C.R., and Bolino, M.C. (2002). *Underemployment and relative deprivation among re-employed executives*. *Journal-of-Occupational-and-Organisational-Psychology*, 75(4), pp. 453-471.

-
- Felstead, A. (2001). *Putting skills in their place: the regional pattern of work skills in late twentieth century Britain*, in Evans K., Hodkinson P., and Unwin L. (eds). *Learning and the Workplace*, Kogan Page, London.
- Fields, D.L. (2002). *Taking the measure of work: a guide to validated scales for organisational research and diagnosis*. Sage: CA.
- Finegold, D. (1999). *Creating Self-Sustaining High-Skill Ecosystems*. *Oxford Review of Economic Policy*, 15(1), pp. 60-81.
- Finegold, D. and Soskice, D. (1988). *The failure of training in Britain: Analysis and prescription*. *Oxford Review of Economic Policy*, 4(3), pp. 21-53.
- Finegold, D., Keep, E., Miliband, D., Robertson, D., Sisson, K., and Ziman, J. (1992). *Higher Education: Expansion and Reform*. Institute for Public Policy Research, London.
- Foster, L., Haltiwanger, J.C., and Krizan, C.J (1998). *Aggregate productivity growth: Lessons from Microeconomic Evidence*. NBER working paper No. 6803, Cambridge, MA.
- Fraser, S. (2002). *The impact of Investors in People on Small Business Growth: Pain or Panacea*. Paper presented at the 25th ISBA National Small Firms Conference, Brighton, pp. 945-967.
- Fraser, S., Storey, D., Frankish, J., and Roberts, R. (2002). *The relationship between training and small business performance: an analysis of the Barclays Bank Small Firms Training Loans Scheme*, *Environment and Planning C: Government and Policy*, 20, pp. 211-233.
- Galindo-Rueda, F., Machin, S. and Vignoles, A. (2003). *Productivity and Education*. CEE mimeo.
- Ghoshal, S. and Bartlett, C.A. (1999). *The Individualised Corporation – A Fundamentally New Approach to Management*. Heinemann, London.
- Goleman, D. (1995). *Emotional Intelligence*. NY: Bantam.
- Goodwin, V.L., Wofford, J.C. and Whittington, J.L. (2001). *A theoretical and empirical extension of the transformational leadership construct*. *Journal of Organisational Behavior*, 22(7), pp. 759-774.
- Green, F., Mayhew, K., and Molloy, E. (2003). *Skills at work. Social Science Week: The Report*. ESRC.
- Green, F., Ashton, D., and Felstead, A., (2001). *Estimating the determinants of supply of computing, problem-solving, communication, social, and teamworking skills*. *Oxford Economic Papers*, Vol. 53 Iss. 3 pp. 406-433.
- Greenhalgh, C. and Stewart, M. (1987). *The effects and determinants of training*. *Oxford Bulletin of Economics and Statistics*, 49, pp. 171-189.
- Greeno, J. (1998). *The Situativity of Knowing, Learning, and Research*, *American Psychologist*, 53, pp. 5-26.
- Groot, W. and Maassen van den Brink, H. (1996). *Overscholing en verdringing op de arbeidsmarkt*, *Economisch Statistische Berichten*, 81, pp. 74-7.
- Guest, D. E. (1997). *Human Resource management and performance: a review and research agenda*. *The International Journal of Human Resource Management*, 8(3), pp. 263-276.
- Guest, D., Michie, J., Conway, N., and Sheehan, M. (2003). *A Study of Human Resource Management and Corporate Performance in the UK*. *British Journal of Industrial Relations*, 41(2), pp. 291-314.
- Guest, D., Michie, J., Sheehan, M., Conway, N and Metochi, M. (2001). *Effective People Management*. London: CIPD.
- Guile, D. and Fonda, N. (1998). *Performance Management through Capability*. Institute for Personnel and Development, London.
- Guile, D. and Fonda, N. (1999). *Management Learning for Added Value*. Institute for Personnel and Development, London.
- Hall, R. and Jones, C. (1999). *Why do some countries produce so much more output per worker than others?*. *QJE*, 114, 1, pp. 83-116.
- Haltiwanger, J.C., Lane, J.I., and Spletzer, J.R. (1999). *Productivity differences across employers: the roles of employer size, age, and human capital*. *American economic review* Vol.89, No.2, pp. 94-98.

-
- Haltiwanger, J.C., Lane, J.I., and Spletzer, J.R. (2000). *Wages, productivity and the Dynamic Interaction of Businesses and Workers*. NBER working paper No. 7994, Cambridge, MA.
- Hansen, M.T. (2002). *Knowledge networks: Explaining effective knowledge sharing in multiunit companies*. *Organisation-Science*, 13(3), pp. 232-248.
- Healey, J. (2002). *FE Colleges Must Adapt their Range of Courses to Address Skills Shortages*. *The Guardian*, 3rd December, p. 43.
- Herriot, P. and Pemberton, C. (1996). *Contracting careers*. *Human Relations*, 49(6), pp. 759-590.
- Hersch, J. (1991). *Education Match and Job Match*. *Review of Economics and Statistics*, 73, 140-4.
- Hirsch, W. and Carter, A. (2002). *New Directions in Management Development*. Institute of manpower Studies, Brighton.
- Hirschhorn, L. (1984). *Beyond Mechanization: Work and Technology in a Postindustrial Age*. MIT Press, Cambridge, MA.
- HM Treasury (1998). *Pre-Budget Report*. Cm. 4076, London: Stationery Office.
- HM Treasury (2000). *Productivity in the UK: The Evidence and the Governments Approach*. London: Stationery Office.
- Hodson, R. (1999). *Management citizenship behavior: A new concept and an empirical test*. *Social-Problems*, 46(3), pp. 460-478.
- Hogarth, T. and Wilson, R. (2002). *Skills Matter: A synthesis of Research on the Extent, Causes and Implications of Skill Deficiencies*. Department for Education and Skills, Nottingham.
- Huff, A.S. (2000). *Changes in Organisational Knowledge Production, 1999 Presidential Address*. In: *Academy of Management Review*, Vol. 25, No. 2, 2000, pp. 288-293.
- Huff, A.S. (2002). *What is the future of management education?* 2nd Annual Conference of the European Academy of Management, Stockholm, May 8-11, 2002.
- Huselid, M. (1995). *The impact of human resource management practices on turnover, productivity and corporate financial performance*. *Academy of Management Journal*, 38, pp. 635-670.
- Ichniowski, C., Shaw, K. and Prennushi, G. (1997). *The Effects of Human Resource Management practices on Productivity: A Study of Steel Finishing Lines*. *American Economic Review*, pp. 291-313.
- Institute for Employment Research (2001). *Projections of Occupations and Qualifications: 2000/2001: Research in support of the national skills task force*. IER, University of Warwick, Coventry.
- Institute for Employment Studies (2000). *Skill Needs in Engineering, Skills Dialogue Report no. 2*. DfEE, London.
- Institute of Management (1994). *Management Development to the Millenium: The Cannon and Taylor Working party reports*. Institute of Management, London.
- Jenkins, Vignoles, Wolf, Galindo-Rueda (2003). *The Determinants and Effects of Lifelong learning*. CEE discussion paper, LSE.
- Jones, A. (1995) in: Hendry, C., Arthur, M. and Jones, A. (Eds). *Strategy through People: Adaption and Learning in the Small-Medium Enterprise*. Routledge, London.
- Jones, C. (1998). *Introduction to Economic Growth*. Publisher W.W. Norton.
- Jorgenson, Dale and Fraumeni, B.M. (1992). *The Accumulation of Human and Nonhuman Capital 1948-1984*. *Journal of Economic Surveys*, pp. 273-331.
- Jovanovic, B. (1982). *Selection and the evolution of industry*. *Econometrica*, Vol. 50, No. 3, pp. 649-670.
- Kanfer, R. (1991). *Motivational theory and industrial and organisational psychology*. In MD Dunnette, LM Hough, M Leaetta (eds) *Handbook of Industrial and Organisational Psychology*. CA: Consultant Psychology, 2, pp. 75-170.
- Kanfer, R. and Ackerman, P.L. (1996). *A self-regulatory skills perspective to reducing cognitive interference*. In: Sarason, I.G., Pierce, G.R. and Sarason, B.R. (Eds.). *Cognitive interference: Theories, Methods and Findings*, NJ: Lawrence Erlbaum, pp. 153-171.

-
- Karambaya, R. (1991). *Contexts for organisational citizenship: Do high performing and satisfying units have better citizens?* Unpublished manuscript, York University.
- Katz, L.F. and Murphy, K.M. (1992). *Changes in Relative Wages, 1963-1987: Supply and Demand Factors*. *Quarterly Journal of Economics*, 107, pp. 35-78.
- Keep, E. and Mayhew, K. (1999). *The assessment: Knowledge, Skills and Competitiveness*. *Oxford Review of Economic Policy*, 15(1), pp. 1-15.
- Keep, E. and Westwood, A. (2002). *Can the UK learn to manage?* Work Foundation, London.
- Koike, K. and Inoki, T. (eds) (1990). *Skill Formation in Japan and Southeast Asia*. University of Tokyo Press, Tokyo.
- Klenow, P. and Rodriguez, A. (1997). *The neo-classical revival in growth economics: has it gone too far*. NBER Macroeconomics Annual, NBER.
- Kristof-Brown, A.L., Jansen, K.J., and Colbert, A.E. (2002). *A policy-capturing study of the simultaneous effects of fit with jobs, groups, and organisations*. *Journal of Applied Psychology*, 87(5), pp. 985-993.
- Lange, T., Ottens, M., and Taylor, A. (1999). *SMEs and barriers to skills development: a Scottish perspective*. *Journal of European Industrial Training*, Vol. 24 No. 1.
- Lave, J. (1988). *Cognition in Practice: Mind, Mathematics, and Culture in Everyday Life*. Cambridge University Press, Cambridge, MA.
- Lave, J. and Wenger, E. (1991). *Situated Learning. Legitimate Peripheral Participation*. Cambridge University Press, Cambridge.
- Lieberman, M.B. (1990). *Exit and declining industries: 'Shakeout' or 'Stakeout'?* *RAND Journal of Economics*, Vol. 21, pp. 538-554.
- Lindvall, J. and Pahlberg, C. (1998). *Multinationals as Carriers of Management Practice, CEMP – The Creation of European Management Practice*. Report No. 3, Uppsala, Sweden, December.
- MacDuffie, J.P. (1995). *Human resource bundles and manufacturing performance: Organisational logic and flexible production systems in the world auto industry*. *Industrial and Labor Relations Review*, 48, pp. 197-221.
- Management Charter Initiative (1992). *Management development in the UK*. MCI, London.
- Mangham, I. and Silvers, M.S. (1986). *Management Training: Context and practice*. ESRC, London.
- Mankiw, G., Romer, D. and Weil, D. (1992). *A contribution to the empirics of economic growth*. *QJE* pp. 407-437.
- Mason, G., Keltner, B., and Wagner, K. (2000). *Productivity and service quality in banking: commercial lending in Britain, the United States and Germany*. In: Barrell R., Mason G., and O'Mahony (eds). *Productivity, Innovation and Economic Performance*. NIESR, Cambridge University Press, pp. 117-148.
- Maton, K. (1999). *Evaluation of small firms training loans*. Department of Education and Employment, London.
- Mayer, J.D. and Salovey, P. (1993). *The intelligence of emotional intelligence*. *Intelligence*, 17, pp. 433-42.
- Mayhew, K. (2003). *The UK Skills and Productivity Gap*. Talk given to the CIHE/AIM Colloquia 30th October.
- Mazza, C., Alvarez, J.L., and Comas, J. (2001). *The Next Step: Media Influences on Knowledge-in-Practice*. CEMP – The Creation of European Management Practice, Report No. 15, Uppsala, Sweden, July.
- McEvily, S.K., Das, S., and McCabe, K. (2000). *Avoiding competence substitution through knowledge sharing*. *Academy-of-Management-Review*, 25(2), pp. 294-311.
- McIntosh, S. (2003). *What Difference Does it Make? Vocational Education for Low-Achieving School-Leaver*. CEE mimeo.
- McIntosh, S. and Steedman, H. (2001). *Learning in the workplace: some international comparisons*. In: Coffield, F. (ed.). *What progress are we making with Lifelong Learning? The evidence from research*, Department of Education, University of Newcastle, pp. 87-100.
- Meyer, H. (2003). *The German Perspective*. Talk given to the CIHE/AIM Colloquia 30th October 2003.
-

-
- Milgrom, P. and Roberts, J. (1986). Price and advertising signals of product quality. *Journal of Political Economy*, 94, pp. 796-821.
- Moeslein, K. (2003). Die Generierung von Managementwissen im Spannungsfeld von Unternehmen und Markt. TUM Business School, IWP-250603, June.
- Mole, K., Greene, F.J. and Storey, D.J. (2002). Entrepreneurship in Three English Counties. Paper presented at the 25th ISBA National Small Firms Conference, Brighton.
- Moreno, L. (1997). The determinants of Spanish industrial exports to the European Union. *Applied Economics*, Vol. 29, Issue 6, pp. 723-732.
- Murnane, R.J., Willett, J.B. and Levy F. (1995). The growing importance of cognitive skills in wage determination. *Review of Economics and Statistics*, 77 (2), pp. 251-266.
- Neely, A.D., Allen, J.P., Grant, E., Kennerley, M., and Lamb, M. (1997). *Competing to Win: A Comparison of Manufacturing Companies in the Eastern Region and Baden-Württemberg*. Report commissioned by the Government Office for the Eastern Region.
- Nickell, S. and Nicolitsas, D. (2000). Human capital, investment and innovation: what are the connections? In: Barrell, R., Mason, G., and O'Mahony M. (eds.). *Productivity, Innovation and Economic Performance*. Cambridge University Press, Cambridge, pp. 268-289.
- Nickson, D., Warhurst, C., Witz, A., and Cullen, A.M. (1998). Aesthetic Labour in the Service Economy: An overlooked development. Paper presented to the 3rd International Labour market Conference Aberdeen, June.
- Nicolai, A.T. (2002). Reflections on the Utilization of Management Knowledge: The Case 'Competitive Strategy', Wittener Diskussionspapiere. Heft Nr. 93, Universität Witten / Herdecke, März.
- O'Connell, P.J. (1999). Adults in training: An international comparison of continuing education and training. CER/WD (99) 1, Centre for Education Research and Innovation, Organisation for Economic Co-operation and Development, Paris.
- O'Mahony, M. and De Boer, W. (2002). Britain's relative productivity performance: update and extensions. NIESR.
- OECD (1996). *Literacy, Economy and Society: Results of the First International Adult Literacy Survey*. OECD and Human Resources Development, Paris.
- OECD (1997). *Literacy skills for the Knowledge Society: Further results from the International Adult Literacy Survey*. OECD and Human Resources Development, Canada.
- OECD (1999). *OECD Employment Outlook*. Organisation for Economic Co-operation and Development, Paris.
- OECD (2000). *Literacy in the Information age*. Organisation for Economic Co-operation and Development, Paris.
- OECD (2001). *Education policy analysis*. Organisation for Economic Co-operation and Development, Paris.
- Organ, D.W. and Payne, B.P. (1999). A new kind of industrial and organisational psychology: Recent contributions to the study of organisational citizenship behavior. *International Review of Industrial and Organisational Psychology*, 14, pp. 337-368.
- Organ, D.W. (1988). *Organisational citizenship behavior: The good soldier syndrome*. Lexington, MA, England.
- Osterman, P. (1994). How common is workplace transformation and who adopts it? *Industrial and Labor Relations Review*, 47, pp. 173-88.
- Oulton, N. (1996). Workforce skills and export competitiveness. In: Booth, A.L. and Snower D.J. (eds) *Acquiring Skills*. Cambridge University Press, Cambridge, pp. 199-230.
- Oulton, N. (2001). Why do foreign-owned firms have higher labour productivity? In N. Pain (eds) *Inward Investment, Technological Change and Growth*. NIESR and Palgrave, London.
- Outrata, R (1998). International competitiveness of Slovak industry and the process of acceding to the European Union. *Ekonomicky Casopis* 46 (2), pp. 186-201.
- Parker, S.K. and Axtell, C.M. (2001). Seeing another viewpoint: Antecedents and outcomes of employee perspective taking. *Academy of Management-Journal*, 44(6), pp. 1085-1100.

-
- Parker, S.K., Wall, T.D., and Cordery, J.L. (2001). *Future work design research and practice: towards an elaborated model of work design*. *Journal of Occupational and Organisational Psychology*, 74(4), pp. 413-440.
- Pettigrew, A., Hendry, C., and Sparrow, P. (1989). *Training in Britain: Employers' Perspectives on Human Resources*. HMSO, London.
- Phillips, B.D., and Kirchoff, B.A. (1988). *The survival and quality of jobs generated by entrepreneurial firms*. Paper presented to the Annual Babson Conference on Entrepreneurship, Calgary, Canada.
- Podsakoff, P.M., Ahearne, M. and MacKenzie, S.B. (1997). *Organisational citizenship behavior and the quantity and quality of work group performance*. *Journal of Applied Psychology*, 82(2): pp. 262-270.
- Podsakoff, P.M., MacKenzie, S.B., Moorman, R. and Fetter, J. (1990). *Transformational behaviors and their effects on followers trust in leader, satisfaction and OCBs*. *Journal of Organisational Behavior*, 16, pp. 289-298.
- Podsakoff, P.M., MacKenzie, S.B., Paine, J.B. and Bachrach, D.G. (2000). *Organisational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research*. *Journal of Management*, 26(3) pp. 513-563.
- Prahalad, C.K. (1997). *The work of the new age manager in the emerging competitive landscape*, in Hesselbein F., Goldsmith M. and Beckard, R. (eds.). *The organisation of the Future*, Jossey-Bass, San Francisco.
- Quinones, M.A. (1995). *Pretraining context effects: training assignment as feedback*. *Journal of Applied Psychology*, 80 pp. 226-38.
- Resnick, L. (1991). *Shared Cognition: Thinking as Social Practice*, in L. Resnick, J. Levine, and S. Teasley (eds), *Perspectives in Socially Shared Cognition*. American Psychological Association, Washington, DC.
- Robinson, S. L. and Rousseau, D. M. (1994). *Violating the psychological contract: not the exception but the norm*. *Journal of Organisational Behaviour*, 15, pp. 245-259.
- Rogoff, B. and Charajay, P. (1995). *What's Become of Research on the Cultural Basis of Cognitive Development?* *American Psychologist*, 50, 859-77.
- Rogoff, B. and Lave, J. (eds) (1984). *Everyday Cognition: Its Development in Social Context*. Harvard University Press, Cambridge, MA.
- Scribner, S. (1984). *Studying Working Intelligence*, in B. Rogoff and J. Lave (eds), *Everyday Cognition: Its Development in Social Context*. Harvard University Press, Cambridge, MA.
- Rosen, S. (1972) *Learning and Experience in the Labor Market*. *Journal of Human Resources*, VII, 326-42.
- Rousseau, D.M. (1997). *Organisational behavior in the new organisational era*. *Annual Review of Psychology*, 48, pp. 515-546.
- Rousseau, D.M. (2001). *Schema, promise and mutuality: The building blocks of the psychological contract*. *Journal of Occupational and Organisational Psychology*, 74, 511-541.
- Rousseau, D.M. and Shperling, Z. (2003). *Pieces of the action: Ownership and the changing employment relationship*. *Academy-of-Management-Review*, 28(4), pp. 553-570.
- Russel, J. S., Terborg, J. R. and Powers, M L. (1985). *Organisational Performance and Organisational Level Training and Support*. *Personnel Psychology*, Vol. 38, pp. 849-863.
- Salas, E. and Cannon-Bowers, J.A. (2001). *The science of training: a decade of progress*. *Annual Review of Psychology*. 52, 471-499.
- Scribner, S. (1988). *Head and Hand: An Action Approach to Thinking*. Occasional Paper No. 3, National Center on Education and Employment, New York, NY.
- Shy, O. (1995). *Industrial Organisation: Theory and Applications*. MIT Press, London.
- Sianesi, B. (2003). *Returns to Education*. CEE mimeo.
- Sianesi, B. and Van Reenen, J. (2002). *The Returns to Education: A Review of the Empirical Macro Economic Literature*, The Institute for Fiscal Studies WP02/05.
- Skills Insight, (2001). *Annual Skills Review*. http://www.skills-insight.org.uk/reports/pdfs/SI_ASR2001/Chapter 1 pg 5-6.pdf. pp. 5-6.

-
- Solow, R. (1956). *A contribution to the theory of economic growth*. QJE. Feb.
- Soskice, D. (1993). *Social Skills from Mass Higher Education: Rethinking the Company-based Initial Training Paradigm*. *Oxford Review of Economic Policy*, 9(3), pp. 101-113.
- Spence, M. (1977). *Consumer misperceptions, product failure and producer liability*. *Review of Economic Studies*, 44, pp. 561-572.
- Stajkovic, A.D. and Luthans, F. (1998). *Self-efficacy and work-related performance: A meta-analysis*. *Psychological-Bulletin*, 124(2). pp. 240-261.
- Stasz, C., Ramsey, K., Eden, R., Melamid, E., and Kaganoff, T. (1996). *Workplace Skills in Practice: Case Studies of Technical Work*. MR-722-NCRVE/UCB, RAND, Santa Monica, CA.
- Stasz, C., (2001) *Assessing skills for work: Two perspectives*. *Oxford Economic Papers*. Vol 53, issue 3, pp. 385-405.
- Stevens, M. (1994). *A theoretical model of on-the-job training with imperfect competition*. *Oxford Economic Papers*, 46, pp. 537-562.
- Stevens, M. (1999). *Human capital theory and UK vocational training policy*. *Oxford Review of Economic Policy*, 15(1), pp. 16-32.
- Stinchcombe, A. (1965). *Social structure and organisations*. In: March, J.G. (ed.). *Handbook of Organisations*, Chicago, Rand McNally.
- Stokes, A. (2001). *Using telementoring to deliver training to SMEs: A pilot study*. *Education & Training*, 43, 6, pp. 317-324.
- Storey, D.J. and Westhead, P. (1994). *Management Development in Small and Medium Sized Enterprises with Growth Potential*. Confederation of British Industry, London.
- Streeck, W. (1989). *Skills and the limits of neoliberalism: the enterprise of the future as a place of learning*. *Work, Employment and Society*, 3, pp. 89-104.
- Sutcliffe, K.M. (1994). *What executives notice: Accurate perceptions in top management teams*. *Academy of Management Journal* 37(5), pp. 1370-1378.
- Tannenbaum, S.I. and Yukl, G. (1992). *Training and development in work organisations*. *Annual Review of Psychology*. 43, pp. 399-441.
- Thesmar, D., and Thoenig, M. (2000). *Creative Destruction and Firm Organisational Choice*. *Quarterly Journal of Economics*, Vol.CXV, No.4, pp.1201-1237.
- Thompson, P., Wallace, T., Flecker, G., and Ahlstrand, R. (1995). *It ain't what you do, it's the way that you do it: production organisation and skill utilisation in commercial vehicles*. *Work, Employment and Society*, 9, pp. 719-42.
- Thomson, A., Storey, J., Mabey, C., Gray, C., Farmer, E., and Thomson, R. (1997). *A portrait of management Development*. Institute of Management, London.
- Topel, R. (1986). *Job Mobility, Search and Earnings Growth*. *Research in Labor Economics*, 8, pp. 199-233.
- Tregaskis, O., and Brewster, C. (1998). *Training and development in the UK context: an emerging polarisation?* *Journal of European Industrial Training*, Vol. 22, No. 4.
- Tsang, M. and Levin, H. (1985). *The Economics of Overeducation*. *Economics of Education Review*, 4, pp. 93-104.
- Van de Ven, A.H. (2000). *Professional Science for a Professional School*, in: Beer, M. / Nohria, N. (Hrsg., 2000): *Breaking the Code of Change*. Harvard Business School Press: Boston MA 2000, pp. 393-413.
- van Smoorenburg, M.S.M. and van der Velden, R.K.W. (2000). *The Training of School-leavers: Complementarity or Substitution?* *Economics of Education Review*, 19, pp. 207-17.

-
- VDI (2003). *Networks of Competence in Germany*, Verein Deutscher Ingenieure e.V. – VDI Technology Center, Department for Basic Issues of Research, Technology and Innovation on behalf of the German Federal Ministry of Education and Research, April.
- Vinten, G. (2000). *Training in small-and-medium-sized enterprises*. *Industrial and Commercial Training*. Vol. 32, No. 1.
- Viscusi, W. (1979). *Job Hazards and Worker Quit Rates: An Analysis of Adoptive Work Behavior*. *International Economic Review*, 20, pp. 29-58.
- Wall, T., Jackson, P.R., and Davids, K. (1992). *Operator work design and robotics system performance: A serendipitous field study*. *Journal of Applied Psychology*, 77, pp. 353-362.
- Wang, D, Tsui, A.S, Zhang, Y. and Ma, L. (2003). *Employment relationships and firm performance: Evidence from an emerging economy*. *Journal of Organisational Behavior*, 24(5): 511-535.
- Warr, P. and Allan, C. (1998). *Learning strategies and occupational training*. *International Review of Industrial and Organisational Psychology*, 13, pp. 83-121.
- Wensley, R. (1999). *Product strategies, managerial comprehension and organisational performance*. *Oxford Review of Economic Policy*, 15(1), pp. 33-42.
- Westhead, P. and Storey, D. (1995). *Management Training and Small Firm Performance: Why is the link so weak?* *International Small Business Journal*, 14(4), pp. 14-24.
- Westhead, P. and Storey, D. (1999). *Training provision and the development of small- and- medium-sized enterprises: a critical review*. *Scottish Journal of Adult and Continuing Education*, Vol. 5, No. 1.
- Westwood, A. and Jones, A. (2003). *FEUK - Productivity, social inclusion and public sector reform, the work foundation*. Report, July 2003.
- Whitley, R. (1984a). *The Fragmented State of Management Studies: Reasons and consequences*, in. *Journal of Management Studies*, Vol. 21, No. 3, 1984, pp. 331-348.
- Whitley, R. (1984b): *The Scientific Status of Management Research as a Practically-oriented Social Science*, in: *Journal of Management Studies*, Vol. 21, No. 4, 1984, pp. 369-390.
- Wiener, M. (1981). *English Culture and the Decline of the Industrial Spirit*. Cambridge University Press, Cambridge
- Wilson, R.A. (2001). *Projections of Occupations and Qualifications 2000/2001 volume 2 regional results*. Department for Education and Employment, Sheffield.
- Wissenschaftsrat (2002). *Empfehlungen zur Entwicklung der Fachhochschulen, Drs. 5102/02*, Berlin, 18. Januar 2002 (<http://www.wissenschaftsrat.de/texte/5102-02.pdf>).
- Wood, R. and Bandura, A. (1996). *Social cognitive theory and organisational management*. In: Steers, R.M., Porter, L.W., and Bigley, G.A. (Eds.). *Motivation and Leadership at Work*, pp. 84-95.
- Wyn Griffiths, M. (2003). *Meeting the productivity challenge: the challenges facing small businesses*. Speech to the British Chambers of Commerce 31st march 2003 at www.sbs.gov.uk/content/pdf/bcc.pdf.
- Xebec McGraw-Hill (2001). *Corporate e-Learning ... Realising the Potential*, Xebec McGraw-Hill & Training Magazine, October, quoted in Beamish, N., Armistead, C., Watkinson, M. and Armfield, G. (2002). *The deployment of e-learning in UK/European corporate organisations*. *European Business Journal*, London, 2002, 14, 3, pp. 1051-1116.

13 Appendix 1

Solving the Skills Gap

BT Tower, 30th October 2003

Attendees:

Sir Michael Heron	Chairman The Council for Industry and Higher Education (CIHE)
Mr Richard Brown	Chief Executive CIHE
Dr Ken Mayhew	Director of the Centre on Skills Knowledge and Organisational Performance (SKOPE)
Mr Michael Kezstenbaum	Director of Strategic Marketing, Learning and Skills Council
Mr Augustine Gallego	Chancellor, San Diego Community College District
Professor Dr Helga Meyer	Vice-Rector, Hochschule Bremen
Dr Ian Johnston CB	Vice-Chancellor, Glasgow Caledonian University
Professor Jim Gallacher	Co-Director, the Centre for Research in Lifelong Learning, GCU
Professor Anne Huff	Founding Director, ESRC/EPSC AIM Initiative
Professor Andy Neely	Deputy Director, ESRC/EPSC AIM Initiative

Mr John Baker	Assistant Director Skills and Education Team, DTI
Dr Martina Behrens	Visiting Fellow, Institute of Education, University of London
Ms Barbara Blake	The Council for Industry and Higher Education, CIHE
Mr Marty Block	San Diego Community College District
Dr Nick Bloom	London School of Economics
Mr Tim Boswell MP	House of Commons
Ms Jacqueline Brown	Advanced Institute of Management Research (AIM)
Dr Roger Brown	Principal, Southampton Institute
Mr John Browning	Retail Management Development, BP Oil UK
Sir John Cassels	National Commission on Education
Ms Rachel Campbell	Partner, KPMG
Mr Dick Coldwell	HEFCE Board Member
Mr Chris Collins	Manager/International Gola Business, City & Guilds
Dr Neil Conway	Birkbeck College, University of London
Dr Geoffrey Copland	Vice-Chancellor and Rector, University of Westminster
Professor Ivor Crewe	Vice-Chancellor, University of Essex
Professor Sue Cox	Chairman, Association of Business Schools (ABS)
Professor Chris Duke	Director HE, National Institute for Adult Continuing Education (NIACE)
Mr Joe Eason	Manager Training and Education, Corus
Mrs Ronwen Emerson	The Council for Industry and Higher Education (CIHE)
Professor Roderick Floud	Vice-Chancellor, London Metropolitan University
Mr Peter Forbes	Employability Works
Mr Barry Garron	San Diego Community College District

Mr Walter Greaves	Chairman of the Board of Governors, Brunel University
Ms Helen Gresty	Regional Policy Co-ordinator, Learning and Skills Council National Office
Mr Leigh Hackel	Head of Higher Level Skills. Sector Skills Development Agency (SSDA)
Mr Richard Hamer	Education Programme Manager, BT
Ms Christine Hayhurst	Director Professional & Public Affairs, Chartered Institute of Management (CIM)
Ms Penny Jarvis	Partner, Egremont Group
Mr Peter Johnson	Chief Executive, George Wimpey plc
Mr Mike Jones	Chief Executive, The Foundation for Management Excellence (FME)
Sir Michael Latham DL	Chairman, Construction Industry Training Board (CITB)
Ms Anne Lindsay	Senior Policy Advisor, Confederation of British Industry (CBI)
Mr Roger McLure	Chief Executive, Scottish Higher Education Funding Council (SHEFC)
Professor Sa'ad Medhat	Director, Engineering & Technology Board (ETB)
Dr Katherin Moeslein	Associate Researcher, (AIM)
Dr Kevin Mole	Warwick Business School
Ms Victoria Morris	Senior Science Policy Manager, Economic and Social Research Council (ESRC)
Mr John Murphy	Head of University Partnerships, BAE Systems
Sir Howard Newby	Chief Executive. Higher Education Funding Council for England (HEFCE)
Mr Richard Olver	Deputy Group Chief Executive, BP plc
Ms Clare Pierce	Implementing Skills Strategy Division, Department for Education and Skills (DfES)
Mr Paul Preston	SVP Corporate Centre Review, Unilever plc
Dr Martin Read	Group Chief Executive, Logica CMG
Professor Steven Schwartz	Vice-Chancellor, Brunel University
Mr Geoffrey Shoesmith	Senior Analyst, Department for Education and Skills (DfES)
Ms Ruth Silver CBE	Principal, Lewisham College
Ms Karen Thaxton	San Diego Community College District
Mr Vanni Treves	Chairman, Channel 4 Television
Sir David Watson	Vice Chancellor, University of Brighton

14 Appendix 2

Agenda

AIM/CIHE Management Research Forum: "Solving the Skills Gap":

A Contribution to the Debate

October 30th 2003

- 09.00: ARRIVAL
- 09.30: Welcome and Introductions: Sir Michael Heron, Chairman CIHE.
Chair: Richard Brown, Chief Executive, CHIE,
- 09.40: The UK Skills and Productivity Gap:
Dr Ken Mayhew, Director of SKOPE, University of Oxford
- 10.00: Recent Lessons Learned:
Michael Kesztenbaum, Director of Strategic Marketing,
Learning + Skills Council
- 10.20: The US Community College Experience:
Augustine Gallego, Chancellor of the San Diego California
Community College System
- 10.50: COFFEE
- 11.10: The German Experience:
Professor Dr Helga Meyer, Director of the Bremen Hochschule
- 11.30: The Scottish Experience:
Dr Ian Johnston CB and Professor Jim Gallacher,
Glasgow Caledonian University
- 11.50: General discussion on the issues raised with further international
and business contributions
- 12.30: LUNCH
Chair: Professor Anne Huff, Founding Director, ESRC AIM Initiative
- 13.40: Summary of the key issues emerging:
Professor Andrew Neely, Deputy Director, ESRC AIM Initiative
- 13.50: General Discussion including perspectives from business
and academic leaders and Business School Deans
- 14.50: Summary and Next Steps
- 15.00: CLOSE

Notes
