# South East Strategic Subjects Study

## A Report to Higher Education South East (HESE)

**from SPRU (Science & Technology Policy Research), University of Sussex**

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## EXECUTIVE SUMMARY

1. The aim of the South East Strategic Subjects Study has been "To provide data and analyses on the supply of and demand for strategic subjects in the South East." In view of time and budget constraints, the study offers analysis by way of an input into policy discussions, rather than a fully researched set of policy recommendations themselves. It has also been necessary to curtail the original plans for a broad survey of industry demand for graduates in the South East, and to rely more heavily on intermediary experts who witness both supply and demand sides of the graduate labour market.

Specifically, the intended outcomes of the project are to:
1. Summarise the current regional balance of HEI supply of places in these strategic subjects against best available evidence of employer demand.
2. Provide evidence on the likely regional economic impact of possible reductions in courses or closures of departments in these areas.
3. Provide an evidence-based input into policy options for HEI decision makers when considering the future provision of these subjects.

2. The prompt for the study originated in the letter by Rt Hon Charles Clarke, then Secretary of State for Education and Skills, in December 2004, triggered by closures of some high-profile university departments. The House of Commons Select Committee of April 2005 focused on the provision of STEM (science, technology, engineering and mathematics) subjects, and recommended some delegation to the regional level to develop responses to perceived shortages. To the subjects indicated by Charles Clarke, which included many STEM subjects together with IT or e-skills and cultural and creative fields, HESE added generic modern languages (French, German, Spanish) and earth sciences and allied to this study. The intended focus of the present report is on areas where the evidence base offered in the Select Committee's Report was adjudged to be inadequate or too highly aggregated to apply in the South East region. That Report did indeed encourage studies such as the present one to be undertaken at regional level, in the course of pointing to many limitations of the data with which it was itself supplied.

3. The Select Committee considered that "It seems unlikely that the recent flurry of departmental closures will end soon" (p.13) and expressed particular concern inasmuch as the shortfall of graduating students in the affected subjects would not meet the needs of industry for highly skilled personnel in the future, especially if the Government pressed ahead with its ambitions to raise the share of R&D in UK GDP in line with EU recommendations. The Report argued for "the relative ease with which STEM graduates currently find employment" (p.17), though the evidence provided here was slim, and it was admitted that salaries were not outstandingly attractive. The problem lay in quality as well as quantity terms – having graduates equipped with the right sorts of skills that employers wanted. According to a market survey by SEMTA, the Sector Skills Council (SSC) for Science, Engineering and Manufacturing Technologies, in 2002, "particular recruitment difficulties were experienced in ... areas requiring a hybrid of technological skills with 'softer' generic business skills; and in production" (pp.16/17). The Report stressed that the implicit effect of Government funding – contrary to its avowed intentions – was to promote a degree of research concentration in particular HEIs and regions, and this needed to be

counterbalanced by a delegation of coordination to the regional level, via RDAs, HEFCE and the SSCs. The Report advocated a 'hub and spokes' model for such coordination. It is not clear whether the model advocated is to rest on 'absolute advantage' or 'comparative advantage', to use the economist's language, and thus how it would work.

4. HEFCE has recently responded to the Select Committee, subsequent to the start of the present study (we should again express our gratitude to HEFCE for supplying us with additional data). The response begins by emphasising that departmental closures do not necessarily imply a subject is 'vulnerable', and can be part of a logical response to changing demands. In our own report below we focus on one particular meaning of 'vulnerability', namely: "... vulnerability of the public interest, in that the provision of the subject is misaligned with employer, government or other demand. This mismatch may be identified at national level and/or at regional level." For example, the cultural and creative subjects are strategic but not vulnerable. Within the branches of engineering subjects there are contradictory patterns. Physics does appear stagnant and chemistry in decline, judged by data on student numbers from 1999/00 to 2003/04. Data arranged according to 2001 RAE scores of departments suggest a sharper fall in lower-ranked departments, though the pattern is not uniform.

5. For our own study, we circulated a questionnaire to heads of all HEIs in the SEEDA region, from a list provided to us by HESE. The list included campuses of HEIs that had their main location in another region, which implied a different aggregation from that used by HEFCE (which is based on 'cost centres'). Replies were eventually received from 19 of the 23 HEIs identified as having campuses in the South East region (though two had no relevant departments). Of the four not replying, three were tributary campuses with headquarters in another region. However quite a number of individual departments in replying universities did not respond.

6. In most of the strategic subjects, there was a rough balance between numbers of departments where student numbers were rising (though mostly not sharply), those where they were stable, those where they were falling, and those where the numbers were erratic. The trends obtained from the survey appear somewhat less worrying than from the HEFCE data, and a part of this seems to be due to upturns in some subject intakes in the current year which is expected to persist into next year – though some of this in turn may be a scramble for places ahead of 'top-up fees' in the following year. Some of the difference may be due to 'selection bias' in the survey responses, though contrary to our expectations two of the 'closures' of departments did feature in our returns. Much more common were indications of restructuring, which as the Select Committee pointed out can heavily distort raw data. Our returns point to a number of cases where the HEFCE data are affected by restructuring. The situation in chemistry may warrant more detailed investigation, as here our figures and those of HEFCE diverge most, and restructuring towards market needs is controversial. The exception to the general pattern of diversity of trends arises in the cultural and creative field, where all responding departments appear to be rising or at least steady in numbers. In all subjects, the greatest pressure appears to be coming in the shape of the downsizing of staff numbers, and this seemingly obvious component of the strategic subject issue warrants more attention than it has so far received.

7. For departments that appear to be 'vulnerable', there appears to be little difference according to ranking by 2001 RAE scores – pressure, in subjects where it is arising, can occur in research-intensive as well as teaching-intensive departments. The Select Committee was much concerned about further pressure to raise RAE scores for the forthcoming 2008 RAE, but we found that most departments are under such pressure. A further distinction between older, newer and 'future' universities indicates some polarization of outcomes. The latter two categories are small in both physics and chemistry, and student numbers in them are falling relative to older universities in earth sciences and to a lesser extent in non-electrical engineering. However the trends in the remaining STEM subjects (electrical engineering, mathematics) as well as IT appear to be similar as between older and newer universities, while in the design and creative field and modern languages their numbers are doing better. Next, we compared small, medium and large departments, to try to detect any effect of economies of scale on student trends. This was not possible for physics and chemistry, where there was only one large (and atypical) department in each case, but for other strategic subjects the general pattern was for medium-sized departments to do at least as well as large departments and often better. Undoubtedly there are a number of small departments that are unviable and may need restructuring. Finally, we computed the 'comparative advantage' for each subject, to show which departments were doing relatively better or worse in relation to overall trends, in the event of any regional restructuring. While the nature of this calculation could lead to a particular HEI gaining or losing all of its strategic departments, the overall result shared the beneficiaries between older, newer and future universities, with the established doing relatively better in STEM subjects and the latter two in the others (including IT).

8. We also circulated a questionnaire intended as the basis for semi-structured interviews with 'intermediaries' in significant organisations who were in a position to see both sides of the graduate labour market. This failed to elicit the range of responses we had hoped for, despite the commitment of a large amount of effort by our team, though some that were supplied by email or telephone proved to be very instructive. The view from 'within' the key STEM sectors tended to confirm alarmist warnings about a contraction of recruitment, and a year-on-year increase in the tailback of unfilled specialist employment positions. In chemistry there was seen to be a contraction of job opportunities of the traditional kind, as work was outsourced elsewhere. These respondents argued for more depth than breadth being required among the skills offered by graduates, implying a lapse of quality. Others from 'outside' the main STEM sectors instead saw a need for widening out and for the inculcation of more generalised rather than more specialised skills. It appears to us that both may well be partly right, as argued in our Conclusion. It is of some concern that even the Sector Skills Councils do not appear to have a very broad gaze over the employment horizon.

9. The same questionnaire was addressed to heads of Careers Advisory Services in the region's HEIs. The replies here were expected to purvey a more university-centred view, and in some areas such as whether graduates were being supplied with the right skills this indeed emerged. However for the most part the rather larger number of responses from the careers advisers (again often obtained after extended negotiation) backed up what the sector skills and professional organisations respondents had told us. They also were in line with the patterns of student intake established through the responses from academics, in terms of which employment areas were growing and

which declining. Similarly, the different responses confirmed that in some areas more specialised skills were in demand (this included some of the Creative and cultural areas as well as STEM subjects), while in others the opposite is the case. The broadest overviews amalgamated these views and did consider that many graduates were not broadly enough prepared for the job market. At least one pointed to the argument that "there is really is no such thing anymore as a 'graduate job'", and the implied need for flexibility and versatility. The more successful careers services appear to tap into the graduate market in SMEs rather than just large firms, but this raised problems of its own in terms of both the quality of graduates (ensuring more preparation beforehand) and the lack of coordination in the SME labour market. Many thought there was much that could be done to improve coordination through practical measures, and that in the absence of this the current situation may be getting worse rather than better.

10. We turned to secondary evidence to fill out the rather limited number of responses obtained through the primary procedures, and again found a fair degree of confirmation of the main views established by the various parties. A forecast in 2002 by Skills Insight stressed that jobs that were least in demand at that time (e.g. in IT) could be most in demand five years later, and conversely. This also needs to be borne in mind in interpreting data on careers destinations of graduates, as supplied by HESA and others, which naturally has to take a short-term view of destinations. The data for the cohort of graduates from all HEIs in England graduating in 2003, taken from the Prospects website and further analysed, show that physics and chemistry appear to have the lowest proportions of their number in work in the UK, but their rates of unemployment and under-employment are about average. The gap is mostly made up of an especially large proportion of physics and chemistry graduates (and to some extent mathematics) going into higher study in the UK. It may be worth analysing this phenomenon further in the context of developments in the labour market, such as the above-voiced concerns about a lack of depth in graduates of English universities, though we have no resources to explore this here. The most apparent pattern is the great diversity of jobs to which graduates in most of the strategic subjects go. In engineering the pattern varies according to particular branch, but it is worth recalling the long-held view that engineering graduates mostly end up in management, for jobs which they may not have been well trained. The Skills Insight data for the South East (2001/02) finds that an equal number of engineering graduates in the region go into 'business activities' as into manufacturing, while in most of the strategic subjects of this inquiry 'business activities' constitute the largest domain of employment.

11. A range of data indicates that, despite the nearby presence of London as a draw on employment, the South East fares quite well in terms of its graduates staying on to work within the region, and certainly better than other regions adjacent to London. This raises the issue of what is to be gained in terms of greater proximity between HEIs and industry in the South East. Such a study has recently been compiled for SEEDA by ourselves and other SPRU colleagues. Overall the study supported the view that "proximity matters", for instance as an attraction for employment into the region, and particularly so for smaller companies where face-to-face interaction was desirable. Again, there are some evident gaps where bridging could be substantially improved.

12. Chapter 4 analyses the data available on changes in industrial demand for highly skilled labour in the South East. The now somewhat outdated information from the

1991 UK Census indicates that, in terms of degree-level skills, the 'South-East' is (or then was) in relative terms about 20 per cent above the average for Great Britain as regards full-time males and part-time females. By subject, and in relative terms, the 'South-East' was about 20 per cent stronger in qualifications in science and technology for males and rather more than this for females. It should be pointed out that in 1991 the 'South-East' did not coincide with today's SEEDA region, though we have removed the impact of Greater London from these data. The more recent 2001 Census does not allow such a fine-grained analysis, but its data suggest that, in terms of higher-level qualifications (here more broadly defined to include HND etc.), the South East (SEEDA) is about 10% above the national per capita average. The rather surprisingly low proportion of full-time students in the South East (despite Oxford), relative to total population, gives some support to the view that high demand for graduate skills overcomes limited supplies from within the region.

13. The recent CIHE Report for SEEDA observes that the South East is well known for a strong presence of high-tech industries and also creative industries, but goes on to point out that, "Generally it is the users of new technologies rather than the creators that are the keys to productivity growth", including the service sectors (as also in the USA during the 1990s). ONS data on UK Business for 2004 indeed show that, measuring by 'local units', i.e. establishments in each locality, over 85% of them, and as much as 82% of medium-to-large units, are in services and infrastructure. The clear 'comparative advantage' (i.e. relative strength) of the South East in terms of manufacturing lies in the 'cluster' of electrical and electronics industries (office machinery and computers, other electrical machinery and equipment, radio, TV and communications equipment, and precision instruments), in both small and medium-large units. In non-manufacturing activities, which as said above dominate the totals, the advantage is greatest in property and business services, also small units (only) in construction, but generally the South East does quite well in terms of medium-large service-based activities. In terms of growth rates of establishments, more new opportunities are growing outside than inside manufacturing for the UK as a whole in recent years, and the same is likely to be even stronger in the SEEDA region (with the possible exception of the electronics 'cluster'). Data to support this are provided by both the Institute for Employment Research and Skills Insight. Decadal figures from 1982 up to a prediction for 2012 indicate that the relative size of both primary and secondary (i.e. manufacturing) sectors in the South East halves, while the gap is made good mostly by the relative as well as absolute expansion of business-related services. Occupational trends show a rising share of managers, professional and associate professional classes.

14. Studies by Skills Insight draw attention to the shortfalls of recruitment by sector. Professionals are seen as the hardest occupation to fill in Business services, Education and Health, whereas in Manufacturing and in Construction the biggest problem seems to lie in craft and skilled manual labour. The above-mentioned SPRU study found shortages of specialised skills in manufacturing sectors, including pharmaceuticals. From a broader perspective, the breadth of skills may however be as troubling. The CIHE Report flagged a possible 'low-skills equilibrium', in which failing supply and therefore failing demand set in a downward spiral. Its report for the RDA stressed the imbalance between economic performance in the region (high) and HEI teaching and research capacity (lower), and spoke of a "misalignment".

15. Such a misalignment is the main focus of our Conclusions in Chapter 5. The clear need established in the preceding chapters was for reassessing graduate recruitment, and anterior to that providing HEI course structures, that reflected the changing pattern of occupational and industrial demand in the South East. The indications are that there is some lag in recognising that employment patterns have been shifting for some time, and will almost inevitably continue to do so. Among our 'intermediary' respondents, the awareness of these facts seems more limited in the STEM subjects (although many academics and careers advisers were well informed), whereas the cultural and creative subjects and even IT (following its crash in the early 2000s) have grasped them more adequately. The key issues emerge in relation to employment in tertiary sectors, particularly the growing arena of business services, and to employment in SMEs rather than medium-large companies. While there are of course many exceptions, these represent the most dynamic sectors of the South East economy, but at the same time the least well structured in terms of graduate labour markets. It may be that the channels for the full range of relevant employers to voice their demands are not fully provided for. There appears to be a consensus that circumstances are changing, and with the growing significance of non-traditional industries and services, non-traditional firms including start-up SMEs, and non-traditional job markets emphasising flexibility and mobility, there is much that can now be done.

16. The HEIs, perhaps through HESE, could play a constructive role in relating their internal and collaborative changes to this emerging structure of employer demands. More research is, as ever, necessary to resolve some of the key uncertainties thrown up by this study, including the question of whether and where to focus on specialisation and/or aim at generalised skills. In terms of actions, while each of our respondent organisations unsurprisingly brought its own perspective to the table, there was a high degree of consensus that more frequent and meaningful contact among all parties was critical. There was some feeling that the degree of communication was actually getting worse, even in established areas. In particular, thought needs to be given as to whether such communication is being filtered out in some ways through the persistence of more traditional views and structures, e.g. about where a STEM graduate looks for employment. Efforts are being made through a range of regional organisations to meet some of the more evident misalignments, yet there is a danger of responsibility not being seized.

17. The anxieties over departmental closures appear to have abated somewhat during the course of our study. A number of factors may have contributed to this, such as the completion of restructuring ahead of the 2008 RAE, the more buoyant numbers of student intake likely in the current year, and so on. At the same time there is no case for complacency. The problems we have been identifying are structural and long-term in nature. There is some evidence that employers, and especially those from the growing host of SMEs, look to a ready supply of local graduates (among other factors) in deciding whether to locate in the South East. While our study throws up some problems with implementing 'hub and spokes' or other models of regional reorganisation, the case for more coordination of effort is a strong one. Problems are arising especially in the extent of downsizing of academic faculty and staff. More might be done, perhaps, with new technology to offset such problems, but it should be remembered that, in the absence of reorganisation and of knowledge bases, technology is not a 'fix'.

## INTRODUCTION

The original purpose of this study of South East Strategic Subjects can be cited from the specification laid out by HESE:

> "The aim of the study is to provide a snapshot overview, as at early 2005, of the supply and demand position in the South East for those strategic subject areas where regional provision is required."

The original objectives of the scoping study could not be met within the budget and resources available to carry out the study. The modified objective presented to HESE was stated as:

> "To provide data and analyses on the supply of and demand for strategic subjects in the South East."

In particular, the outcomes were reduced in two main ways. First, the study would become an input into policy options rather than a construction of policy options, focusing on the regional evidence base. Second, there would be limitations on the extent of sources of evidence, in terms of the number, range and duration of interviews, desk-based research, etc. Specifically, a large-scale study of employer demand was ruled out, and the situation regarding the demand for graduate employment would be gauged by a combination of quantitative evidence and the views elicited from a number of 'experts', whose intermediary position in the labour market ought to place them in a position to hold credible views.

The aims were clarified as the study progressed. In the form eventually circulated as a request for information to HEIs and other experts, the objectives were represented as follows.

**The intended outcomes of the project** are to:
1. Summarise the current regional balance of HEI supply of places in these strategic subjects against best available evidence of employer demand.
2. Provide evidence on the likely regional economic impact of possible reductions in courses or closures of departments in these areas.
3. Provide an evidence-based input into policy options for HEI decision makers when considering the future provision of these subjects.

The balance between the supply of and the demand for higher education provision in a number of key subjects has been a matter of rising political concern in recent months, particularly following the letter by Rt Hon Charles Clarke, then Secretary of State for Education and Skills, in December 2004. The House of Commons Science and Technology Committee of April 2005 focused on the provision of STEM (science, technology, engineering and mathematics) subjects, and recommended some delegation to the regional level to develop responses to perceived shortages. To the subjects indicated by Charles Clarke, which included many STEM subjects together with IT or e-skills and cultural and creative fields, HESE added generic modern languages (French, German, Spanish) and earth sciences and allied.

This survey of the SEEDA region is intended to adduce evidence in order to overcome some of the inadequate evidential base emphasised in the House of

Commons Committee's report. It is mainly intended to collect some primary data but also to help warn us of potential pitfalls in crude readings of the numbers. The questions therefore relate to some of the key points made by the Science and Technology Committee about incautious use of quantitative evidence.

The study now reporting falls into five main parts. Chapter 1 consists of an assessment of prevailing views on the issue, centred around the Science and Technology Committee's report. Chapter 2 analyses the responses of HEIs to our questionnaire. Chapter 3 looks at the more limited range of responses from 'experts', defined as individuals and organisations tasked with the responsibility to consider the balance between supply and demand in relation to the region. Chapter 4 involves an analysis of some of the available data relating to the changing situation of graduate employment in the South East. Chapter 5 draws conclusions and presents some policy implications.

## CHAPTER 1: ISSUES AND VIEWS

The context for this study was provided by the Report of the Science & Technology Committee already referred to, which was published at the time the study was being set up. The whole approach of our study was deeply influenced by this Report, which accepted that evidence was often weak and/or ambiguous – a major rationale for the present work. As this study was being drafted, a response to the Science & Technology Committee came from HEFCE, which as shown below expressed some reservations about the evidence base for policy recommendations. This chapter surveys some of the main anxieties of the Science & Technology Committee, and the caution exercised by HEFCE in its measured response, focusing on issues that will be explored in later chapters.

### *1.1 The Science & Technology Committee's Report*

The Report of the House of Commons Science and Technology Committee (hereafter the 'Select Committee') of April 2005, 'Strategic Science Provision in English Universities', provided the immediate backdrop to the present study. It focuses only on the STEM subjects (science, technology, engineering and mathematics), as compared with the longer list of strategic subjects mentioned in Charles Clarke's letter, and still longer list formulated by HESE for this project. Nevertheless it is worth representing some of its main contentions at some length, as a guide to where views appear to stand on the general issue of 'strategic subjects' in English universities.

Its opening summary sets out the issue as follows:

> "The Government has placed graduates in science, technology, engineering and mathematics (STEM) subjects at the heart of its political and economic agendas... [T]he number of students choosing to take a STEM subject at undergraduate level has been in decline for several years. One of the most worrying symptoms of this decline is the recent closure of a number of important university departments, particularly in chemistry, mathematics, physics and engineering... [T]he system may find it difficult to cater for the future increases in uptake that are so fundamental to the realisation of the Government's ambitions." (p.3)

Concern had thus been triggered by high-profile departmental closures like the chemistry department at the University of Exeter, but there were others (see Box 1.1 ). The situation was likely to persist since chemistry departments were running at a loss.

The Report denies that there is any downward trend in employment opportunities for STEM graduates. It argued for

> "... the relative ease with which STEM graduates currently find employment. The Director General of the Research Councils (DGRC), Professor Sir Keith O'Nions, told us that, 'of all the PhDs who graduated in physical science and engineering in 2003, 79 per cent of them were in jobs in 2004, which is very good news, and 42 per cent were in jobs where they were in research roles and of those about half were in the educational system'." (p.17)

This would not appear to be such good news for the remaining 21% of PhDs who were not in jobs by 2004, and in any case may not apply to graduates with bachelors

and masters degrees. No doubt the Committee heard other evidence, but this sole reference appears a somewhat flimsy base for such strong assertions about employability. The Report later mentions some concerns over salaries in STEM occupations, which might be taken as a further contradiction.

**Box 1.1: Closures of STEM departments in England**

"As well as the chemistry department at Exeter, there have been high profile closures of chemistry departments at Kings College London, Queen Mary London and Swansea University; of physics departments at the University of Newcastle and Keele University; of mathematics at the University of Hull; and of civil engineering at Aston University." (S&T, p.12)
"It seems unlikely that the recent flurry of departmental closures will end soon... The Royal Society of Chemistry (RSC) has found that chemistry departments tend to operate at a loss. Dr Simon Campbell, President of RSC, told us that 'we have surveyed eight chemistry departments across the country and all of them are running at a loss. The loss range is between 20 and 60 per cent of their budget. In every case, research is subsidising teaching'." (S&T, p.13)

Less contentiously, the Report stresses that problems will be exacerbated if the Government intends to meet its "ambitious" target of raising R&D to the target of 2.5% of GDP: the Royal Society and Ed Metcalfe of SEEDA agree on a figure of another 50,000 researchers being needed by 2014 to attain such a target, or some 5000 p.a.

What does this signify for the balance between supply and demand? Again, the evidence base the Committee had available to draw on looks insecure (see Box 2.2), in particular its pointed comment that "the vagueness of [the DGRC's] answer surprised us." They drew attention to the role that Sector Skills Councils (SSCs) might play in confronting demand with supply.

**Box 1.2: Lack of clear evidence on supply and demand**

"We asked the DGRC whether he thought that the supply of skills in the UK graduate market matched employer demand. He told us that 'even on physics and chemistry where you might have expected I had done a reasonable amount of homework in advance of this meeting, I come clean and say that we cannot go very much beyond anecdotal evidence of whether supply is meeting demand and what the demand is. [...] Those numbers go up and down but I do not think we have good trend numbers'. [While this can be understood] ... Nonetheless, the vagueness of his answer surprised us. The Government created Sector Skills Councils precisely in order to improve its management of the interplay between supply and demand in the employment market." (S&T, p.20)

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As the Report emphasises, the balance is not just a quantitative but also a qualitative issue – having the right skills at the right levels to meet employer demands. "This

included a widespread concern across all disciplines about the general shortage of graduates with advanced numerical skills (p.16). Beyond these, a survey by the then DfEE (Department for Education and Employment) in 1999 had found a "'lack of relevant work experience, followed by lack of commercial understanding/awareness and weak communication and presentation skills'" (pp.18/19). The Report then points out that it is not clear whether the failings on the latter scores are the fault of university courses or training provision by the employers themselves. There will always be problems with attempting any precise match, for the following reasons:

> "a) Breadth versus depth.... There is no evidence to suggest that tailoring courses to the requirements of specific jobs would attract students to them. To a certain extent, employers will always bear some of the responsibility for job-specific training.
> "b) Multiple skills applications. As the DGRC told us 'there is not a one-to-one correlation between what people do in a degree and what sort of job they do'...
> "c) The evolving marketplace. Organisations adapt in response to emerging technologies and changes in market conditions... " (pp.19/20)

The second point is worth elaborating on, as it will be a key element in our own conclusions later. The Report cites the 2002 market survey by the Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTA), which we will be drawing on in Chapter 2 in regard to the South East: "According to the SEMTA survey, particular recruitment difficulties were experienced in leading areas of technological development; areas requiring a hybrid of technological skills with 'softer' generic business skills; and in production" (pp.16/17). It notes with concern that, "Equipping graduates with STEM skills does not necessarily mean that they will go on to pursue careers in science, engineering and technology" (p.23).

The later sections of the Select Committee's Report are given over to examining the problems of research concentration, seen as an "inevitable consequence" (p.52) of Government funding provision even if disavowed as a policy objective, and what can be done in a world in which there is unlikely to be any substantial further expansion of Government funding for the subjects. At this point the Committee turn to advocating regional provision on a structure they refer to as "hub and spokes", using the RDAs etc. alongside HEFCE to ensure that each region maintains strength in the strategic subjects. It argues for greater regional collaboration and coordination, including a Regional Affairs Committee to be established within HEFCE "to coordinate the implementation of the hub and spokes model within the regions" (p.68).

This model draws solace from Government evidence that high quality research departments are widely spread across the country (p.75). However, it described some key gaps in regional provision (p.76). It is, indeed, not entirely clear whether the regional provision advocated is to be based on what economists would call 'absolute advantage' or instead 'comparative advantage', at both regional and institutional level. That is, does one pick the 'best' HEIs in each region or across the country as a whole, or go instead for sharing responsibilities among all HEIs, and in either case what would that do to overcome trends towards research concentration?

The Report concludes with a look at the future that so-called 'top-up fees' might presage for strategic subjects, and sees there are arguments both ways (p.77):

### *1.2 The response from HEFCE*

HEFCE drew on its extensive data (which we will also be utilising in Chapter 2 for the South East) in order to respond to the Select Committee's Report. Its working group expressed a strong wish to play down fears of a system in crisis (see Box 1.3). Analyses of science subjects shows "departmental closure is more likely in, but not confined to, departments with a low RAE score" (p.19). Intervention should be limited and careful, with a strong evidence base, but HEFCE can support it in certain ways.

**Box 1.3: HEFCE's overview on strategic subjects**

"As the Science and Technology Select Committee has stated, it would be exaggerating to say that university science departments are in crisis... The dynamism of the English HE sector is a great strength, and interventions should, as a rule, be kept to a minimum... Second-guessing the market may ultimately reduce the dynamism of the English HE sector." (HEFCE, p.1)
"The group advises that the closure of departments does not in itself mean that a subject is vulnerable. Departments may not always close due to shortage of student demand, but due to strategic reinvestment or because a course is deemed too expensive to run. Provision may be transferred elsewhere or become part of a new degree (so be partly moved to a new cost centre). Capacity may be redeployed, and often is maintained in a manner that takes the discipline forward in innovative ways." (HEFCE, p.7)

Its key concern is with vulnerability, measured by a mismatch between supply and demand. Departmental closures do not necessarily mean vulnerability. Many strategically important subjects are well supplied and not vulnerable. Nor can vulnerability be identified with small or weak departments. Two definitions were chosen by HEFCE (see Box 1.4).

**Box 1.4: When are strategic subjects vulnerable?**

"The first definition relates to institutional vulnerability, meaning subjects which are primarily located in small specialist institutions (monotechnics), which may be more susceptible than larger institutions to changes in the external environment.
"The second definition of vulnerable is where there is a vulnerability of the public interest, in that the provision of the subject is misaligned with employer, government or other demand. This mismatch may be identified at national level and/or at regional level."

Although some HEIs in our own survey qualify as 'monotechnics' in strategically significant subjects and thus as possibly vulnerable in HEFCE's first sense, we will be focusing almost exclusively on the second aspect of vulnerability ("vulnerability of the public interest") in what follows. It may be noted in passing that the impending merger of KIAD and SIAD does represent a regional consolidation of 'monotechnics' of the kind seemingly desired. It may also be noted that HEFCE's advisory group

"... does not recommend that cultural and creative industries should be specified as a target subject as a whole, because these subjects, while strategically important, show no signs of vulnerability on grounds of lack of student demand at the national level. There are however, some concerns about the long-term sustainability of some creative arts institutions." (p.6)

In the second respect of mismatch between subject provision and employer demand:

"The analysis at HESA cost centre level shows the anticipated profile of some decline in activity in mathematics; chemistry; chemical engineering; mineral, metallurgy and materials engineering; and information technology and systems science. However other aspects of engineering have seen steady or only very slightly declining activity; these being civil engineering, general engineering and mechanical, aero and production engineering. Indeed some engineering has seen steep increases in activity. For example, computer software engineering had seen growth in activity of nearly 10,000 FTEs between 1999-2000 and 2003-04 (an increase of 29%). Similarly electrical, electronic and computer engineering grew by some 1500 FTEs in the same period, an increase of 9.5%." (p.4)

Annex B of the HEFCE response provides more detail at 'cost centre' level, and broken down between Home and International students (see Box 1.5, also Table 1.1 for data on the subjects being considered in our own study, for England as a whole).

**Box 1.5: HEFCE's analysis of detailed trends in strategic subjects**

"Engineering: overall there is increased activity in engineering cost centres. However, this is accounted for by growth in Computer Software Engineering and Electrical, Electronic and Computer Engineering; other subjects in the group are showing a loss in activity. Computer Software Engineering has dipped in 2003-04 after a peak in 2002-03...

"Languages: this group shows overall improvement in Home and International activity. However, using these data it is difficult to judge how many students are involved in major subject study rather than occasional modules...

"Mathematics: as with languages, activity in Mathematics can often be 'service teaching' and these data may not give an accurate picture of the subject. Nevertheless, it is interesting to see the large growth in International activity...

"Physical Sciences: here the data give an expected outcome, with Physics showing a stagnant profile, and Chemistry a decline in numbers, as does Earth, Marine and Environmental Sciences

"Design and Creative Arts: this cost centre shows buoyant activity." (HEFCE, p.18)

Table 1.1: FTE numbers by student fee status and HESA cost centre, England, 1999-00 to 2003-04

| Cost centre | Fee status | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | % change |
|---|---|---|---|---|---|---|---|
| Physics | Home | 8581 | 8257 | 8328 | 8462 | 8678 | +1 |
| | EC | 462 | 416 | 325 | 322 | 328 | -29 |
| | Internat | 297 | 283 | 305 | 368 | 432 | +45 |
| Chemistry | Home | 11933 | 10959 | 10731 | 9978 | 9524 | -20 |
| | EC | 586 | 488 | 374 | 299 | 267 | -55 |
| | Internat | 376 | 370 | 451 | 467 | 554 | +47 |
| Earth, Marine, Environ'l | Home | 13646 | 13014 | 13157 | 12619 | 12231 | -10 |
| | EC | 568 | 581 | 477 | 432 | 398 | -30 |
| | Internat | 314 | 353 | 458 | 469 | 506 | +61 |
| Chemical Eng'g | Home | 1953 | 1822 | 1635 | 1544 | 1732 | -11 |
| | EC | 168 | 237 | 108 | 91 | 95 | -44 |
| | Internat | 493 | 328 | 490 | 514 | 630 | +28 |
| Civil Eng'g | Home | 6931 | 6788 | 7088 | 6485 | 6858 | -1 |
| | EC | 1380 | 1296 | 1092 | 889 | 674 | -51 |
| | Internat | 1191 | 1021 | 1162 | 1029 | 1079 | -9 |
| Computer Software Eng'g | Home | 33850 | 38446 | 46307 | 49012 | 43671 | +29 |
| | EC | 1954 | 1844 | 2083 | 2029 | 1730 | -11 |
| | Internat | 1902 | 2522 | 4206 | 5290 | 5501 | +189 |
| Electrical, Electronic, Comp Eng | Home | 16315 | 17657 | 17730 | 17578 | 17862 | +9 |
| | EC | 2008 | 2091 | 1749 | 1509 | 1393 | -31 |
| | Internat | 2514 | 2293 | 3104 | 3528 | 4243 | +69 |
| General Eng'g | Home | 14472 | 14622 | 14423 | 13794 | 13921 | -4 |
| | EC | 1332 | 1326 | 869 | 889 | 752 | -44 |
| | Internat | 1544 | 1914 | 1874 | 2000 | 1766 | +14 |
| Mechanical, Aero, Prod'n Eng | Home | 16254 | 16387 | 16655 | 16617 | 16143 | -1 |
| | EC | 2195 | 1998 | 1603 | 1506 | 1357 | -38 |
| | Internat | 1969 | 1653 | 1924 | 2105 | 2406 | +22 |
| Mineral, Metallurgy, Mater. Eng | Home | 2857 | 2770 | 2503 | 2525 | 2625 | -8 |
| | EC | 249 | 281 | 170 | 172 | 166 | -33 |
| | Internat | 351 | 306 | 345 | 467 | 535 | +52 |
| Mathematics | Home | 19161 | 18625 | 18442 | 17298 | 17376 | -9 |
| | EC | 1054 | 1042 | 810 | 728 | 667 | -37 |
| | Internat | 1567 | 1622 | 1956 | 2392 | 3116 | +99 |
| Info Tech and Systems Sciences | Home | 18856 | 19873 | 15993 | 17002 | 15117 | -20 |
| | EC | 737 | 781 | 513 | 531 | 483 | -34 |
| | Internat | 902 | 1329 | 973 | 1407 | 1415 | +57 |
| Design and Creative Arts | Home | 60586 | 64961 | 68130 | 73088 | 74290 | +23 |
| | EC | 3667 | 3843 | 3583 | 3606 | 3680 | +0 |
| | Internat | 3593 | 3788 | 4213 | 4679 | 4812 | +34 |
| French, Spanish, German | Home | 16395 | 17589 | 18295 | 17568 | 16412 | +0 |
| | EC | 1629 | 1796 | 1710 | 1587 | 1458 | -11 |
| | Internat | 550 | 636 | 780 | 905 | 819 | +49 |

Source: HEFCE 2005, table 1.

Table 1.2 summarises some interesting information of trends of FTE numbers according to results of the 2001 RAE exercise, in selected subjects. It will be observed

that departments across England with rankings below 4 have generally seen proportionately larger falls in numbers since 1999. However there has also been a slight drop in numbers of 5* departments in Physics and 5 ranked departments in Mathematics and Chemistry. It will also be observed that these subjects show high proportions of students in departments with 5 or 5* rankings, so the 'tail' of low-ranked departments is relatively small in terms of student numbers.

Table 1.2: UG Home/EU FTEs by 2001 RAE rating, England

| Subject | | <3 or n/s | 3a/3b | 4 | 5 | 5* |
|---|---|---|---|---|---|---|
| Mathematics | % total 03-04 | 18.2% | 8.2% | 5.4% | 41.6% | 26.6% |
| | % ch. since 99-00 | -2.3% | -6.9% | -1.0% | -5.4% | +3.5% |
| Chemistry | % total 03-04 | 18.7% | 11.6% | 14.4% | 31.3% | 23.9% |
| | % ch. since 99-00 | -17.4% | -3.2% | -1.7% | -5.1% | +1.4% |
| Physics | % total 03-04 | 3.5% | 5.1% | 16.1% | 52.5% | 22.8% |
| | % ch. since 99-00 | -2.7% | -1.8% | +1.2% | +4.7% | -1.0% |

Source: HEFCE 2005, extracted from tables 3-5. n/s = not submitted.

### *1.3 Conclusions*

The Select Committee considered that it was unlikely that the recent flurry of departmental closures would end soon, and expressed particular concern that the shortfall of graduating students in the affected subjects would not meet the needs of industry for highly skilled personnel in the future, especially if the Government pressed ahead with its ambitions to raise the share of R&D in UK GDP in line with EU recommendations. The Report argued that STEM graduates currently find employment with "relative ease", though the evidence provided here was slim, and though salaries are not outstandingly attractive. The problem lay in quality as well as quantity terms – having graduates equipped with the right sorts of skills that employers wanted, perhaps involving 'softer' generic business skills. The Report stressed that the implicit effect of Government funding – contrary to its avowed intentions – was to promote a degree of research concentration in particular HEIs and regions, and this needed to be counterbalanced by a delegation of coordination to the regional level, via RDAs, HEFCE and the SSCs. The Report advocated a 'hub and spokes' model for such coordination. It is not clear whether the model advocated is intended to rest on 'absolute advantage' or 'comparative advantage', to use the economist's language, and thus how it would work.

HEFCE has recently responded to the Select Committee. The response emphasises that departmental closures do not necessarily imply a subject is vulnerable, and can be part of a logical response to changing demands. Vulnerability has at least two relevant meanings, and in the present report we focus on misalignment with employer, government or other demand, at regional level. For example, the cultural and creative subjects are strategic but not vulnerable. Within the branches of engineering subjects there are contradictory patterns. Physics does appear stagnant and chemistry in decline, judged by HEFCE data on student numbers from 1999/00 to 2003/04. Data arranged according to 2001 RAE scores of departments suggest a sharper fall in lower-ranked departments, though the pattern is not uniform.

## CHAPTER 2: RESULTS OF THE SURVEY OF ACADEMICS

This chapter takes up the 'supply side' of the supposed mismatch, by looking at the extent of a decline in student undergraduate numbers in the strategic subjects. Apart from data collection it has two main objectives: the first is to assess whether 'crude' numbers produced by HEFCE inadvertently misrepresent the real situation, in line with the Select Committee's doubts; the second is to analyse the data to see whether different types of HEIs are feeling the effects of declining numbers more or less seriously.

### *2.1 The questionnaire to academics*

We circulated a questionnaire to heads of all HEIs in the SEEDA region, from a list provided to us by HESE. The list included campuses of HEIs that had their main location in another region – this immediately implied a point of contrast with HEFCE data which is based on the latter (see below). The questions asked (see Appendix 2.1) were developed from the Select Committee Report, and especially their reservations concerning naive use of the accessible data on whether departments in the STEM subjects were meeting their targets, and how raw numbers were to be interpreted.

After a small number of locating questions (where they were replying from), the heads of department were thus asked the numbers of students taken each year in their department, followed by whether they were subject to a quota on numbers they took – obviously if their numbers were limited by university policy the steadiness (or otherwise) of numbers might be seen in a somewhat different light. The question was expanded further on the basis of a point made by the Select Committee, that meeting quotas or similar rules was sometimes used as a guideline as to whether targets were (not) being met. A crude guide to numbers falling short in the STEM or other strategic subjects thus could come from responses about these targets. But as the Select Committee pointed out, if the targets (quotas etc.) were themselves being revised downwards, that would not tell us very much. We therefore asked about the pattern of change in quotas over the past five years.

The next question asked about patterns of intake over the past five years, giving five options (rising, steady, ...). Intake could diverge from quotas, and in any case many HEIs do not use quotas. This was therefore the best simple guide as to changing numbers, and in addition could be verified against HEFCE data when that became available. However it is subject to the considerations raised by the other questions.

The following question directed the respondent's attention to minimum numbers necessary for survival, to try to elicit evidence that strategic subjects might be in danger of becoming unviable through student numbers being too small. In the event this did not prove very successful as an objective measure, because the notion of 'viability' depended on whether one was talking about national presence in the subject, or about covering costs. In the latter case, numbers close to existing numbers or quotas were deemed to be minima. As an impressionistic indicator of the national presence, which was what was intended, the responses were nevertheless of some use.

The next question clarified this point but was omitted from the second version of the questionnaire – it asked whether departments felt they were covering their teaching costs. As the Select Committee pointed out, if numbers of students in strategic subjects were being met but departments were still running at a loss, that would constitute another kind of threat to longer-term viability. The Committee asked but did not answer whether the new variable (so-called 'top-up') fees would resolve any financial shortfall (as noted in Chapter 1 it expressed reservations about this). Answers to our own questionnaire were for the most part fairly unequivocal on this. The HEFCE response to the Select Committee discussed in section 1.2 above also makes the point that *all* teaching is underfunded.

The penultimate question concerned RAE scores. It asked what the department's score was (if any) in the last RAE exercise (2001), in order to analyse whether numbers were behaving differently in research-intensive departments, and similar issues. It also asked what the targets were for the next RAE (2008), in the light of the Select Committee's anxieties that too much pressure on upgrading research might be coming at the cost of reducing student intake for teaching purposes.

The last question was one of the most important. The Select Committee pointed out that apparent patterns of student intake could be affected by restructuring operations undertaken within the HEIs, especially those designed to readjust for what might otherwise have been falling numbers. Here we therefore asked for restructuring moves under a range of indicative headings (expanded, downsized, taken in other groups, merged with other groups, refocused, etc.).

Of the 23 HEIs in the SEEDA region, responses have been collated from 19 of them, although some have not replied for all relevant departments. Two HEIs, Imperial College's campus at Wye, and Thames Valley University's Reading campus, had no relevant departments within the region. The remaining HEIs were telephoned repeatedly at central university and at departmental level. All but one of the four remaining omissions relate to tributary campuses where the HQ is located in another region, and the data are difficult to separate. In some cases it was not clear from the replies to our questionnaire whether the subject did or did not exist in the tributary campus within the SEEDA region, as the reply could be rather generic for the HEI as a whole. Subject to this reservation, a picture of the spread of strategic subjects around the region can be obtained from Table 2.1.

Some patterns are worth remarking on, prior to full analysis. Our survey seemed unlikely to pick up closures since it was directed to extant departments, but in fact two closures responded. One was Chemistry at the University of Kent, which had merged with Physics in 1997 but now entry into Chemistry has ceased; however a new Forensic Science degree, largely based on chemistry, is expanding (the Select Committee pointed to the expansion of Forensic Science on a national scale; see also SEMTA's report on Forensic Science, 2004). One of our responses from 'intermediaries', covered in Chapter 3, also related to this course. The second closure was of Mathematics at Canterbury Christ Church.

Table 2.1: Responses of student numbers to HEFCE (H) or Questionnaire (Q)

| | Physics | | Chem. | | Earth | | Non-elect | | El'c eng'g | | Maths | | IT | | Creat-ive | | Langs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | Q | H | Q | H | Q | H | Q | H | Q | H | Q | H | Q | H | Q | H | Q |
| Brighton | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Brunel* | | | | | | | | | | | | ✓ | | ✓ | | | | |
| Bucks Chilterns | | | | | | | ✓ | | ✓ | | | | ✓ | | ✓ | | ✓ | |
| Canterbury Ch'Ch | | ✓ | | | | ✓ | | | ✓ | | | X | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Chichester | | | | | ✓ | | | | | | ✓ | | ✓ | | ✓ | ✓ | | ✓ |
| Cranfield* | | | | | | | | | | | | | | | | | | |
| Greenwich* | | | | ✓ | | | | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| Imperial, Wye* | | | | | | | | | | | | | | | | | | |
| Kent | ✓ | ✓ | ✓ | X | ✓ | | ✓ | | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| KIAD | | | | | | | | | | | | | | | ✓ | | | |
| Open* | | | | | | | | | | | | | | | | | | |
| Oxford | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | |
| Oxford Brookes | | | | | ✓ | | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Portsmouth | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | ✓ |
| Reading | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Royal Holloway | ✓ | ✓ | X | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| SIAD | | | | | | | | | | | | | | | ✓ | ✓ | | |
| Solent | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Southampton | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Surrey | ✓ | ✓ | ✓ | ✓ | X | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sussex | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | ✓ | |
| Thames Valley* | | | | | | | | | | | | | | | | | | |
| Winchester | | | | | | | | | | | | | ✓ | | ✓ | ✓ | | |

Notes: H = Student numbers given in HEFCE returns; Q = Student intake given in Questionnaire responses; X = closure (or no longer reporting)
* = Subsidiary campuses (and therefore not reported by HEFCE). Imperial Wye and Thames Valley Reading both reported to us that their campuses had no students in these strategic categories.

The predominant trends set out in Table 2.2 below are erratic or steady. Many of the 'erratic' patterns are up-then-down, but quite a number involved declines several years ago, with stability or growth subsequently. In IT, several respondents referred to the 'national cycle' of a sharp fall early in this decade, which their own numbers reflected. This fall, for well-known reasons, now seems to have flattened out. Similarly in engineering, there appears to have been a fall in several departments early in the decade, which has recovered to some gains in the last year or two (there does not seem to be any clear pattern as between the various branches of engineering). In physics and especially chemistry the picture appears very confused – the responses cover the spectrum, though few record any large gains in numbers. In chemistry, one

university recorded fluctuations between 85 and under 50 in recent years, another between 43 and 19 (in both cases the current intake is towards the upper figure). The very diverse nature of these returns, including the semi-closure of chemistry at Kent, do support the Select Committee's argument for taking a more regionally based view rather than over-reacting to individual cases.

Table 2.2: Intake trends, quotas and restructuring (if any) for respondents, by subject

| Subject | No. of Responses | Intake | Quota | Restructure** |
|---|---|---|---|---|
| Physics | 5 + 1* | rising –2<br>slight fall – 2<br>erratic – 1 | no – 2<br>yes – 3 | expanded – 1<br>downsized – 2<br>merged – 2<br>refocused – 1 |
| Chemistry | 7(8) | rising – 2<br>steady – 3<br>erratic – 2<br>closed – 1 | no – 4<br>yes – 2 | expanded – 1<br>downsized – 2 (staff)<br>refocused – 2<br>merged then closed – 1 |
| Earth sci | 7 | rising – 2<br>steady – 3<br>slight fall – 1<br>erratic – 1 | no – 4<br>yes – 2 | expanded – 1<br>merged – 2<br>refocused – 2 |
| Engineering | 10(14) | rising – 2<br>steady – 5<br>slight fall – 1<br>erratic – 6 | no – 6<br>yes – 5 | expanded – 2<br>downsized – 2<br>merged – 5<br>refocused – 2 |
| Mathematics | 11 | rising – 3<br>steady – 1<br>slight fall – 2<br>erratic – 3<br>closed – 1 | no – 6<br>yes – 5 | expanded – 2<br>downsized – 2<br>merged – 2<br>refocused – 3<br>closed down – 1 |
| IT | 10 | steady – 2<br>slight fall – 2<br>sharp fall – 1<br>erratic – 5 | no – 3<br>yes – 6 | merged – 2<br>taken in – 1<br>different honours – 1<br>refocused – 3 |
| Creative | 10(30) | rising – 19<br>steady – 11 | no – 6<br>yes – 3 | expanded – 4<br>downsized – 1<br>merged – 3<br>taken in – 3<br>refocused – 4 |
| Languages | 8(12) | rising – 4<br>steady – 2<br>slight fall – 3<br>sharp fall – 3 | no – 2<br>yes – 5 | expanded – 2<br>downsized – 1<br>merged – 3<br>away from single honours – 1<br>refocused – 1 |

Note: Numbers of responses refer to HEIs, with separate departmental returns given in brackets. Intake trends relate to departments; quota numbers to HEIs.

* 1 Physics in Science framework (not included in totals)

** May include multiple responses

In regard to quotas and their possible impact on the figures, one new university noted in relation to chemistry that, "We do not have a quota since recruitment into these science subjects is so difficult."

### *2.2 Analysing the responses*

Table 2.3 divides the returns according to the score that the department or 'Unit of Assessment' obtained in the 2001 RAE. This is to test whether trends differ according to the research focus of the department. As elsewhere pointed out, there are supporters for both more specialisation (separating research from teaching) and more synergy (combining them). It is difficult to see any coherent pattern in the results according to RAE score. The balance between rising, falling and steady numbers looks much the same in each area. There is slender evidence for greater expansion in high-scoring departments in Mathematics and in Languages, though not at any acceptable level of statistical significance. It should be pointed out that some approximations were needed to obtain this division by RAE score, since departments sometimes recorded more than one score (e.g. Pure Maths and Applied Maths); however we do not believe this obscures the interpretation of the results. The question about pressure from upgrading for the next RAE revealed little, as nearly all departments recorded the target of aiming to increase by a grade for next time (those already with 5* from 2001 aside). One of the few cases where a gain of two grades was posted (for a department of Chemistry) seemed to be recovering numbers. It appears that this pressure, if it exists, is more or less ubiquitous. Some departments were privately sceptical about their chances of improvement.

Table 2.3: Intake trends according to 2001 RAE score

| Grade 2001 | 3a/3b | | 4 | | 5/5* | |
|---|---|---|---|---|---|---|
| Physics | 1 | rising | 1 | erratic | 3 | rising –1<br>falling – 2 |
| Chemistry | 1 | erratic | 2 | rising – 1<br>steady –1 | 3 | steady – 2<br>erratic – 1 |
| Earth sci. | 2 | rising –1<br>erratic – 1 | 0 | | 3 | rising – 1<br>falling – 1<br>erratic – 1 |
| Engineering | 5 | rising – 1<br>falling – 2<br>erratic – 2 | 1 | rising | 6 | steady – 3<br>erratic – 3 |
| Mathematics | 3 | falling – 1<br>erratic – 2 | 3 | rising – 1<br>erratic – 2 | 4 | rising – 2<br>steady –1<br>erratic – 1 |
| IT | 1 | falling | 3 | falling – 2<br>erratic – 1 | 3 | steady – 1<br>falling – 1<br>erratic – 1 |
| Creative | 6 | rising – 5<br>steady – 1 | 1 | rising | 1 | rising |
| Languages | 2 | steady – 1<br>falling – 1 | 4 | rising – 1<br>falling – 3 | 3 | rising – 2<br>falling – 1 |

The creative and cultural areas are evidently expanding in most HEIs that specialise in them, though modern languages (especially German) appear to be suffering more. In the creative/cultural field alone, several (mostly specialist) institutions claimed that they were covering their teaching costs – on the contrary, in almost all areas teaching was not thought to cover its costs, and it was believed unlikely that 'top-up' fees would fully remedy this situation. For physics and chemistry, one established university noted that, "Given the level of fees, science is simply not economical for a university whatever size intake is involved. All one can do is ameliorate the problem." As the Select Committee pointed out, this implies that research is subsidising teaching in the sciences, or else viability is under threat.

The results can be compared with the data provided to us by HEFCE, covering the years 1999/2000 to 2003/04. The figures for the last of these years have a strong disclaimer as being provisional. Moreover a general disclaimer is a condition of using these figures: "Data provided by HEFCE are based mainly on authoritative datasets held but is not necessarily part of a published series. They should not be reproduced without the prior written agreement of HEFCE" (which we have obtained). As compared with the provisional data from HEFCE ending in 2003/04, our figures cited above include 2004/05 and sometimes include speculation about the intake for 2005/06. The difference in chronology is significant, because many departments recording decline or stability in the years to 2003/04 saw an improvement in 2004/05. This may or may not be a temporary rise, perhaps caused by an inrush to beat the top-up fees beginning in 2006/07. The HEFCE figures do not include several campuses in our survey area, although Brunel and Greenwich were the only ones among these to respond to us with data. There were also quite a number of instances in which we obtained a return of positive numbers whereas the HEFCE data cited zeroes; conversely some of the HEFCE numbers for incumbent FTEs were too high to be generated by the numbers we were quoted for annual intake. The reason is that HEFCE compiles its data on a cost centre basis, rather than a regional basis. It would be a major and probably unfruitful task to reconcile the two.

In the next table (Table 2.4) we compare results of the two returns in respect of exhibited trends. Following the findings of other studies including some by HEFCE (see Table 1.1 in Chapter 1 above), we distinguish here between Electrical-Electronic Engineering (including Software Engineering) and other branches of Engineering. The results, incidentally, do show that some of the trends apparently observed in the HEFCE data are the result of restructuring, such as the apparent disappearance of Chemical Engineering from the South East region's HEIs. The figures cited in the next few tables relate to undergraduate FTEs only.

In the next set of tables we score assessments of change ('trends') over the past 5 years by converting the above qualitative reckonings to point scores, as follows: sharp rise – 7; rising – 6; slight rise – 5; steady or erratic upwards – 4; slight fall or erratic downwards – 3; falling – 2; sharp fall – 1; closed – 0. Averages of these point scores and the number of returning HEIs are shown in Table 2.4, first from the questionnaire data and then from HEFCE data.

Table 2.4: Average trends per subject, from questionnaires and HEFCE returns

| | Q'aire trend | No. HEIs | HEFCE trend | No. HEIs |
|---|---|---|---|---|
| Physics | 4.3 | 6 | 4.3 | 7 |
| Chemistry | 4.0 | 6 | 2.0 | 8 |
| Earth sci | 4.1 | 7 | 3.5 | 11 |
| Non-elect Eng | 4.1 | 8 | 3.6 | 11 |
| Elect. Eng | 3.3 | 7 | 4.6 | 13 |
| Mathematics | 3.6 | 11 | 3.1 | 11 |
| IT | 3.4 | 10 | 3.5 | 10 |
| Creative | 5.3 | 9 | 5.2 | 17 |
| Languages | 4.0 | 8 | 3.3 | 12 |

Note: Trends here are average point scores, as explained in the text.

With two exceptions the 'average' trends are generally quite similar. The large discrepancies are for Chemistry, where our results average out at a 'steady' figure as compared with 'falling' for HEFCE data, and for Electronic Engineering where the pattern is roughly reversed. In these and other subjects the main differences appear to be compositional, i.e. which particular HEIs are included/excluded from each list, although there are some blatant discrepancies arising in HEIs appearing in both lists, which are probably accounted for by restructuring efforts not taken account of in the HEFCE data (given their cost-centre bases). Whether one can draw the conclusion that the position of Chemistry is less worrying than often thought (and conversely for Electronic engineering) is a matter for further investigation.

The restructuring question therefore also elicited a great diversity of responses. The immediate objective of the question, as noted above, was to detect whether 'crude' figures on numbers (e.g. as reported by HEFCE) might be distorted by structural changes such as mergers. Our view is that our respondents have answered for existing entities and the trends they describe are, on the whole, free from any such distortions. More broadly, the answers do indicate a wide range of ways in which departments or schools react to difficult circumstances. The impression is that little expansion of staff overall is taking place, and when 'expanded' is recorded it is more likely to refer to new courses or additional students. Influxes of overseas students were seen by several as crucial for viability. 'Downsized', on the contrary, is mostly taken to mean contraction of staff numbers. Mergers of sub-branches into schools etc. appears common (most apparently in engineering and modern languages), though the focus is still quite specialised. There was little indication of changes outside the institutions, apart from some taking in of small operations in ancillary institutions.

Table 2.5 considers the 'age' of the HEI, and uses only the HEFCE data. We distinguish 'established' (pre-1992 universities), 'new' (those becoming universities ca. 1992), and 'future' universities (those intending to become so, including the specialist Institutes of Art and Design ('monotechnics'), which have since merged).

Table 2.5: Numbers enrolled according to 'age' of HEI

| | | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | trend |
|---|---|---|---|---|---|---|---|
| Physics | estab. | 1379 | 1373 | 1348 | 1332 | 1493 | 5 |
| | new | 143 | 159 | 168 | 164 | 178 | 5 |
| | future | 0 | 0 | 0 | 0 | 0 | - |
| Chemistry | estab. | 1475 | 1387 | 1297 | 1172 | 947 | 2 |
| | new | 188 | 158 | 180 | 126 | 151 | 3 |
| | future | 0 | 0 | 0 | 0 | 0 | - |
| Earth | estab. | 937 | 995 | 1071 | 904 | 1198 | 5 |
| | new | 636 | 641 | 576 | 518 | 434 | 2 |
| | future | 269 | 209 | 130 | 136 | 118 | 2 |
| Non-elect | estab. | 1998 | 2020 | 2187 | 2059 | 2256 | 5 |
| | new | 2509 | 2489 | 2390 | 2241 | 2250 | 3 |
| | future | 1208 | 1216 | 1193 | 966 | 941 | 2 |
| Elect. Eng | estab. | 2408 | 2545 | 2706 | 3199 | 3279 | 6 |
| | new | 3196 | 3170 | 3357 | 3525 | 3543 | 5 |
| | future | 744 | 818 | 733 | 670 | 525 | 2 |
| Maths | estab. | 2342 | 2375 | 2351 | 2295 | 1966 | 3 |
| | new | 701 | 654 | 537 | 476 | 459 | 2 |
| | future | 606 | 208 | 156 | 124 | 295 | 2 |
| IT | estab. | 43 | 112 | 201 | 179 | 199 | 6 |
| | new | 1047 | 867 | 832 | 825 | 785 | 3 |
| | future | 1019 | 931 | 1269 | 1320 | 932 | 3 |
| Creative | estab. | 2207 | 2137 | 2262 | 2258 | 2549 | 5 |
| | new | 2540 | 2958 | 2961 | 3504 | 3428 | 6 |
| | future | 6471 | 7128 | 7305 | 7576 | 7431 | 6 |
| Language | estab. | 2417 | 2334 | 2186 | 2148 | 1853 | 2 |
| | new | 725 | 698 | 789 | 871 | 831 | 5 |
| | future | 0 | 80 | 76 | 72 | 32 | 4 |

It will be noted that the summative 'trend' ascribed in the final column is rather arbitrary in distinguishing (say) slight falls from (medium) falls. The overall level of the student body is taken into account in this assessment. The results should be taken in the light of the approximations involved.

The above table suggests some polarization of outcomes. Numbers of students at new universities in Physics and Chemistry are small, and seemingly non-existent at 'future' universities (though our own data do show some positive returns). Their trend patterns are however no worse at the new than at established universities. In Earth sciences, numbers at new and future universities were of a similar magnitude to those at established universities at the beginning of the decade, but by its middle had dropped below half of the latter, whose numbers were on the increase. It should be mentioned that some of our respondents had particular difficulty in knowing what 'earth and allied sciences' exactly covered. A similar if less dramatic polarization occurs in Non-electrical engineering (engineering other than the electronics-software fields), where increases of about 250 over the five years in the established universities were offset by falls of about 250 in both new and 'future' universities.

In the remaining subject areas, the new and/or future universities have not done much worse than the established universities, and often better. In Electrical engineering, both established and new do quite well, while in Mathematics both are falling (in the latter case the pattern for future universities, where Maths is often a service activity, is highly erratic). In the area of IT and e-skills, all three reflect the 'national cycle' referred to in many of our returns – even the respectable rise of the small numbers in established universities comes to a halt. In the Design and Creative field, all show gains, with new universities and future (which include the specialist Institutes) each showing gains of about 1000 over the quinquennium. Finally, in Languages, the declines are limited to the established universities (as a group), although the small numbers in future universities are probably on service courses.

Table 2.6: Numbers enrolled according to size of department

| | | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | trend |
|---|---|---|---|---|---|---|---|
| Physics | small | 96 | 85 | 72 | 75 | 78 | 3 |
| | medium | 794 | 802 | 778 | 785 | 943 | 5 |
| | large | 633 | 645 | 667 | 635 | 650 | 4 |
| Chemistry | small | 53 | 23 | 60 | 7 | 4 | 1 |
| | medium | 924 | 848 | 741 | 632 | 460 | 2 |
| | large | 685 | 674 | 676 | 659 | 634 | 3 |
| Earth | small | 352 | 376 | 323 | 259 | 227 | 2 |
| | medium | 562 | 528 | 603 | 628 | 584 | 5 |
| | large 300 | 928 | 941 | 861 | 671 | 939 | 4 |
| Non-elect | small | 0 | 4 | 3 | 8 | 2 | 4 |
| | medium | 1085 | 1084 | 1227 | 1019 | 1180 | 5 |
| | large | 4630 | 4636 | 4540 | 4240 | 4265 | 3 |
| Elect. Eng | small | 0 | 19 | 60 | 80 | 0 | 3 |
| | medium | 2744 | 2812 | 2652 | 2888 | 2784 | 4 |
| | large | 3604 | 3704 | 4084 | 4426 | 4563 | 6 |
| Maths | small | 31 | 36 | 17 | 4 | 5 | 1 |
| | medium | 2184 | 1778 | 1603 | 1490 | 1635 | 3 |
| | large | 1435 | 1423 | 1424 | 1401 | 1080 | 3 |
| IT | small | 131 | 95 | 78 | 128 | 203 | 5 |
| | medium | 735 | 823 | 976 | 999 | 829 | 5 |
| | large | 1242 | 992 | 1249 | 1197 | 883 | 3 |
| Creative | small | 52 | 51 | 52 | 41 | 44 | 3 |
| | medium | 4034 | 4057 | 4277 | 4392 | 4805 | 6 |
| | large 1000 | 7132 | 8114 | 8198 | 8904 | 8561 | 6 |
| Language | small | 0 | 80 | 76 | 72 | 32 | 3 |
| | medium | 1813 | 1722 | 1734 | 1756 | 1692 | 3 |
| | large 400 | 1329 | 1310 | 1241 | 1263 | 993 | 2 |

Table 2.6 is similarly based on HEFCE data but compares small, medium and large HEIs in the respective subjects. In most cases small was defined as an HEI with under 100 FTEs in the subject, medium as between 100 and 499, and large as 500 or more, after averaging over the five years of the data. Normally this produced sharp cut-off points, but in some cases it was thought more useful to shift the demarcation for 'large' HEIs – down to 300 for Earth sciences and 400 for Modern languages, and up to 1000 for Design and Creative. We considered assessing the various branches of

Engineering separately, but restructuring of departments and thus categories ruled this out.

These results have implications for the debate over whether to consolidate into regional hubs. Elsewhere we have argued, on the basis of a survey of the literature rather than original research, that there is little empirical support (e.g. from RAE gradings) in the UK or other countries of stronger academic performance from larger departments (von Tunzelmann et al., 2003). This conclusion was rejected by the Government on the grounds that it represented a travesty of government policy – an irrelevant remark that was in any case scorned by the Select Committee (p.53). From the above, which as HEFCE data covers just the SEEDA region in a narrow sense (i.e. ignoring branches of HEIs with HQ in other regions), and which does not incorporate the generally more positive results from 2004/05, rather confirms the impression that stronger performance is not restricted to larger departments and that larger departments do not necessarily fare well. The results from the small departments are difficult to interpret, but suggest that many of these are too small to be viable, except perhaps as service departments. The boundary between medium and large 'departments' is of more concern here.

In the case of Physics and Chemistry there was only one 'large' HEI, for the same university, and as it was atypical on other grounds we have not examined these subjects here (the 'medium' category in both subjects was made up of a bunch of HEIs with quite similar average numbers, so no other cut-off point suggested itself). The remaining subjects are included in the following sub-table:

| | |
|---|---|
| Trend for medium depts < large | 1 |
| Trend for medium depts = large | 2 |
| Trend for medium depts > large | 4 |

While there is admittedly some degree of subjectivity as to whether, for example, a fall is slight, medium or sharp (and the same for rises), we believe these results are indicative. Allowing for the fact that other issues apart from size influence these results, including the question of whether the HEI concerned is a recent or older-established university as in the previous tabular arrangement, we would contend that there is no support here for consolidation on size grounds alone. At the same time, and for what it is worth, our personal beliefs are in favour of greater regional cooperation and 'alignment' (von Tunzelmann, 2004).

The final table in this section concerns 'comparative advantage', for reasons adumbrated in Chapter 1 above, and makes an assessment of the *comparative* strengths of HEIs in the region, supposing that some consolidation was to be sought. This is also derived from the Select Committee's recommendations, though as seen above that Report did not make it clear whether it was advocating comparative or absolute advantage for any regional consolidation. The exercise could be conducted in a variety of ways. What we have done is, for each subject, to calculate the 'average' trend (point score) of HEIs recording student numbers in the subject. This is shown in the first data column of the Table 2.7 (in this table we have averaged the HEFCE returns and those of our own questionnaire, for simplicity). It may be recalled that a score of 4 represents steadiness of numbers enrolled in the subject. The trend for each HEI is then compared with this subject average to indicate whether the HEI in

question has a comparative advantage (ratio > 1) or disadvantage (ratio < 1) in the subject (in cases where the ratio was exactly equal to 1 we scored the HEI at 0.5). The second data column shows the number of HEIs at present recording student numbers in the subject since 1999/2000, and the remainder those that would hypothetically retain a comparative advantage through having a ratio greater than or equal to 1. These are divided as between established, new and 'future' universities as before.

Table 2.7: Comparative advantage of HEIs by subject, according to 'age' of HEI

| | Av. trend | Existing HEIs | Advantage established | Advantage new | Advantage future |
|---|---|---|---|---|---|
| Physics | 4.3 | 8 | 3 | 0 | 1 |
| Chemistry | 3.0 | 9 | 3 | 2 | 0 |
| Earth sci | 3.8 | 12 | 4 | 1 | 0 |
| Non-elect Eng | 3.8 | 12 | 4 | 2 | 0 |
| Elect. Eng | 4.0 | 13 | 4 | 2 | 2 |
| Mathematics | 3.3 | 15 | 3 | 2 | 0 |
| IT | 3.5 | 15 | 2 | 4 | 4 |
| Creative | 5.3 | 18 | 2 | 3 | 3 |
| Languages | 3.6 | 15 | 3 | 3 | 1 |

Note: 'Av. trend' is an average of the trend we obtained from our questionnaires (where available) and HEFCE's assessment. As explained in the text above, the trend is scored from 0 (closure) up to 7 (sharp rise in numbers), with 4 representing a steady intake.

Since there is no mechanism in this calculation to produce a comparative advantage for the institution, as opposed to the subject, it would be possible for a particular HEI to end up with all subjects or none as a result of this exercise. In fact one established university (not Oxford, incidentally) comes out as hypothetically present in all but one of these subjects, while another established university loses all but one. More seriously, there is an evident outcome, which might have been expected, that the established universities are doing better in STEM subjects while new and 'future' universities appear to be doing well in the remaining subjects.

### *2.3 Conclusions*

In order to meet the Select Committee's challenge to simply accepting 'crude' data on numbers, this chapter has assessed the outcomes of a questionnaire circulated to heads of all HEIs in the South East region, from a list provided to us by HESE. The list included campuses of HEIs that had their main location in another region. Replies were eventually received from 19 of the 23 HEIs identified as having campuses in the South East region (though two had no relevant departments). Of the four not replying, three were tributary campuses with headquarters in another region. However quite a number of departments in replying universities did not respond.

In most of the strategic subjects, there was a rough balance between numbers of departments where student numbers were rising (though mostly not sharply), those where they were stable, those where they were falling, and those where the numbers were erratic. The trend patterns from the survey, e.g. in chemistry, appear somewhat less worrying than from the publicly available HEFCE data, and a part of this seems to be due to upturns in some subject intakes in the current year which is expected to

persist into next year – though some of this in turn may be a scramble for places ahead of 'top-up fees' in the following year. Some of the difference may be due to 'selection bias' in the survey responses, though contrary to our expectations two of the 'closures' of departments did feature in our returns. Much more common were indications of restructuring, which as the Select Committee pointed out can heavily distort raw data. The exception to the general pattern of diversity of trends arises in the cultural and creative field, where all responding departments appear to be rising or at least steady in numbers. In all subjects, the greatest pressure appears to be coming in the shape of the downsizing of staff numbers, and this seemingly obvious component of the strategic subject issue warrants more attention than it has so far received.

In section 2.2 we have analysed both our own questionnaire data and HEFCE data in greater detail, in trying to establish differences in trends according to type of institution and department. For departments that appear to be 'vulnerable', pressure can occur in research-intensive as well as teaching-intensive departments. The Select Committee was much concerned about further pressure to raise RAE scores for the forthcoming 2008 RAE, but we found that most departments are under such pressure. A further distinction between older, newer and 'future' universities indicates some polarization of outcomes as between STEM and other subjects, with more established universities better preserving their position in the former and newer universities in the latter (including IT). This was also the situation when we measured 'comparative advantage', i.e. allowing for differences in trend as between subjects. As for economies of scale, the general pattern was for medium-sized departments to do at least as well as large departments and often better. Undoubtedly there are a number of small departments that are unviable and may need restructuring, though in some cases these are providing service functions to other departments.

There is some indication of a polarization of trends according to subject, with 'established' universities having tended to do relatively better in STEM subjects, while 'new' and 'future' universities fared better in IT, creative and modern languages areas. Any policy development to consolidate regional provision may have to take this on board. In any event, the issue also needs to be viewed from the perspective of employer demand, as we proceed to do in the next two chapters.

## APPENDIX 2.1

Please email the reply to your Vice-Chancellor or equivalent, or directly to us at: HESE-study@sussex.ac.uk

1. Please indicate (in confidence) which HEI you are replying from …..

2. Please indicate the department/field your answers relate to:
   - Physics
   - Chemistry
   - Earth science and allied
   - Mathematics and allied
   - Engineering and allied
     - (which branch?)
   - IT/ computer science and e-skills
   - Cultural and creative
     - (which branch?)
   - Mass communication and documentation (media studies, journalism, etc.)
   - Generic modern languages (French/German/Spanish)
   - Other title for the above areas (please specify) ….

3. How many students do you take in each year at present in the above categories?
   Do you have a quota for student numbers?
   If so, how has it changed in the last five years?

4. Has the intake of students in your department (etc.) in the last five years been:
   - rising
   - steady
   - slightly declining
   - sharply declining
   - erratic (how?)

5. What size of intake do you think is required for the department to be viable?

6. Is your teaching provision fully covering its costs?
   If not, do you think new ('top-up') fees will resolve the problems?

[NB: This question was dropped in a later version]

7. What was your department's RAE score in 2001?
   What is your target for 2008?

8. Has the department (etc.) recently been restructured?
   - expanded?
   - downsized?
   - taken in other groups?
   - merged with other groups?
   - shifted into / out of single honours?
   - refocused?
   - other?

## CHAPTER 3: EMPLOYMENT TAKE-UP IN STRATEGIC SUBJECTS

The second applied part of the study concerned 'contacts with intermediaries'. This was resorted to as a 'short cut' to try to get some information within the brief time window available as to the state of current and impending demand for graduate numbers in the SEEDA region. Our initial plan had been to develop an interview structure for use with employers across the region, in conjunction with the Institute for Employment Studies at Sussex, but this was ruled out as being too expensive and time-consuming. In a second effort, we suggested contacting expert intermediaries who might be in a position to have knowledge about the state of demand for graduates of this region. The outcome was an avowed compromise, and aside from our own reservations about the research design we were advised by some commentators that the results might be problematic. The chapter to follow details the outcomes of the interview process and its findings, then balances this against quantitative evidence on job destinations of graduates, though much of this is not specifically for the South East. It is clear to us that, while a lot is being done, there is little concertation in the process of aligning student places in HEIs to changing market demands in the region.

### *3.1 Interviews with Intermediaries*

The procedure that was followed for the contacts with expert intermediaries was as follows. The study was to be limited (in view of time and other constraints) to organisations with a distinctively South-eastern focus, although we broke this rule on several occasions. The procedure followed is set out in Box 3.1.

**Box 3.1: Procedure for contacting expert intermediaries**

The first part of the study consisted of sending out a number of pilot questionnaires to the pre-determined contacts, with the notion of a pilot being a strong recommendation from HESE's steering committee (for the content of the questionnaire see Appendix 3.1). With the odd exception we had little feedback on the questionnaire, and most of what was said was to the effect that their own interests would require a more specific set of questions. Many of them replied that they were not able to answer it and the great majority did not reply at all.

For the second part of the study, an email and/or phone number from the organisations were determined through the websites whenever possible. This was followed by sending out the cover letter and questionnaire. We did not receive any replies to these questionnaires so we started phoning the contacts, wherever a number was provided. However, some organisations did not provide us with the contact numbers of their members. In situations where we did not receive a phone contact the email was sent again.

During the phone calls, for most of the time it was not possible to reach the direct contact. In these cases we left messages with the secretaries and sent the email again, following the call. Furthermore, in the second and third emails, the messages were carbon copied to the second contacts whenever possible. The contents of these emails were also changed, and we asked our contacts to forward them to the relevant person in case they were not able to answer them themselves.

The limited number of returns are no basis for an effective analysis, but do reveal some key points that we had been intending to elicit from employers. Arguably the most significant response is that from SEMTA, the Sector Skills Council responsible for Science, Engineering and Manufacturing Technologies. In many ways this confirmed the worst fears on the score of the future of STEM subjects. For instance, in reply to Question 2 about whether there has been a fall in recruitment of such graduates in the last 5 years, the respondent answered 'yes'; moreover there was a 'tailback' of unfilled specialist vacancies and this has been rising year on year. So far as the demand side is concerned, the respondent considered that graduates had no difficulty in finding employment in the sectors relevant to this SSC, and that while there was a 'tailback' of underemployed graduates in some sub-sectors this was not growing ('quite static'). The situation was much the same as between part-time and full-time students. Salaries were keeping up with other sectors.

This response from SEMTA vigorously rejects the view that there is a shift to more generalised skills. On the contrary, the problem lies in a shortage of higher-level specialised skills, and it is these that are most needed (it may be noted that this rather conflicts with the evidence from SEMTA cited in the Select Committee's Report, see p.11 above). Graduates from the South East are not fully equipped to meet these demands, and this issue urgently needs addressing. Employers are not happy about the quality of graduates from the South East region, from both older and newer universities. Perhaps this is why the respondent was able to point out that recruitment from outside the region was on the increase (but whether from other regions or other countries is not stated). The problem was 'hopefully temporary' as it could in principle be addressed, but HEIs needed to focus more on what skills employers wanted, and to work in partnership with employers and SSCs to effect this.

The return from the Royal Society of Chemistry, Chilterns and Middlesex branch, an area spanning many large potential employers, also considers that there has been a drop in recruitment of graduates over the past five years, which is primarily attributed to outsourcing production in the chemicals industries to areas of cheap labour (mainly overseas), although some offset may have come through replacements of those being 'railroaded' into early retirement. In this respondent's view, the problem is worsening, as manufacturing falls below self-sustaining 'critical mass', and this pattern of industrial decline will be very difficult to reverse in the face of political neglect. With some exceptions, part-time students are probably better placed than full-time students, encumbered with heavy debts, and forced into short-term solutions to employment. Salaries are low compared to, say, law. There are some differences within the field, and post-1992 universities may have tailored their courses more towards thriving segments of industry (others, however, may have pursued short-term trends). SMEs tend to require recruits to make a quick impact on the business, and therefore to be well trained beforehand. Organic chemists tend to get snapped up by pharmaceutical companies but inorganic and physical chemists have more of a problem.

While there may be some shift towards more generalised skills, this respondent doubted whether this would be the answer for either employers or graduates. Without undervaluing this view in any way, as it appears well informed by the context 'within' the arena of science, engineering and manufacturing industries, the picture from outside the range spanned by SEMTA or the RSC could look rather different. The return from the Kent branch of the Royal Society of Chemistry drew our attention to

the range of employers in the region who make use of graduates in Forensic science, including large pharmaceutical laboratories for which the district is well known. As observed elsewhere (see p.17 above), the University of Kent has closed its Chemistry department and moved some of the resources into a new chemistry-based Forensic science field. Forensic science has been criticised (by the House of Commons Select Committee among others) of being over-expanded, perhaps through the effect of media attention, but this evidence suggests an active local/regional demand. The report from RSC Kent very helpfully includes a list of recent examples of employment in the region, which does indicate a range of employment in police and similar forensic work (one imagines some of this may be once-for-all) but also outside, including the above-mentioned pharmaceutical laboratories.

The (phone) feedback from the Royal Photographic Society refers to the need to combine artistic skills with other competencies, such as those in business-management fields. It will be observed that the demand for photography students is assessed as having fallen and may continue to do so. This is despite appearing to be most related to the 'design and creative' field, which we have seen above to be one of fairly vigorous growth in student numbers.

A response that was unfortunately more typical, albeit polite, was from EUskills (SSC for Energy and Utilities):

> "I'm afraid that we're not in a position to answer some of the very detailed questions you ask regarding graduate employment, earnings and the linkages between SE employers and graduates.
> "As a newly established, UK-wide Sector Skills Council our level of understanding of regional graduate issues is not sophisticated enough to meet you needs. I would recommend that you contact the local LSCs, Business Links and the RDA."

This and others like it carry implications of a problem of 'misalignment', on which we wish to elaborate in this chapter and also in our Conclusions (Chapter 5). It appears that the SSCs, for all their suitability to the tasks they are taking on, still for the most part adopt a rather traditional view of the skills that their remit embraces. They are not alone in doing so – a professor of engineering at one of the South East's leading universities made a similar point about a recent report in *The Economist*, "based on a wide ranging study in the manufacturing industry. I was a little distressed by its very narrow focus."

Thus these very limited returns, obtained after a large expenditure of effort on generally non-responsive audiences, do lead into at least some of our major conclusions. We will look at graduate destinations after first considering the feedback from careers advisory specialists.

### *3.2 Feedback from Careers Advisers*

The Careers Advisory Service has been undergoing a process of overhaul over recent years, and in the view of commentators has become more professional in that process. Since the respondents were located within HEIs, it is apparent that their views will be less detached from those of the HEIs than, say, Sector Skills Councils. However, since they confront issues of the placement of graduate students on a day-to-day basis, our

feeling was that their opinions would be worth soliciting. The procedure followed was as set out in Box 3.2.

**Box 3.2: Procedure for contacting careers advisers**

In order to contact careers advisers, we started with a quick search on the Internet websites of each HEI. When available, we immediately obtained the phone contact of the CAS department. Otherwise, we simply got the main switchboard phone number, and contacted them afterwards. During the first phone contact, after explaining the aims and the content of the project, we asked for the direct phone number of the CAS department, the name of the director/head of the department/manager and his/her personal email address (in order to send personalised email messages to each one of them). In some cases, there was some reluctance to reveal the name of the person, direct phone number or email address.

When possible, an email message, with a cover letter and a short questionnaire as an attachment, was sent to each Head of the CAS department. When the specific contact was not available, the email has been sent to the generic address: careers@*xxx*.ac.uk, specifying in the text of the message that it should be forwarded to the Head of the department. In each email message, we included a phone number to call for any further clarification.

After one week, phone calls were made as a reminder about the project. A second email was sent to all the departments that had experienced problems with email attachments. As we still did not get much feedback yet, the CAS departments were contacted again by phone in mid July. In many cases, a significant proportion of the Careers Advisers were already on holiday, and the remaining staff did not have any time to fill in the questionnaire. In other cases, the Heads of the department said that they would not be able to answer to those questions in an appropriate way and if they did, they would simply be guessing. Sometimes, the Heads of the CAS departments decided to not take part to this project as they were not interested.

From the phone calls, another phenomenon emerged. Because of the presence in the questionnaire of one or two questions which the respondents would not be able to answer, they decided to give up and not fill it in at all. In particular, the questions which caused the greatest trouble were number 6: "*Do you think the problems are more or less acute for the post-1992 universities?*" and number 8. "*Would you be able to assess what proportion of such graduates find employment in the locality of their university, in the rest of the SE region, or outside? And has this been changing?*". After explaining to them that even a partially filled questionnaire would be very welcome, as well as any other kind of comments or feedback, the first answers via email started arriving. In some cases, the Heads of the CAS department preferred the option of a phone interview, because of the possibility of clarifying immediately any doubts about the content of the/questions.

By the time of going to the report stage we had received a total of seven filled questionnaires (both via phone and email), but there are some CAS departments which – so far as they told us – intended to reply very soon. In other cases, we are still

waiting for some feedback, both via phone and email. In all these cases, a reminder via email, underlying the short time still available and the relevance of the CAS department's cooperation with the project has been sent.

Of the responses received, three (from Greenwich, Imperial College and Thames valley) relate to subjects taught in London rather than in the SEEDA region (despite having campuses within the region), while three (from Kent, KIAD and SIAD) are for modern languages or cultural and creative fields. Only the broad-ranging return from Sussex therefore gives us much to go on. The results are summarised for cross-referencing in Table 3.1.

Table 3.1: Summary of responses from Careers Advisory Departments

| | Sussex | Greenwich | Imperial | Kent | KIAD | SIAD | TVU |
|---|---|---|---|---|---|---|---|
| Subject | All | IT | STEM, IT | Langs. | Cult. | Cult. | Cult. |
| 2. Fall in recruitment | yes – esp. IT | d.k. | Eng'g stable, IT down and up | no | no – increase | no | no |
| 3. Change in balance of skills | all need portfolio | more generalised | more high skilled | general always required | more specialist | not more general | differs by subject |
| SE graduates well equipped | average | not always | yes | urged on students | generally, but some 'shop around' | more experi-ence wanted | generally employers happy |
| 4. Difficult to find employ? | for many in niches | yes | no, but need to look globally | for some | yes for highly specialised | yes – tailback not growing | no – but early mobility required |
| 5. Temporary or permanent? | permt. | d.k. | only have full-time | part-time worse | | permt. | needs resolving |
| 6. Worse for old/new universities? | same | tougher for newer | d.k. | | newer do better | tougher for newer | differs by subject |
| 7. Salaries | stable and low | d.k. | recent rise | | some low paid | keeping up | keeping up |
| 8. Proportion finding employment locally | more locally | d.k. | significant | about 40% in Kent | probably <25%, London effect | most if include London | 89% in SE incl. London |

Notes: 'd.k.' = don't know. Numbers in the first column relate to questions in the questionnaire.

The results as regards question 2, of whether there has been a fall in recruitment in the last five years, are mostly in line with numbers of student places as given in Chapter 2 above. Imperial College finds engineering employment stable, but its proud academic record may be giving somewhat atypical results. The results for Cultural and creative as well as Modern languages reject any decline. The IT pattern is in accord with the 'national cycle' encountered in Chapter 2. The response from Sussex is in keeping with these views:

"Yes, there has been a fall in graduate recruitment in the last 5 years: September 11, 2001, seemed to mark a turning point that had a major impact on graduate recruitment – first seen in relation to IT/Computing students finding it extremely difficult to find placements, then with graduates and postgraduates in IT/Software Engineering. Careers Services hear rather messages [sic.] from employers that there are not enough high calibre graduates around with science/engineering/IT/Maths knowledge base but then we find that 'good' students have applied to these organisations and been rejected for various reasons."

The answers to question 3 on whether the balance of skills has been changing, and in particular in the direction of more specialist or more generalised skills, again produces a division along subject lines, though different from that relating to recruitment numbers. Imperial College, for engineering and IT, together with the Institutes of Arts and Design, reject the call for more generalised skills and contend that deeper and more specialist knowledge is what is needed. But Greenwich, for IT, argues for greater generalisability, while Kent, for Modern languages, considers that in this field wider skills have always been required. The less subject-specific responses from Thames Valley and especially Sussex see that things differ according to subject, but the latter (particularly) stresses the need for a portfolio of skills. Again, Sussex's response is worth quoting:

"There has been the expectations that all graduates should offer a portfolio of personal qualities and skills which are well developed in addition to business and commercial awareness and high level work experience alongside their graduate knowledge base.

"So the expectation package has changed to one of:

**GRADUATE JOB** = **DEGREE** + **COMPETENCIES** + **RELEVANT SKILLS** + **EXPERIENCE** + **ENTERPRISING PERSONAL QUALITIES**

In support of this, the respondent goes on in relation to the next sub-question to state that:

"Graduates from the SE region are, in general, no better equipped than graduates from any other region in the country; the main issue is that academic programmes need to fully embrace incorporating explicit personal development alongside intellectual/academic development. It is not acceptable, given the high and increasing expectations of employers that individuals graduating from HE should go into such a competitive labour market without preparation. Akin to sending your mediaeval knight into battle without armour!"

In general, the question of whether the students were well equipped produced rather defensive answers, that might be expected to differ from responses from employer-based organisations; but we consider the set of answers given above to be honest ones.

Thames Valley gave the clearest answer regarding any differences between large companies and SMEs in these respects, as follows:

"Yes, indeed.

- "The main cause of these differences is the absence of the Human Resources function in the SMEs. Because of this, the recruitment process for them can be very tricky.

- "From the employees' viewpoint, finding a job in a SME can be tricky as well, as they have to get experienced by themselves, because of the absence of a specific training programme performed by the Human Resources function.
- "However, finding a job in a SME can have the advantage for the employee of becoming multi-skilled and experienced."

More will be said on this issue below.

Question 4 on whether graduates were finding it difficult to gain employment produced a greater consensus, perhaps more so than Table 3.1 implies. The general view was that the situation in respect of a 'tailback' of graduates wanting jobs was not worsening much, but there were many pockets of specialised niches where problems were arising. KIAD instanced the cases of "jewellery, goldsmithing and silversmithing along with fashion design for example", as jobs that were hard to find within the region.

The question produced several illuminating responses that are in line with much contemporary thinking about the changing nature of employment, and in particular its more short-term and mobile nature, especially for new graduates. KIAD pointed out that

> "There really is no such thing anymore as a 'graduate job' and in the creative arts new graduates may well find themselves working unpaid or in low paid jobs at the initial start of their career (e.g. runner in film/television).
>
> "The different employment styles – e.g. part-time working, freelance work, short term contracts, portfolio careers – will inevitably continue and graduates of all disciplines will need to acquire skills to be able to deal with the flexible and changing work patterns of the future. Radical developments in technology will also result in changes in work patterns, job opportunities and the types of jobs available. Graduates are also now encouraged to have a more 'global view' of employment opportunities."

Responses from both Thames Valley and Sussex stressed the need for, or at least extent of, high mobility in the early stages of a career. The latter, for instance, envisaged problems for both students and employers if these factors were not taken into account:

> "There is a tailback of individuals who have expectation-management problems and as a result stay in low-level clerical roles, for example an assistant curator role in a museum, waiting for their dream job to come along in the SE without facing up to the fact that mobility in the early part of their career may be required.
>
> "Other technical and engineering employers look for increasingly complex skill-sets (e.g. new computer languages) without being adaptable and recruiting a graduate they can train."

In relation to question 5, the respondents tended to think the problems (if that is what they can be styled) will not go away of their own accord. However the more optimistic did not see them as insuperable – as with the SEMTA response noted in the preceding section, they felt that the problems could be addressed though needing proper attention. The position is stated vigorously by Thames Valley:

> "It is not question of being temporary or permanent. They could be solved completely, but a lot of work is needed. In particular, more work is required to help graduates:

a. to find job opportunities which are available;
b. to create new skills, which could be required by their future employers.

"In order to do this, however, more resources are needed. More investments in the CAS are required."

Further thoughts by other respondents on how this might be done will be outlined below.

The remaining questions cited in Table 3.1 can be covered quickly. Question 6, on whether the employment problems were better or worse for graduates from post-1992 universities, was perhaps inappropriate for this particular component of the survey, since HEI-based respondents were naturally only limitedly aware of what was happening in other HEIs. Question 7 brought out a general view that salaries were not getting any worse in relative terms, though (except for Imperial) they were not rising either. Sussex and others argued that in relative terms the national data tended to overstate earnings of graduates – a point to be reckoned with in regard to the frequent efforts to compute a rate of return to graduate education. Question 8 also brought out a division of views, with Sussex claiming that more graduates were seeking jobs locally while others pointed to the growth of an international labour market. Both of course could be – and probably are – correct.

The final question, not referred to in Table 3.1, asked whether more could be done to match supply and demand, and it produced some interesting suggestions. Several pointed to more frequent contact between universities and employers, including provision of work placement schemes and the like. Each saw themselves as having a part to play in this. This view was shared by SEMTA, who wrote:

"Most definitely. There should be a greater focus upon employers' needs and HEIs should work in partnership more with employers and Sector Skills Councils to identify skill gaps and skill needs."

It was noticeable that the more proactive and successful careers advisers appeared to reach out more to SMEs, but this created its own problems, as KIAD noted:

"To increase the opportunities for SMEs to somehow work more closely with educational establishments. Time is money for such companies so setting up 'events' can be difficult but greater communication may help. We are involved in promoting the STEP scheme for second or penultimate year undergraduate students to undertake paid work placements. The most each year placed has been 2 as securing specialist placements is difficult. Some of the unpaid volunteering initiatives have been successful however."

This view was echoed by Thames Valley. It appears that SMEs offer the brightest hopes of new sources of employment, but stretch the abilities of labour markets to function.

This view appears more realistic than that from one of the branches of the Royal Society of Chemistry, who thought that the Government might do more to turn around the fortunes of the main industry on which chemistry students traditionally relied. Our SPRU colleague, Susan Kay, who is involved in a dissertation on the situation in regard to departmental closures in Greater London, pointed out to us a response she had had from one professor of chemistry in a post-1992 university:

"We've 'morphed' from 'Applied Chemistry' to 'Chemical and Pharmaceutical Sciences' to 'Pharmacy and Chemistry'. The market is definitely a big financial

driver but we respond to it… [As well as forensic science,] 5 to 10 years out, we see more of the same: that is, more concentration on applications of chemistry – particularly in the pharmaceutical and life sciences, chemistry applied to biology and medicine and materials (although the latter will be research only as opposed to teaching like for pharmaceutical sciences) and we'll respond to that."

The Sussex careers advisory respondent, who had the widest overview, considered that the situation was deteriorating:

"Yes I do think more could be done in the region to relate supply and demand and with the Government's HE participation plans I think this will be important. When one hears, for example, that pharmacy graduates do not automatically find pre-registration places after graduation any more (always previously managed in a balanced way by the profession) then I think it is time to consider the social and ethical consequences for individuals who in this case have made a career decision and find that despite success on the course they may have to spend an additional year waiting to find a pre-registration place. The same might be said of many other discipline areas, e.g. Law, etc.

### *3.3 The destinations of graduates*

HESA and its predecessors have been publishing data on the first destination of graduate students for many years. Although the statistical basis of this information has been updated, there is still a lag of some years in providing the data. It has the well-known weakness of reporting on the situation within a relatively short period after graduation, but of course any allowance for longer-term adjustments to labour market conditions would slow the reporting process down even further, as well as it becoming more and more difficult to collect the data. With some care in use, the information is nevertheless quite valuable, especially for comparative assessment. However it needs to be squared with the point made in the previous section about the seemingly growing casual nature of the labour market, most often asserted in relation to 'new paradigm' sectors such as those relating most closely to IT.

The dangers of relying too greatly on short-term data are exemplified by the following view, stated in the survey for the *South East Skills Audit 2002*, based on 12,883 interviews with employers in the South East:

"Respondents were asked about the extent to which certain types of 'generic' (or transferable) skills are required for their job role both now and in five years time. ... [T]he skills rated lowest now, such as IT operator skills and management skills, are expected to experience the highest increase in the demand for high levels of skills over the next five years. Similarly, the highest rated skills now: spoken communication skills and job specific skills, are expected to experience the least growth over the next five years." (p.5)

".. all skills are anticipated to be required at increasingly high levels over the next five years, and ... employees expect employers to require a balance of skills for their job role, regardless of the occupation or sector." (p.6)

The latter point of course supports the view of the Careers Advisory department at the University of Sussex, noted in the previous section.

From the Prospects website, and its section on *What do graduates do?* (2005), the following tables can be compiled. The figures apply to graduates graduating in 2003. These data apply to the whole of England, since equivalent data for the South East alone are not readily available.

Table 3.2: Proportions of graduates in UK employment and un(der)employed, 2003 cohort, English HEIs

| Subject | All graduates, nos | % response to survey | % with UK employment | % in higher UK study | % believed unemployed | % under-employed* |
|---|---|---|---|---|---|---|
| Physics | 1960 | 85.9% | 40.4% | 27.1% | 10.0% | 12.6% |
| Chemistry | 2665 | 84.1% | 46.9% | 25.2% | 8.3% | 9.8% |
| Earth sciences | 4315 | 86.8% | 57.0% | 10.9% | 7.1% | 13.2% |
| Civil engineering | 1420 | 84.3% | 70.2% | 6.4% | 3.5% | 3.0% |
| Elect. engineering | 3970 | 79.9% | 61.3% | 8.4% | 12.7% | 9.2% |
| Mech. engineering | 2565 | 84.3% | 65.3% | 7.3% | 9.0% | 6.0% |
| Mathematics | 3980 | 87.6% | 48.0% | 12.2% | 7.1% | 8.4% |
| Information tech. | 15045 | 81.1% | 63.7% | 6.0% | 12.1% | 8.1% |
| Design studies | 10435 | 80.2% | 67.6% | 2.8% | 11.8% | 20.1% |
| Drama | 3900 | 78.3% | 65.8% | 2.9% | 6.8% | 18.5% |
| Fine art | 3410 | 77.7% | 55.9% | 5.6% | 11.1% | 25.6% |
| Music | 2725 | 83.8% | 52.6% | 8.0% | 5.8% | 14.5% |
| Modern languages | 8785 | 83.4% | 50.4% | 7.3% | 6.0% | 11.8% |

* Proportion responding to O in Table 3.3 below.

The response rate to the survey is typically around 80% and often more, so the sample is likely to be representative. The most striking findings are in the two middle data columns. Graduates in Physics, Chemistry and Mathematics are the only ones with employment rates within the UK below 50%. The branches of Engineering see ratios around 60 to 70%, as does IT, and so also some branches of the Cultural and creative fields, though others and Modern languages are in the low 50s. At first sight this appears to support the low employability argument. However we can see in the next column that a major factor for Physics and Chemistry and to a lesser extent Mathematics, is the high proportions engaged in higher-level (postgraduate) study in the UK. These figures do not incorporate those in other further study, such as FE, or those in higher-level study overseas; nonetheless the high numbers of physicists and chemists undertaking advanced studies appears rather noteworthy, especially given common employer complaints about the low levels of skills of specialist graduate students. As HEFCE has also pointed out in a different connection, it also undermines the Select Committee's contention that UK undergraduate applicants were shunning the harder subjects.

It might, of course, be claimed that the large numbers going into advanced subjects in these areas was a reflection of a poor job market for undergraduate-level skills, and that the advanced degree was a way of coping with the lack of employment on offer. That in itself implies a hiatus in the job market, as we shall term it in Chapter 5. The last two columns give figures for open and 'disguised' unemployment by subject. While some specific subjects have very low rates for both (notably Civil engineers), the broad figures (S&T, Engineering, Cultural and creative, etc.) do not correlate very well with the apparent expansion/contraction of particular fields implied in Chapter 2 above. For an indicator of the underemployed, i.e. those ostensibly in employment but

in practice waiting for something better to turn up, we have taken the proportions in category O of occupations in the next table, i.e. retail assistants, catering, waiting and bar staff. While a few graduate musicians and linguists (and others) could be being profitably employed in these occupations, it seems a reasonable proxy. In fact the correlation with open unemployment in the preceding column is quite close (much the same is true of category N, another possible area of disguised unemployment).

Table 3.3 gives a detailed breakdown from the same source of the percentages of occupations filled by graduates of the strategic subjects, again for the whole of England. The main point we wish to make in relation to this table is the diversity of occupations filled by graduates in each discipline. There are some obvious exceptions, notably the high proportion of Engineers in the category of Engineering professionals, but the general pattern of diversity holds. This may be partly due to the early mobility effect noted in the previous section, but there can be later mobility as well, generally drifting up the occupational scale. It has been an issue for over a century that Engineers in England mostly end up as managers, regardless of the fact that their training (at least until recent times) has given them no formal background in such areas.

Table 3.3: Occupations of 2003 graduate cohort, England, percentages

| | Physics | Chem. | Earth sci. | Civil eng'g | Elec. eng'g | Mech. eng'g | Maths | IT | Design studies | Drama | Fine art | Music | Mod. langs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 2.0 | 3.8 | 3.6 | 0.8 | 1.7 | 1.4 | 1.7 | 2.5 | 3.0 | 2.8 | 2.3 | 2.7 | 7.2 |
| B | 9.2 | 8.2 | 13.4 | 4.2 | 8.8 | 7.5 | 7.8 | 11.4 | 7.3 | 8.8 | 8.2 | 7.7 | 13.8 |
| C | 6.1 | 22.0 | 2.6 | 0.2 | 0.1 | 0.3 | 0.8 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| D | 2.7 | 2.2 | 1.5 | 69.0 | 25.6 | 48.9 | 1.1 | 1.3 | 1.0 | 0.0 | 0.4 | 0.3 | 0.3 |
| E | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| F | 3.9 | 3.4 | 1.9 | 0.3 | 1.3 | 1.0 | 12.3 | 3.1 | 3.5 | 8.9 | 5.5 | 20.5 | 4.1 |
| G | 6.2 | 4.0 | 0.8 | 1.0 | 0.8 | 0.8 | 17.1 | 1.8 | 0.1 | 0.2 | 0.0 | 0.7 | 2.0 |
| H | 5.1 | 1.7 | 1.3 | 0.3 | 16.2 | 2.1 | 4.7 | 37.5 | 1.1 | 0.3 | 0.5 | 0.8 | 1.2 |
| I | 1.1 | 1.0 | 0.2 | 0.1 | 0.4 | 0.0 | 0.1 | 0.3 | 0.2 | 0.4 | 0.7 | 0.2 | 0.4 |
| J | 3.6 | 3.7 | 7.8 | 2.1 | 2.6 | 2.4 | 10.5 | 4.2 | 1.2 | 2.9 | 1.4 | 2.7 | 6.7 |
| K | 1.6 | 0.7 | 2.2 | 0.1 | 4.4 | 1.5 | 0.8 | 2.8 | 33.1 | 19.8 | 14.8 | 17.3 | 6.4 |
| L | 9.4 | 16.0 | 17.0 | 9.2 | 5.7 | 6.4 | 3.4 | 2.9 | 3.8 | 4.6 | 5.0 | 4.1 | 5.5 |
| M | 5.5 | 3.4 | 4.1 | 1.1 | 1.7 | 1.4 | 10.0 | 3.7 | 1.8 | 2.0 | 1.7 | 2.4 | 4.5 |
| N | 15.2 | 9.0 | 14.1 | 2.3 | 6.3 | 4.7 | 11.9 | 10.1 | 9.1 | 14.8 | 11.9 | 13.8 | 21.7 |
| O | 12.6 | 9.8 | 13.2 | 3.0 | 9.2 | 6.0 | 8.4 | 8.1 | 20.1 | 18.5 | 25.6 | 14.5 | 11.8 |
| P | 1.5 | 1.5 | 3.1 | 0.4 | 0.3 | 0.6 | 1.3 | 0.7 | 2.1 | 6.4 | 6.9 | 4.0 | 3.4 |
| Q | 2.5 | 1.5 | 1.8 | 1.8 | 2.0 | 2.9 | 0.5 | 0.9 | 0.4 | 0.3 | 1.1 | 0.5 | 1.0 |
| R | 11.6 | 7.6 | 11.2 | 4.1 | 12.4 | 11.8 | 7.4 | 8.2 | 12.2 | 9.2 | 13.8 | 7.6 | 9.4 |
| S | 0.3 | 0.1 | 0.3 | 0.1 | 0.4 | 0.4 | 0.1 | 0.3 | 0.1 | 0.0 | 0.1 | 0.1 | 0.3 |

Key to Occupations:
A - Marketing, sales, and advertising occupations
B - Commercial, industrial and public sector managers
C - Scientific research, analysis and development occupations
D - Engineering professionals
E - Health professionals
F - Teaching professionals
G - Business and finance professionals
H - Information technology professionals
I - Nursing and health associate professionals

J - Business and financial associate professionals
K - Media, PR, literary, design and sports professionals
L - Other professional, associate professional and technical occupations
M - Numerical clerks and cashiers
N - Other clerical and secretarial occupations
O - Retail assistants, catering, waiting and bar staff
P - Health and childcare related occupations
Q - Armed forces and public protection service occupations
R - Other occupations
S - Unknown occupations

Table 3.4 gives a further breakdown for the clustered group of Engineers. The percentages are of total employment, as in Table 3.2. The tightness of the clustering is relaxed, especially for the Electrical and Electronic Engineers, the expanding group.

Table 3.4: Engineering occupations of 2003 graduate cohort of engineers, England, percentages of total employment

| | Civil | Electrical | Mechanical |
|---|---|---|---|
| Design and development engineers | 2.7% | 4.9% | 10.2% |
| Civil engineers | 42.6% | | |
| Construction engineers | 11.4% | | |
| Electrical engineers | | 5.2% | |
| Electronic engineers | | 4.9% | |
| Mechanical engineers | 5.0% | 3.0% | 20.9% |
| Production and process engineers | | 1.0% | 3.7% |
| Quality control engineers | | | 1.0% |
| Engineering professionals NEC | 5.4% | 2.8% | 5.5% |
| Other | 1.9% | 3.8% | 5.0% |

This diversity is likely to be at least as great within the South East region, in the light of its more rapid shift into 'new-paradigm' fields such as those surrounding IT. This view is supported by data for the South East from Skills Insight, given in Table 3.5.

Table 3.5: Principal employment one year after graduating for 2001/02 graduates, by main subject area, for SE

| Subject Area | South East |
|---|---|
| Physical sciences | Business activities (28%) |
| Mathematical sciences | Business activities (32%),<br>Financial activities (22%) |
| Engineering & technology | Manufacturing (28%),<br>Business activities (28%) |
| Computer science | Business activities (39%) |
| Creative arts & design | Trade (25%) |
| Languages | Business activities (22%) |
| Combined | Business activities (23%) |
| All subjects | Education (20%) |

NB: Business activities includes Property development, Renting, Business and Research activities.

The rather blanket nature of these categories of occupations, which owe to official and international definitions of sectors, limits the inferences that can be drawn, but they show that traditional manufacturing only surfaces at the top in Engineering and

technology, and even there it is tied with Business activities (broadly defined). As we will argue in Chapter 5, there is scope for new links to be built up at regional level.

### *3.4 Mobility and proximity*

The CIHE report to SEEDA in 2004 included several tables, parts of which we have put together as Table 3.6. It will be seen that London and the north obtain the highest ranks in terms of those staying on to work in their home region. The East and East Midlands perform least well. Despite the significance of the London effect for the South East, the region performs creditably in terms of retaining its students and residents by all of these criteria. This suggests that, whatever the struggles being experienced in certain graduate labour markets in the region, the situation is no worse than in other regions and somewhat better than in the obvious comparators.

Table 3.6: Percentages of students or residents staying to work in the home region, and ranks by region

| Region (institution or domicile) | % of HEI graduates in jobs staying to work in home region | | % domiciled employed in home region | | % domiciled masters graduates staying to work in home region | | % leavers in SET subjects getting employment in home region | |
|---|---|---|---|---|---|---|---|---|
| | % | Rank | % | Rank | % | Rank | % | Rank |
| South East | 53 | 4 | 52.2 | 6 | 57.6 | 6 | 50.7 | 4 |
| London | 70 | 1 | 66.4 | 2 | 77.7 | 2 | 60.6 | 2 |
| South West | 52 | 5 | 50.1 | 8 | 60.4 | 5 | 49.0 | 5 |
| East | 50 | 8 | 46.1 | 9 | 53.7 | 8 | 45.4 | 7 |
| East Midlands | 39 | 9 | 51.4 | 7 | 52.0 | 9 | 39.6 | 9 |
| West Midlands | 52 | 5 | 60.7 | 5 | 56.9 | 7 | 41.4 | 8 |
| Yorks/Humber | 51 | 7 | 61.3 | 4 | 69.4 | 4 | 47.2 | 6 |
| North West | 62 | 2 | 68.7 | 1 | 72.5 | 3 | 61.4 | 1 |
| North East | 59 | 3 | 63.5 | 3 | 79.1 | 1 | 54.3 | 3 |

Original sources: col. ii: from HEFCE Regional Profiles, 2003
col. iv: HESA data on destinations of leavers, 2001
col. vi: What do graduates do? (www.prospects.ac.uk)
col. viii: HESA, DELHE survey 2004, special run

The notion of the importance of 'proximity' as between universities and industry is one favoured (though tinged with some scepticism) in the Select Committee's report, as an argument for the regional approach to student provision. It is also one that has enjoyed considerable popularity in the recent academic literature, though again subject to some controversy.

A pair of studies commissioned by SEEDA and undertaken at SPRU has examined the role of proximity for the South East, based on telephone interviews with companies (mostly SMEs). In the first phase (reporting November 2004), 17 firms were interviewed by telephone using a semi-structured questionnaire. Broken down into three types of sectors, among the results were the following:

> "ICT: Almost every company reported having some links with universities and government funded research centres. Physical proximity to such institutes,

however, was considered to be largely unimportant... Relationships with universities are usually based on specific contacts, but there is little firm knowledge about the strategy or direction of public research institutes.

"Pharmaceuticals/Biotechnology: In accessing the SET base, firms in this category tended to recruit graduates rather than to commission research.

"Other: This category contained firms operating in manufacturing, construction, and engineering. All firms reported links with universities – such as giving research to students and sponsoring projects – and they had established close relationships with the help of other agencies; the most quoted agencies were Thames Water and SEEDA."

This survey:

"... produced more evidence of the growing importance of the region in relation to SET and that 'proximity matters'. Particularly for smaller companies, information and knowledge is often best acquired through face-to-face interactions, which in turn often means interactions with those who are relatively close by in the region." (p.11)

In Phase 2, reporting in March 2005, a slightly different structure of sectors was considered:

[IT] "Most firms emphasised that links are forged with universities independently of their location, but proximity would make it somewhat easier if the relevant expertise was available and accessible locally. Universities were perceived as contributing to developments in the industrial key technologies, such as Artificial Intelligence, but the main contributions were said to be made by firms rather than universities or other research institutes." (p.5)

[Other industries] "The areas of interest for the firms were numerous because of their varying specialisations ... Advances in the new technologies to these industries are, according to the firms, dependent on universities and firms localised in the South East no more than in all other industrial countries. In other words, there was no perceived research competence in the relevant areas that is specific to the South East." (p.6)

[Service/consultancy firms] "All firms were keen on establishing links with universities; the general view was that universities may have technologies in certain departments, specifically engineering, which are not known to industry." (p.6)

As with the flow of students into employment, the results suggest a foundation for interaction, but some gaps in the flow and some areas where bridging could be substantially improved. We pick this up in our Conclusions in Chapter 5, but first examine the nature of graduate employment in the South East in Chapter 4, at the end of which we will summarise views about the demand side for strategic subjects in the South East.

## APPENDIX 3.1

INTERVIEW QUESTIONS FOR EXPERTS

Please indicate which subjects you are replying for:

| | |
|---|---|
| STEM (physics, chemistry, earth science, maths, engineering) | |
| IT / computer science and e-skills | |
| Cultural and creative | |
| Generic modern languages | |

In cases where you have said yes to at least two of the above, and if your answers below would differ according to subject please indicate there to which subject you are referring.

•1. Which companies / organisations do you see as major employers of qualified graduates in these fields within the SE region? (please list several names or types)

•2. Do you think there has been a fall in recruitment of such graduates in the last 5 years?
If so, has there been more recruitment from outside the region?
Is there a tailback of unfilled specialist vacancies in recent years?

If so, has it been growing?

•3. Do you perceive a change in the balance of requirements for such graduates?

Is there a shift towards more generalised skills?
If so, are graduates from the SE region equipped for any such changes?
Do you find that employers are generally happy with the quality and quantity of graduates from the SE region?

Are there differences between large companies and SMEs in these respects?

•4. Do you find that many of these graduates have difficulty in finding employment in the region?

Is there a tailback of inadequately employed graduates in these fields?

If so, is it growing?

•5. Do you think the problems you identify are temporary or more permanent?

Do they affect part-time as well as full-time student graduates?

•6. Do you think the problems are more or less acute for the post-1992 universities?

•7. Have earnings/salaries of graduates in these fields been keeping up with those of others in recent years, as you see it?

•8. Would you be able to assess what proportion of such graduates find employment in the locality of their university, in the rest of the SE region, or outside?

And has this been changing?

## CHAPTER 4: THE NATURE OF GRADUATE EMPLOYMENT IN THE SOUTH EAST

The CIHE Report for SEEDA, *Improving Partnerships between RDAs and Higher Education*, observed that:

> "To meet its economic target [of being one of the world's top 15 regions in labour productivity and employment rates], the RDA in the South East (SEEDA) has set out a strategy ... One of the key partners in this strategy should be higher education, in order to meet the demands of its growing knowledge economy and its sector strengths in hi-tech and advanced engineering, IT, pharmaceuticals and media/creative industries, all strong graduate employment sectors."

In this chapter we assess the changing knowledge base of industrial demand in the South East at greater length.

### *4.1 Graduate qualifications in the South East*

The South East is a region with a structure of qualifications above the national average in most respects. Table 4.1 is taken from the 1991 Census of Population, showing the *relative* importance of people with university or similar qualifications in that year (based on a large sample of the Census). In 1991 the 'South-East' region included London. For this table we have selected the sub-regions of 'Outer Metropolitan' and 'Outer South-East' within that large South-East region. It should however be noted that some 'home' counties included here (Essex, Hertfordshire, Bedfordshire) are no longer part of the SEEDA region.

Table 4.1: Relative qualification levels of the 'South-East', 1991 Census

| | male, full-time | male, part-time | female, full-time | female, part-time |
|---|---|---|---|---|
| All qualific'ns | 115.9 | 104.6 | 94.5 | 111.6 |
| Higher degrees | 121.8 | 93.5 | 103.2 | 125.3 |
| First degrees | 117.7 | 103.2 | 98.6 | 118.2 |

Note: Great Britain = 100. 'Higher degrees' = masters, doctorates, etc.
Source: 1991 Census of Population, special volumes on Qualified Manpower in Great Britain, Table 2.

The figures are calculated as relative percentages, with any figure greater than 100 implies above-average strength (relative to Great Britain as a whole) of the qualification category. Clearly the 'South-East' as here defined was about 15-20% stronger in relative terms than the national average for male full-timers, and in that area for female part-timers. However for male part-timers (a small category) and female full-timers the percentages were around the national average. It should be observed that the definition of 'all qualifications' is wide-ranging, and that the next two rows are more relevant to what HEIs were supplying to the region.

Table 4.2 breaks this down according to the field in which the degree or other qualification was earned. The raw data here come from the Census's 10% sample and consequently have a higher margin of error. Here we are not able to distinguish between full-timers and part-timers. Unlike the ratios in Table 4.1, in this table the figures are expressed as percentages of all national qualifications in each category

(rather than of all persons in the sample). Thus percentages here for degree/qualification subjects in excess of 100% in the 'South-East' have to be counterbalanced by those under 100% (by contrast, in Table 4.1 the figures in excess of 100% have to be counterbalanced by not-given figures under 100% by some other region or regions). The final column in Table 4.2 gives the share of the subject in all (national) qualifications.

Table 4.2: Relative qualification levels by subject of degree, South East, 1991

| | Male | | | Female | | | Share in |
|---|---|---|---|---|---|---|---|
| Subject | all | higher | first | all | higher | first | all qual. |
| Education | 79.8 | 72.4 | 82.7 | 100.7 | 86.9 | 104.0 | 16.0% |
| Health | 78.7 | 80.6 | 75.3 | 95.3 | 105.0 | 92.9 | 17.9% |
| Technology | 107.3 | 118.4 | 114.6 | 117.1 | 129.4 | 111.9 | 18.5% |
| Agric, vet | 84.1 | 115.8 | 89.5 | 120.4 | 117.6 | 110.3 | 1.1% |
| Science* | 116.0 | 120.1 | 115.4 | 131.3 | 129.2 | 123.3 | 10.1% |
| Social, bus | 100.7 | 93.3 | 98.2 | 98.3 | 85.6 | 95.2 | 23.3% |
| Vocational | 100.8 | 77.3 | 94.4 | 98.6 | 89.3 | 101.8 | 3.7% |
| Languages | 91.0 | 84.9 | 91.4 | 95.9 | 110.2 | 91.2 | 3.4% |
| Arts | 86.8 | 83.5 | 85.9 | 92.9 | 87.9 | 90.9 | 2.7% |
| Fine Arts | 83.4 | 57.8 | 77.2 | 97.3 | 55.9 | 90.4 | 3.0% |

* includes Mathematics. NB: totals in the final column do not add to 100% because of a small number of not-stated cases. Great Britain = 100.
Source: 1991 Census of Population, special volumes on Qualified Manpower in Great Britain, Table 9.

It will be immediately observed that, at least in 1991, the 'South-East' stood out as well above the relative average in regard to two 'subjects', namely Technology (including engineering) and Science (including mathematics). In both cases this applied to both males and females, and to higher as well as first degrees. We are of the opinion that this focus on science and technology in the present SEEDA region is if anything understated, in view of the changes in boundaries of the 'South-East' since 1991. This could reflect either an unusually high demand for Technology and Science (STEM) in the South East, or an overstocked supply. Rather surprisingly, the region comes out as relatively low in the demand for (or supply of) qualifications in Languages, which is often assumed to be a local strength, on geographical and other grounds.

The aggregated data for the more recent 2001 Census do not as yet allow this fine degree of assessment. From it, Table 4.3 has been constructed, showing the relative proportions of those with 4 or 5-level qualifications (first degree, HND, etc.), given in the first data column. Here the proportions in the South East (SEEDA region proper) are compared with England & Wales as the base, rather than with Great Britain as in Tables 4.1-4.2. As might have been expected from the above results, the South East is well above the national average (the numbers here are based on all persons aged between 16 and 74, and not just a sample). The second data column shows the proportion of students (aged 18-74) in the population, and – possibly surprisingly – the South East is well below the average, notwithstanding the predictably high share in Oxfordshire. The third column gives the relative proportion of full-time students who were economically active and in employment, while the last column shows the proportion economically inactive (again predictably high in Oxfordshire). The

breakdowns according to old county divisions are given in the table to indicate something of the diversity of pattern across the region.

Table 4.3: Relative qualifications and student proportions, 2001

| Region/county | with level 4/5 qualifications | full-time students | % students employed | % students economically inactive |
|---|---|---|---|---|
| South East | 110.1 | 91.8 | 108.6 | 97.3 |
| Berks | 132.0 | 93.4 | 112.3 | 95.5 |
| Bucks | 120.5 | 65.8 | 132.3 | 83.7 |
| E Sussex | 110.4 | 111.9 | 101.9 | 98.6 |
| Hants | 101.7 | 60.9 | 111.5 | 95.8 |
| Kent | 81.1 | 66.2 | 114.6 | 93.4 |
| Oxon | 140.2 | 168.1 | 71.3 | 118.8 |
| Surrey | 137.4 | 86.1 | 112.4 | 96.6 |
| W Sussex | 96.8 | 57.4 | 143.3 | 79.3 |

Note: England & Wales = 100. Data source: Census 2001, table KS13.

If we leave Oxfordshire out of the account for a moment, these figures imply that demand factors of high-qualification employment rather than the supply of student places are driving the relatively high level of the South East's knowledge base. This is despite the finding in Chapter 3 above of the creditable performance of the South Eats in retaining its graduates for first employment within the region. The Oxfordshire result does not really overturn this conclusion, because Oxford University is usually regarded as supplying a national rather than regional demand (this inference is supported by evidence presented by Faggian & McCann, 2004).

### *4.2 Industrial structure in the South East*

The CIHE Report observed that:

> "- The region has a third of total UK employment in sectors of IT, telecoms, defence and aerospace, plus 60% of UK motor sport, and also an important share of emerging industries (eg nanotechnology).
>
> "- In creative industries such as the AV sector, some 66% are graduates and some 24% have post-graduate awards. In the three interactive media sectors of web design, CD-Rom production and computer games about 81% are graduates."

It went on to point out sagely that:

> "In the 1990s, it was the service sectors of retail and wholesale rather than the IT and computing industries that accounted for the surge in productivity in the USA. Generally it is the users of new technologies rather than the creators that are the keys to productivity growth."

Table 4.4 uses ONS data to assess the 'comparative advantage' of the SEEDA region, measured in terms of the proportions of 'local units', i.e. establishments. Since the national totals are dominated by small and often very small 'units', we have also examined medium and large (ML) units separately in the table, defined as those units with 50 or more employees.

Table 4.4: Relative proportion of activities in the South East, in terms of 'local units', 2004

| | Share of all units, by sector, UK | Share of ML units, by sector, UK | SE comp. advantage all units | SE comp. advantage small units | SE comp. advantage ML units |
|---|---|---|---|---|---|
| Agriculture | 6.81 | 0.42 | 50.4 | 50.0 | 190.2 |
| Mining | 0.12 | 0.30 | 68.3 | 70.4 | 16.9 |
| Food tobacco | 0.46 | 2.21 | 55.1 | 57.3 | 47.7 |
| Textiles | 0.24 | 0.74 | 53.9 | 59.5 | 6.8 |
| Clothing | 0.21 | 0.24 | 31.4 | 31.8 | 21.3 |
| Leather | 0.04 | 0.09 | 51.5 | 51.0 | 55.8 |
| Wood | 0.40 | 0.37 | 95.8 | 97.0 | 41.0 |
| Paper | 0.12 | 0.65 | 87.0 | 87.1 | 84.8 |
| Publishing | 1.41 | 1.58 | 115.3 | 116.0 | 95.4 |
| Coke petrol'm | 0.01 | 0.07 | 60.0 | 58.1 | 0.0 |
| Chemicals | 0.20 | 1.16 | 98.8 | 101.5 | 95.5 |
| Rubber plastic | 0.37 | 1.47 | 83.3 | 85.4 | 71.8 |
| Nonmetallic mins | 0.31 | 0.76 | 78.3 | 80.2 | 59.9 |
| Metals | 0.11 | 0.53 | 66.5 | 72.8 | 28.6 |
| Fab metals | 1.35 | 1.75 | 89.8 | 91.4 | 60.2 |
| Machinery | 0.64 | 1.71 | 89.6 | 90.3 | 91.0 |
| Office machy | 0.05 | 0.19 | 147.5 | 142.6 | 161.1 |
| Elect machy | 0.26 | 0.87 | 120.6 | 120.9 | 127.6 |
| Radio TV | 0.13 | 0.41 | 172.5 | 175.8 | 159.8 |
| Instruments | 0.23 | 0.71 | 138.9 | 136.0 | 168.9 |
| Motor vehicles | 0.14 | 0.78 | 79.0 | 85.0 | 58.3 |
| Other transport | 0.12 | 0.51 | 143.7 | 151.2 | 107.8 |
| Manuf'g nes | 0.93 | 0.96 | 89.2 | 89.5 | 78.8 |
| Utilities | 0.12 | 0.70 | 77.9 | 75.5 | 100.5 |
| Construction | 9.34 | 4.60 | 113.8 | 114.1 | 88.6 |
| Motor trades | 3.83 | 2.12 | 101.5 | 101.2 | 109.0 |
| Wholesale | 6.13 | 4.92 | 95.7 | 94.8 | 128.9 |
| Retail | 13.63 | 9.87 | 87.0 | 86.5 | 105.4 |
| Hotels catering | 7.32 | 6.31 | 90.1 | 89.7 | 103.6 |
| Transport | 3.62 | 4.63 | 90.1 | 89.9 | 97.8 |
| Telecoms | 1.15 | 2.95 | 95.7 | 94.4 | 116.0 |
| Finance | 1.67 | 3.74 | 89.7 | 89.2 | 100.9 |
| Property, business | 25.17 | 16.37 | 123.0 | 122.9 | 121.4 |
| Education | 2.30 | 10.94 | 86.3 | 85.1 | 100.2 |
| Health | 1.82 | 4.76 | 89.9 | 91.3 | 81.3 |
| Public admin | 9.25 | 9.62 | 106.9 | 107.6 | 86.2 |

Note: For columns 1-2: percentages of total units (all sectors); for columns 3-5 (SE comparative advantage): UK = 100.
Source: Compiled and calculated from ONS data on UK Business for 2004. Note that the ONS follows its principle of rounding figures to the nearest 5 units, which can distort patterns such as that in petroleum products.

The first two data columns give the shares of each activity in the total number of 'local units' across the UK. Thus, in the first row, agriculture has 6.8% of all UK units, but only a little over 0.4% of medium-large units. It is worth pointing out here a point to be elaborated below, that traditional manufacturing accounts for only a small

proportion of all units – 7.7% of the UK totals in 2004, although this rises to 17.7% if only medium-large units are counted. Even within manufacturing, often-ignored sectors like publishing and printing account for sizeable shares. Over 85% of all units, and nearly 82% of medium-large units, are in services and infrastructure. This is critical in thinking about future demand for graduate skills, as we shall argue later.

The remaining three data columns show the relative strengths of the SEEDA region according to this measure of 'local units'. The third column gives the overall intensity of total activity in the SEEDA region, the fourth column that for small units, and the final column for medium-large units. As before, these are relative measures of strength, with any figure above 100 indicating a comparative advantage in that activity – here indexed to the UK as a whole. So for agriculture in the first row, the South East has a substantial disadvantage in all units and small units, but an advantage in medium-large units. The clear advantage of the South East in terms of manufacturing lies in the 'cluster' of electrical and electronics industries (office machinery and computers, other electrical machinery and equipment, radio, TV and communications equipment, and precision instruments), in both small and medium-large units. This must reflect the significance of the M4 'corridor'. There are also comparative advantages mostly in relation to small units in publishing and printing and in other transport (probably water transport equipment). In non-manufacturing activities, which as said above dominate the totals, the advantage is greatest in property and business services, also small units (only) in construction, but generally the South East does quite well in terms of medium-large service-based activities. This brings us back to the point already made about looking outside manufacturing (without ignoring it, as the electronics area indicates) for employment demands.

Our intention had been to assess the growth patterns by sector and firm size in the South East. While this would be possible from published data, the series are complicated by multiple changes of both sector and region. It would require a full research project to sort out these problems adequately. We have therefore settled for computing the growth trends according to activity over the period 1995/2003, for the UK as a whole, in Table 4.5. The measure used here is not 'local units' but numbers of enterprises registered for VAT. All trends were estimated from logarithmic growth equations. The first data column in Table 4.5 shows the predicted initial level in the opening year (1995), the second column shows the percentage growth rate in number of VAT-based enterprises over the next 8 years. Telecoms enterprises and education show high growth rates though from quite low bases around 1995. The annual growth rate in property and business services enterprises of 5.3% is however achieved from a high initial level. Manufacturing enterprises as a whole meanwhile decline at just over 1% p.a. This of course may be simply a contraction of SMEs, though we doubt it. More new opportunities are growing outside than inside manufacturing for the UK as a whole over these years, and in our view the same is likely to be even stronger in the SEEDA region (with the possible exception of the electronics 'cluster').

Table 4.5: Growth rates of activities, UK VAT-based enterprises, 1995/2003

| VAT base | constant | slope |
|---|---|---|
| agriculture | 156530 | -1.26 |
| mining/util | 1901 | -3.96 |
| manufg | 158419 | -1.04 |
| constrn | 172301 | 0.11 |
| motor trade | 71611 | -1.06 |
| wholesale | 117360 | -1.12 |
| retail | 219257 | -1.82 |
| hotel | 102130 | 0.78 |
| transport | 65710 | -1.42 |
| telecom | 5519 | 15.49 |
| finance | 12222 | -1.00 |
| property | 307429 | 5.28 |
| education | 5682 | 7.90 |
| health | 9595 | -0.77 |
| pub admin | 137585 | 0.27 |
| all | 1539549 | 0.77 |

Source: National Statistics, PA1003, Data for 2003, Table 1A; own calculations of growth rates from logarithmic regressions.

Support for these views is given in Tables 4.6 and 4.7, extracted from data for the South East prepared by the Institute of Employment Research. The data are given at decadal intervals from 1982 through to predictions for 2012.

Table 4.6: Numbers employed in the South East, by sector, and percentages

| | 1982 | 1992 | 2002 | 2012 | 1982 | 1992 | 2002 | 2012 |
|---|---|---|---|---|---|---|---|---|
| Sector | 000s | 000s | 000s | 000s | % | % | % | % |
| Agriculture | 84 | 82 | 74 | 65 | 2.7 | 2.3 | 1.8 | 1.5 |
| Mining | 18 | 4 | 6 | 4 | 0.6 | 0.1 | 0.1 | 0.1 |
| Utilities | 32 | 30 | 16 | 14 | 1.0 | 0.8 | 0.4 | 0.3 |
| *Primary/utilities* | *133* | *117* | *96* | *83* | *4.2* | *3.2* | *2.3* | *1.9* |
| Food etc. | 56 | 34 | 31 | 30 | 1.8 | 0.9 | 0.7 | 0.7 |
| Engineering | 181 | 137 | 131 | 107 | 5.7 | 3.8 | 3.1 | 2.4 |
| Other manuf. | 389 | 307 | 277 | 238 | 12.3 | 8.5 | 6.6 | 5.3 |
| *Manufacturing* | *626* | *478* | *439* | *375* | *19.8* | *13.2* | *10.5* | *8.4* |
| Construction | 228 | 269 | 279 | 304 | 7.2 | 7.4 | 6.7 | 6.8 |
| Trade | 542 | 651 | 766 | 845 | 17.2 | 18.0 | 18.3 | 18.8 |
| Catering | 180 | 214 | 247 | 265 | 5.7 | 5.9 | 5.9 | 5.9 |
| Transport etc. | 193 | 215 | 249 | 269 | 6.1 | 5.9 | 5.9 | 6.0 |
| *Distribution* | *915* | *1079* | *1262* | *1379* | *29.0* | *29.8* | *30.2* | *30.7* |
| Banking | 101 | 159 | 164 | 169 | 3.2 | 4.4 | 3.9 | 3.8 |
| Other business | 309 | 501 | 804 | 946 | 9.8 | 13.8 | 19.2 | 21.1 |
| Other services | 157 | 177 | 261 | 290 | 5.0 | 4.9 | 6.3 | 6.5 |
| *Business/services* | *566* | *836* | *1229* | *1405* | *17.9* | *23.1* | *29.4* | *31.3* |
| Public admin. | 194 | 194 | 168 | 162 | 6.1 | 5.4 | 4.0 | 3.6 |
| Education | 221 | 275 | 313 | 342 | 7.0 | 7.6 | 7.5 | 7.6 |
| Health/social | 274 | 370 | 392 | 440 | 8.7 | 10.2 | 9.4 | 9.8 |
| *Non-market serv.* | *689* | *839* | *874* | *944* | *21.8* | *23.2* | *20.9* | *21.0* |
| All sectors | 3157 | 3618 | 4179 | 4491 | 100 | 100 | 100 | 100 |

Note: Sub-totals of sectors (1-digit level) are given in italics

Source: Institute of Employment Research, *Working Futures: Regional Report 2003-04*.

The first four data columns in each table give the absolute numbers involved (or predicted), in thousands, the second four give these as percentages of the region's total. The most striking result in the table is that not only do Primary sectors more than halve in relative size over this period of 30 years, so also (from a much higher base) do Secondary sectors, i.e. manufacturing. In the Tertiary sectors, distribution and non-marketed services are fairly constant as a proportion of the total. The decline of the Primary and Secondary sectors is thus made good by the sharp rise of business-related services, and despite the flatter performance of the financial segment of this sector.

Such results are underlined by Skills Insight, after some adjustments to the above IER data, in their *Annual Skills Review 2004*, which:

> "... shows that most of the growth is forecast to occur in the business and financial services sectors, the majority of which is to occur in the second half of the forecast period [i.e. after 2007]. The public sector is also forecast to experience substantial growth, although most of this will happen in the period up until 2007... The manufacturing sector is currently forecast to suffer most, with around 27,000 jobs expected to disappear in the first half of the forecast period with another 23,000 predicted to be lost in the second half" (p.8)

A cautionary note is however warranted:

> "... these forecasts take no account of replacement demand or skills shortages, which is likely to mean that the demand from the manufacturing and construction sectors is likely to be stronger than the data above might suggest [based on productivity growth]." (p.10)

Table 4.7: Numbers employed in the South East, by occupation, and percentages

| | 1982 | 1992 | 2002 | 2012 | 1982 | 1992 | 2002 | 2012 |
|---|---|---|---|---|---|---|---|---|
| Occupation | 000s | 000s | 000s | 000s | % | % | % | % |
| *Managers/officials* | *394* | *521* | *723* | *850* | *12.5* | *14.4* | *17.3* | *18.9* |
| Sci/tech profs. | 99 | 121 | 162 | 197 | 3.1 | 3.3 | 3.9 | 4.4 |
| Health profs. | 18 | 22 | 32 | 38 | 0.6 | 0.6 | 0.8 | 0.8 |
| Teach/res. profs. | 118 | 146 | 173 | 200 | 3.7 | 4.0 | 4.1 | 4.5 |
| Business profs. | 63 | 82 | 118 | 146 | 2.0 | 2.3 | 2.8 | 3.3 |
| *Professional* | *298* | *372* | *484* | *581* | *9.4* | *10.3* | *11.6* | *12.9* |
| Sci/tech assocs. | 54 | 62 | 92 | 113 | 1.7 | 1.7 | 2.2 | 2.5 |
| Health assocs. | 92 | 113 | 126 | 139 | 2.9 | 3.1 | 3.0 | 3.1 |
| Protect. services | 24 | 34 | 61 | 81 | 0.8 | 0.9 | 1.5 | 1.8 |
| Culture/sports | 38 | 54 | 96 | 121 | 1.2 | 1.5 | 2.3 | 2.7 |
| Business assocs. | 134 | 181 | 243 | 281 | 4.2 | 5.0 | 5.8 | 6.3 |
| *Associated profs.* | *343* | *444* | *618* | *734* | *10.9* | *12.3* | *14.8* | *16.4* |
| *Admin/clerical* | *548* | *642* | *582* | *486* | *17.4* | *17.7* | *13.9* | *10.8* |
| *Skilled trades* | *472* | *476* | *440* | *404* | *15.0* | *13.2* | *10.5* | *9.0* |
| *Personal servs.* | *117* | *176* | *297* | *417* | *3.7* | *4.9* | *7.1* | *9.3* |
| *Sales/cust. servs.* | *192* | *238* | *325* | *384* | *6.1* | *6.6* | *7.8* | *8.5* |
| *Machine etc. ops.* | *296* | *265* | *268* | *255* | *9.4* | *7.3* | *6.4* | *5.7* |
| *Elementary occs.* | *498* | *484* | *442* | *381* | *15.8* | *13.4* | *10.6* | *8.5* |
| All sectors | 3157 | 3618 | 4179 | 4491 | 100 | 100 | 100 | 100 |

Note: Sub-totals of occupations are given in italics.
Source: As for Table 4.6.

Equivalent data to the figures in Table 4.6 but arranged by occupation are given in Table 4.7. The occupational trends naturally reflect some of the sectoral trends, with for example the rising share of Managers and officers, Professional and Associate professional classes, as the counterpart of the rising share of Business services in Table 4.6. There are sharp relative falls in classes such as Administrative and clerical, Skilled trades, Machine and other operatives, and Elementary occupations; generally reflecting the increased knowledge base of employment in the region. While of course these data involve predictions to 2012, and are not purely extrapolations since they take into account other information, the trends they flag are generally well under way by 2002.

### *4.3 Skills gaps in the South East*

;More immediate information on skills gaps in the South East come from a survey by Skills Insight for 2002/03 (*Business Needs and Competitiveness Survey 2002/03*). The survey was based on a large-scale sample of over 10,000 organisations in the South East region. Summarised results by sector are given in Table 4.8.

Table 4.8: Recruitment difficulties in the South East, by sector and occupation

| Sector | % with recruitment difficulties* | % reporting lack of applicants** | Other main causes, selected | Occupations hard to fill |
|---|---|---|---|---|
| Agriculture | 33% | too few | | |
| Manufacturing | 24% | 97% | | craft + skilled manual 1/3 |
| Construction | 32% | 98% | poor industry image | craft + skilled manual 1/2 |
| Trade | 29% | 84% | | sales > 1/2 |
| Catering | 29% | 90% | high cost of living, 80% | sales almost 1/4 |
| Transport | 34% | 78% | high cost of living, 83% | routine + unskilled 1/3 |
| Business servs | 22% | 91% | | professional 1/4 |
| Financial | 25% | too few | | clerical etc. > 1/3 |
| Public admin | 26% | too few | | |
| Education | 34% | 88% | high cost of living, 85% | professional almost 1/2 |
| Health | 43% | 87% | | professional almost 1/3 |
| Personal | 32% | 83% | unattractive package, 77% | personal services 1/5 |

* in last 12 months, % of reporting organizations
** % having at least some significance ('too few' = not enough observations to report)

In most of the sectors, the lack of applicants is the largest single source of reported recruitment difficulties, though the high cost of living in the South East is notable in some sectors. Professionals are seen as the hardest occupation to fill in Business services, Education and Health, whereas in Manufacturing and in Construction the biggest problem seems to lie in Craft and skilled manual labour. If we take into account the streaming of graduates into a wide range of professional occupations, including management, as set out in Chapter 3 above, the impact of the kinds of

weaknesses brought about by shortfalls in the supply of graduates becomes rather starkly evident.

The SPRU *Report on the Study of Business Engagement with the SET Base in the South East*, Phase 1 (November 2004), provided results from a small number of interviewed companies:

> "Pharmaceutical and biotechnology firms experienced shortage of technical skills, marketing and sales skills. A shortage of researchers in biochemistry, protein analysis, immunology was identified as particularly significant.
>
> "Firms in manufacturing sectors repeatedly mentioned the lack of engineering skills, along with insufficient government support." (p.9)

On the positive side, the SPRU report found that:

> "Almost one third of the sample indicated that the quality of the regional SET base has improved in the last five years. Particularly Pharmaceutical/biotech and Other firms perceived this." (p.9)

The CIHE Report draws attention to a possible 'low-skills equilibrium', in which companies cease to be attracted to the region because of the low levels of skills in evidence, which in turn are no longer provided because there is no demand:

> "Generic skill gaps in graduates (as well as in specific technical disciplines), in such areas as communication, team-working and knowledge of business, have been a problem widely reported by employers [... and] progress is relatively slow."

This Report makes an insightful comparison:

> "It is interesting to note how much lower the South East's share of total HEI income is compared to its economic contribution... Equally there is a misalignment between the contribution and distribution of regional economic performance and HEI teaching and research capacity across the region. This issue needs further analysis but presents some interesting challenges. The RDA will want to consider how far it wants to encourage and help fund greater alignment."

This perhaps runs counter to conventional wisdom about student places in the South Eats, but is in line with our results in section 4.1 above about demand rather than supply factors driving "economic contribution" and the knowledge base in the South East. The point about "alignment" will be key to our Conclusions in Chapter 5.

### *4.4 Conclusions about demand for graduates*

In Chapter 3 we began our attempt to assess the demand side of the equation by contacting intermediaries expected to have considerable expertise in relating the supply of graduates to the demand from business and elsewhere for their employment. We also obtained a number of responses from heads of Careers Advisory Services, though these were expected to take a more university-focused viewpoint. Progress on these fronts was slow, and the results have to be tempered by accepting the very limited nature of the response. By and large they confirm the views expressed in the Report of the House of Commons Select Committee together with HEFCE's response, as surveyed in Chapter 1. Graduates in STEM subjects seemingly find it generally unproblematic to get jobs in their areas of specialisation, yet jobs are disappearing in

traditional areas of chemistry etc. Views are very divided as to whether greater specialisation or more general skills are needed. However the job market more broadly is changing, with permanent jobs-for-life less often the norm. Many respondents thought there was much that could be done to improve coordination between student supply and employment demand through practical measures, and that in the absence of this the current situation may be getting worse rather than better.

We turned to secondary evidence to fill out the rather limited number of responses obtained through the primary procedures, and again found a fair degree of confirmation of the main views established by the various parties. Data for the cohort of graduates from all HEIs in England graduating in 2003 show that physics and chemistry appear to have the lowest proportions of their number in work in the UK, yet their rates of unemployment and under-employment are about average. The gap is mostly made up of an especially large proportion of physics and chemistry graduates (and to some extent mathematics) going into higher study in the UK. The most apparent pattern is the great diversity of jobs to which graduates in most of the strategic subjects go. The Skills Insight study for the South East (2001/02) finds that in most of the strategic subjects of this inquiry 'business activities' (broadly defined) constitute the largest domain of employment. Studies by SPRU and others support the view that 'proximity matters' in university-industry relations, for instance in attracting employment into the region, especially for smaller firms. Again, there are some evident gaps where bridging could be substantially improved.

Chapter 4 has analysed the data available on changes in industrial demand for highly skilled labour in the South East. The now somewhat outdated information from the 1991 UK Census indicates that the 'South-East' was about 20 per cent stronger in qualifications in science and technology for males and rather more than this for females. It should be pointed out that in 1991 the 'South-East' did not coincide with today's SEEDA region, though we have removed the impact of Greater London from these data. The more recent 2001 Census does not allow such a fine-grained analysis, but its data suggest that, in terms of higher-level qualifications, the South East (SEEDA) is about 10% above the national per capita average, despite a below-average proportion of full-time students.

The recent CIHE Report for SEEDA observes that the South East is well known for a strong presence of high-tech industries and also creative industries, but goes on to point out that, "Generally it is the users of new technologies rather than the creators that are the keys to productivity growth", including the service sectors. The clear 'comparative advantage' (relative strength) of the South East within manufacturing lies in the 'cluster' of electrical and electronics industries. In non-manufacturing activities, which dominate the totals, the advantage is greatest in property and business services. In terms of growth rates of establishments, more new opportunities are growing outside than inside manufacturing for the UK as a whole in recent years, and the same is likely to be even stronger in the SEEDA region (with the possible exception of the electronics 'cluster'). Occupational trends show a rising share of managers, professional and associate professional classes in the region. Studies of skill gaps by Skills Insight indicate that professionals are seen as the hardest occupation to fill in business services, education and health, whereas in manufacturing and in construction the biggest problem seems to lie in craft and skilled manual labour.

## CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

At the outset of their useful guide, *Labour Market Information for Higher Education Institutions*, Maginn and Dench (2000) observe that:

> "'Labour market information' is one of the footballs that higher education institutions and employers' groups have kicked backwards and forwards for decades. The HEIs have frequently been frustrated by the employers' lack of precision in defining their need, their readiness to act in ways other than they speak in assessing and taking on new graduates, and their tendency to seek to solve the problems of yesterday's skills gaps. Reciprocally, the employers cannot understand the universities' long lead time in developing and changing courses, the apparent unwillingness of academics to engage with the real issues of the marketplace, and the apparent failure of graduates to 'hit the ground running'."

The main thrust of this study has been to position the discussion of issues over HEI provision of student courses in the context of wider evidence about long-term patterns of industrial change in the South East, as well as in the country at large. In this Conclusion, we wish to overview the indications of 'misalignment' between HEI provision and occupational demand.

The Prospects website gives the following very sensible advice to graduates seeking employment:

- "Employment has changed in the last 40 years, from a stable industrial structure dominated by the manufacturing industry to a much more volatile service-based industry.
- "The graduate labour market is constantly changing as a result of globalisation – companies operate on a much more international basis with increasing competition from abroad.
- "Technological advances have made the world a smaller place and changed the nature and location of many jobs. There has been an increase in people entering the multimedia, e-commerce, and creative and digital industries. Higher education has reacted to this by expanding the provision of both undergraduate and postgraduate courses in these subject areas.
- "A highly volatile political arena has affected the development of many companies.
- "There has been an increase in the number of those opting for postgraduate study: 15 years ago there were 100,000; today there are over 400,000. With increasing numbers of graduates from a wider range of backgrounds, a postgraduate qualification is now being seen by many as essential, rather than a luxury, in order to be able to compete in an ever-changing employment market."

It is not self-evident from the material that we have collected how much of this advice has been absorbed by the HEIs that supply the students to the labour market, the employers who demand them, the organisations that advise them, nor of course by the students themselves. Instead we detect some 'misalignment' between supply and demand. The HEFCE response to the Select Committee's Report uses the same language: "It is important to attempt to pinpoint accurately where the misalignment is occurring between supply and demand, so that interventions can be suitably targeted... the problem ... may lie outside the HE sector." (HEFCE, p.8). HEFCE proceeds to

itemise many possible areas in which this misalignment could reasonably be argued as occurring.[1] Networks aim to link disparate parties, but 'network failure' is widespread in failing regions – even if the networks do exist (which often they do not), they pull in different directions from one another. The same may be true albeit in milder fashion in the South East of England, notwithstanding its considerably greater economic success.

The clear need established in the preceding chapters has been for reassessing graduate recruitment, and anterior to that providing HEI course structures, that reflected the changing pattern of occupational and industrial demand in the South East. The indications from our admittedly very limited number of responses are that there is some lag in recognising that employment patterns have been shifting for some time, and will almost inevitably continue to do so. In view of the paucity of evidence it would not be appropriate to point the blame for any shortcomings on any one particular type of institution or organisation – for instance many academics as well as careers advisers in HEIs appear aware of what is happening. It may be that the channels for the full range of relevant employers to voice their demands are not fully provided for. Among intermediary organisations, the problems seem to arise more in the STEM subjects, whereas the cultural and creative subjects and even IT (following its crash in the early 2000s) have grasped the implications of the changes more adequately. The key issues emerge in relation to employment in tertiary sectors, particularly the growing arena of business services, and to employment in SMEs rather than medium-large companies. While there are of course many exceptions, these represent the most dynamic sectors of the South East economy, but at the same time the least well structured in terms of graduate labour markets. Many of our respondents thought that much more could be done to communicate needs through arranging for more frequent contact, even though they may have disagreed about whose was the primary responsibility for doing so.

CIHE criticises UK Government policy at large, in its *Science and Innovation Framework 2004-2014*, on this account:

> "However, these proposals do little to encourage a more demand led approach to knowledge transfer or address the limited capacity of SMEs to absorb or evolve R&D, knowledge or new approaches, whether in partnership with HEIs or the other organisations. They also tend to neglect the creative industries and service sector through an over-concentration on more traditional industries."

One form of 'networking' intended to overcome such neglect is that advocated by the Select Committee, of a 'hub and spokes' model of regional collaboration among HEIs. The HEFCE group in its response rightly points out that, "collaboration of this type requires trust and effective relationships between the partners. The group strongly rejects therefore the notion that these types of arrangements should be imposed" (HEFCE, p.9) – specifically, they rejected the idea of a competition to select regional centres of excellence. But HEIs may need to do more to meet demand of their own accord by rationalising structures: "The group wonders whether certain science departments (for example, chemistry) should be encouraged to focus more

[1] It may be noted that in our own recent academic investigations of regions as diverse as Eastern Europe and Southern Italy, we find repeated evidence of 'misalignment' (von Tunzelmann 2004; Iammarino 2005).

clearly either on courses to meet technical skills gaps or courses to meet high-level research needs" (HEFCE, p.13).

The key issue of closures of departments evidently needs to be broached at the level of groups of HEIs. The evidence produced by the Select Committee indicated cases where this had already happened, at least on a bilateral basis, in some of the most widely concerning cases of strategic closures. While some of the heat seems to have gone out of this debate in the months since the present study was constituted, perhaps in view of the apparent buoyancy of numbers for the immediate future, it remains the case that strategic subjects warrant strategic solutions. Recruitment in some key areas may be falling but it is also changing, and studies support the view that new employers continue to be attracted by a suitable graduate skills base. A combination of issues on the supply side (e.g. new forms of teaching provision, consequences of staffing reductions, etc.) needs to confront the emerging issues on the demand side upon which this study has focused. In our view, the HEIs, most probably channelled through HESE, are in a strong position to formulate strategies to face up to the new calls, all the more so if the Government is to pursue EU-wide plans to augment industry's R&D base. We have argued elsewhere that, at this level too, the nature of demand is changing and that new technologies (IT, biotechnology, nanotechnology, etc.) are pervasively demanded across the full range of industries – primary and tertiary as well as all secondary sectors – and are not largely confined to the 'high-tech' sectors, which in fact account for only a tiny share of the EU's employment and output (von Tunzelmann & Acha, 2004).

What could the HEIs and HESE do? The most obvious answer is to institute more research to assess more adequately what changes are taking place in employer demands in the region and how HEI responses might be conducted (e.g. through collaborative, part-time, distant-learner or other means). The confusing results we obtained for 'depth' of skills as against 'breadth', for instance, deserve fuller attention. Any such research needs to give fuller weight to the less well structured parts of the graduate labour market – the SMEs, the tertiary sectors, and so on. At the same time, more research in isolation is clearly not sufficient. Our own problems with securing responses were difficult enough, but our colleagues at IES assured us that they would have been worse if we had attempted the large-scale study of employer demand that we first intended. Research could however be directed at elucidating more precisely the nature of demand-side changes, at the 'micro' level as it were.

While each of our respondent organisations unsurprisingly brought its own perspective to the table, there was a high degree of consensus that more frequent and meaningful contact among all parties was critical. There was some feeling that the degree of communication was actually getting worse, even in established areas. More broadly there was a view that, with the growing significance of non-traditional industries and services, non-traditional firms including start-up SMEs, and non-traditional job markets emphasising flexibility and mobility, there is much that can now be done. More 'depth' (specialisation) appears to be required in some subjects and more 'breadth' (generalisation) in others, while in many cases both may be needed. The patterns are – at least on the surface – complex and rather confused. In this process of realignment HESE could play a major role.

HEFCE has already, in its reply to the Select Committee, cautioned against 'knee-jerk' responses to departmental closures. There could be many good as well as bad reasons for closures. This, however, is no cause for complacency. In our view the issue of the supply of and demand for graduate students in the South East, as well as throughout the UK, is a structural one, and the evidence we have obtained does not reassure us that the matter of structural changes is being adequately recognised. CIHE's point about the dangers of a "low-level equilibrium", or what others might refer to as a cumulative downward spiral, in which falling graduate supply chokes off incipient employer demand and feeds back into further supply reductions, needs to be recalled. There is an 'information gap', to be sure, which might be addressed by stepping up the flow of good information. However, underlying that there is probably a filtering effect – that in the absence of better direct communication and contact little will be seen to need any change or transformation. HESE could help to overcome this filtering-out effect in view of its own strategic position in relation to the graduate labour market in the South East.

Although it goes somewhat beyond our brief, we also see some merit in calling organisations with a broader remit into play to organise adequate responses. Both HEFCE and CIHE contended that RDAs and Sector Skills Councils (SSCs) could have key roles in helping to overcome any misalignment. Indeed this is precisely what the SSCs were set up to do, and in many cases they already are performing valuable work to this effect. However, we do find some indications that even the SSCs tend to think inside the particular sectors for which they are constituted. HESE as well as HEFCE might reasonably put some pressure on the Sector Skills Development Agency (SSDA) to resolve any problems on this score, especially by way of a regional dimension to the current and forthcoming Sector Skills Agreements (SSAs) and the Skills for Business network. RDAs like SEEDA may be doing this through the Framework for Regional Employment and Skills (FRESA) and the new Regional Skills and Productivity Alliances. But as the CIHE Report states, "There is a danger though of too many different local and regional bodies being created to tackle regional and sub-regional skills and productivity issues, leading to confusion and inefficient working." Yet there is an equal danger of everything falling between stools because of a presumption that other bodies are taking responsibility.

While our study throws up some problems with implementing 'hub and spokes' or other models of regional reorganisation, the case for more coordination of effort is a strong one. Problems are arising especially in the extent of downsizing of academic faculty and staff. More might be done, perhaps, with new technology and modes of pedagogy to offset such problems, but the consensus of many recent studies of information technology is that, in the absence of reorganisation and of developing adequate knowledge bases, technology is not a 'fix'.

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