

STUDY OF THE INFORMATION TECHNOLOGY, COMMUNICATIONS AND ELECTRONICS SECTORS

A report to the CBI Information Age Partnership on clusters

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ELECTRONICS SECTORS**

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JC1516

February 2001

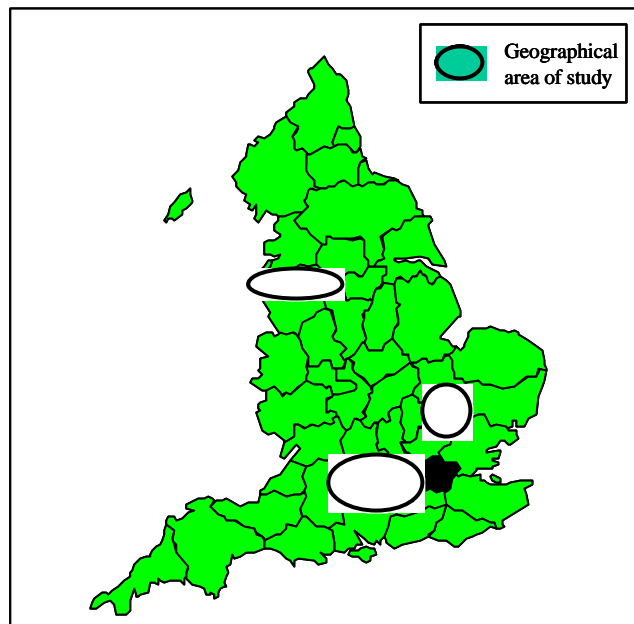
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1. Introduction

- 1.1 The information technology, communications and electronics (ITCE) sectors have a key role to play in the future development of the UK economy. Undoubtedly, they are important sectors in their own right, employing a large and – for the most part – highly skilled workforce and contributing directly to economic growth. But their greater impact arguably lies in the influence they are having on other businesses and sectors through the development, application and implementation of key enabling technologies. These, in turn, are fundamentally reshaping the manner in which all forms and stages of business are done: the performance of the ITCE sectors and the competitiveness of the UK economy writ large are intimately inter-related.
- 1.2 The focus for this study has been the ITCE sectors *as a group of sectors*: how they are organised, how this might be changing and the implications that follow for business competitiveness. The initial premise was that the Cambridge area showed at least some of the characteristics of a value-added ITCE cluster. And in this context, our brief was to “*examine through field work at least two further areas of ITCE co-location to see whether they exhibit value-added cluster interaction when compared to Cambridge and how they are (or could be) developed and sustained*”.
- 1.3 To this end, we have examined ITCE activity within three distinct geographical areas: the Cambridge sub-region (which itself embraces much of Cambridgeshire and the northern parts of Hertfordshire and Essex); the M4 corridor (through Berkshire and parts of Oxfordshire, Buckinghamshire, Wiltshire, Hampshire, Surrey and west London); and the area around Manchester and Liverpool in the North West. These are mapped in Figure 1.1.
- 1.4 The three areas are – intentionally – quite diverse. The *M4 area* has long been a leading centre of ITCE activity. While its early origins can be traced to public expenditure on defence-related activity in the immediate post-war period, subsequent growth has undoubtedly been driven by the adjacency of both Heathrow airport and London. Both continue to be important influences; indeed the possibility of international communications has underpinned the area’s complement of high profile inward investors.

Figure 1.1: Situating the Study

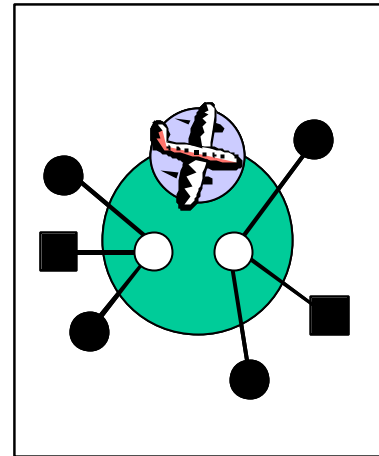


- 1.5 The *area around Liverpool and Manchester* is different. Situated at the heart of a major regional market, much activity within the ITCE sectors is concerned with servicing regional needs: the presence of offices of major international companies is testimony to this. But there are also regional specialisms: in Manchester itself there is an emerging group of firms specialising in creative/new media.
- 1.6 The growth of the *Cambridge sub-region* as a centre of ITCE expertise initially owed much to links with the University, first through the provision of instruments (some electronic) and more latterly through spin-offs from, *inter alia*, the computer laboratory and engineering departments. However Cambridge too is multi-dimensional and inward investors are now a prominent feature of the ITCE sectors.
- 1.7 Notwithstanding their contrasting origins, all three areas can boast a complement of ITCE activity. *What is much less clear is the extent to which co-location is also associated with clustering behaviour.* To unpack this issue we have sought to examine the nature and significance of co-location by examining three different possibilities. These are best regarded as different points on a spectrum from “co-location” through to “clustering” and they are summarised in Figure 1.2.

Figure 1.2: Understanding co-location across the ITCE sectors

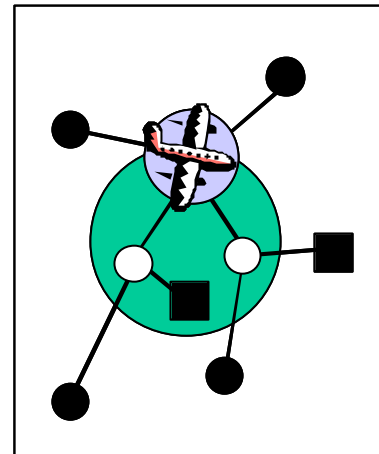
Co-location

...that co-location is apparently of little functional consequence and seems to be of little relevance in terms of ITCE firms' competitive performance: firms do not emphasise the local area (or place), or firms within it as important vis-à-vis their own competitiveness



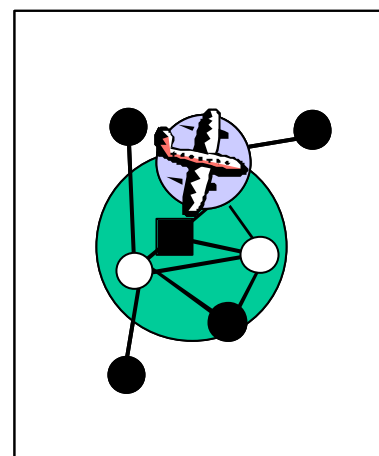
Agglomeration

...that co-location enhances firms' competitive performance, but it does so for reasons that are – in essence – “passive”. In this instance the place/area is regarded as important by firms, but for reasons other than active interaction with other local firms



Clustering

...that co-location enhances firms' performance because it facilitates collaborative working relationships with a range of local suppliers, customers, competitors, universities, research institutions, and so on



A note on method

- 1.8 This study has been largely empirical in character and a good deal of effort has been put into fieldwork in order to categorise firms and then consider the implications. Our coverage of the Cambridge sub-region has drawn on work undertaken over the last two years as part of SQW's extensive review of the Cambridge Phenomenon. This included both a questionnaire survey and in-depth consultations.
- 1.9 In both the North West and the M4 area, some 15-20 consultations were completed with a range of ITCE companies, business support providers, universities, providers of specialist property and the like: organisations offering complementary perspectives on the nature and extent of clustering activity. During the course of these interviews, a questionnaire was developed and piloted and this subsequently provided the basis for a large scale postal survey of firms. In both the North West and M4 areas, we sought to include every establishment (for which we had records) employing more than 10 people as well as 500 randomly selected business units with less than 10 employees. In addition, questionnaires were sent to firms in the Cambridge area that did not respond to the Phenomenon survey: for this reason, the Cambridge data are less representative (and less extensive) than those for the other two areas under consideration.
- 1.10 A third strand of fieldwork has involved a survey of employees from ITCE firms. Participating firms were recruited during either the postal survey or the face to face interviews and their employees were asked to complete a short questionnaire which examined previous work experience, job satisfaction, perceptions regarding the local area, the scope for local job moves, and so on. In total some 18 firms participated in the survey of employees and from these, we were able to derive indications of local labour market dynamics.
- 1.11 Overall, the response from our fieldwork was quite disappointing. Both the face-to-face meetings and the postal survey encountered some reticence amongst would-be respondents: with regard to the former, meetings were unavoidably but repeatedly postponed at short notice and in terms of the latter, the overall response rate was low. Nevertheless, at the end of our period of fieldwork, we were left with some 169 completed questionnaires. Of these, some 74 were from firms in the North West, 63 from the M4 area and the remaining 32 from firms in the Cambridge sub-region (additional to the data we already held from 190 firms).

The structure of this report

- 1.12 This report is divided into four further chapters reflecting the requirements of the study brief. First, in Chapter 2, we consider – in general terms – the nature of ITCE activity across our three case study areas and we consider the extent to which these *places* can be regarded as characteristic of functioning clusters. In this context we consider the nature of firms within them and the extent of collaboration, relationships along the supply chain, links with local universities and research institutes and the character of the physical infrastructure including the extent to which this helps – or hinders – cluster-like behaviour within the locale.
- 1.13 However the fact that a *place* is associated with certain characteristics cannot be used to infer that all firms within it behave in the same way. Chapter 3 therefore seeks to examine the specific firms – wherever they might be located – that exhibit the most pronounced cluster-like behaviour. We compare this group with a second that appears to derive benefits from agglomeration (but not clustering) and a third that seems simply to display the characteristics of co-location: a critical question for the study as a whole is the extent to which competitive performance of the first group is actually enhanced by clustering behaviour.
- 1.14 The focus of the argument shifts in Chapter 4 and – in the specific context of Cambridge – the discussion broadens to consider the nature of clustering activity in the ITCE sectors vis-à-vis other sectors, notably biotechnology. Finally, in Chapter 5, we provide some initial thoughts on the policy implications arising from the foregoing discussions and analysis.
- 1.15 This report is supported by two working papers that were developed during the early part of the study and are presented as a separately bound annex. These comment respectively on the characteristics and dynamics of ITCE activity in the M4 area and the North West. The working papers draw heavily on the qualitative information generated during our early face to face interviews and reflect on the contours of ITCE activity within the two comparator areas.

2. The Cambridge sub-region, the M4 area and the North West Central Belt: cluster as "noun"

2.1 Discussions about clusters are often shrouded in a basic ambiguity as to whether the object of interest is essentially a noun (and usually a place) or a verb (typically a form of business behaviour). Of course, to some degree at least, the power of the concept rests in the fact that it relies on and reflects *both* domains. The “Cambridge high tech cluster” says something about the *businesses* within Cambridge and something about *Cambridge* which is over and above the business community, albeit intimately bound up with it. Equally a comment about “Silicon Valley” must implicate both *the place* and the *actors* within it: one is not reducible to the second, but nor are they functionally autonomous.

2.2 In this chapter, the focus of our discussion is “cluster as noun” and we address, in particular, the extent to which our firm’s eye view – derived from the business survey – reveals the Cambridge sub-region, the M4 area and the Central Belt of the North West as clusters. To this end, we examine *for each area*, the four tiers of a theoretical cluster. First, however and by way of context, we provide a short profile of our survey respondents.

Profile of our survey respondents

2.3 In total, our survey generated 169 responses from firms within the Information Technology, Communications and Electronics (ITCE) sectors. Of these, 32 were from firms in the Cambridge sub region, 63 from respondents in the M4 area and 74 from firms in the Central Belt of the North West. Across these groups, there were some notable sectoral contrasts. As Table 2.1 demonstrates, the incidence of firms specialising in electronic components, hardware and equipment was relatively higher in the M4 area, whereas the sectoral group embracing software was more strongly represented in the North West Central Belt.

Table 2.1: Sectoral profile of survey respondents, by area

| Aggregated sector | Cambridge sub-region | | M4 area | | North West Central Belt | |
|--|----------------------|------|---------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| Electronic components / hardware / equipment | 8 | 25% | 20 | 32% | 16 | 22% |
| IT services / sales / consultancy | 9 | 28% | 20 | 32% | 24 | 32% |
| Software / content / internet / systems / telecomm | 13 | 41% | 20 | 32% | 32 | 43% |
| Other | 2 | 6% | 3 | 5% | 2 | 3% |
| Total | 32 | 100% | 63 | 100% | 74 | 100% |

2.4 There were also some noticeable differences with respect to size. Table 2.2 shows the distribution of respondents according to the number of people employed “at this and other local sites (within five miles)”. It demonstrates that small units (although not necessarily small firms) dominated the size profile of Cambridge respondents whereas comparatively large business units (employing 250 or more people) accounted for nearly a fifth of responses from the M4 area. The average employment size of the responding business units was also very different: 27 in the Cambridge sub-region compared with 262 in the M4 area.

Table 2.2: Size profile of survey respondents, by area

| Employment at local sites | Cambridge sub-region | | M4 area | | North West Central Belt | |
|---------------------------|----------------------|------|--------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| less than 10 | 17 | 55% | 14 | 23% | 20 | 27% |
| 10-49 | 8 | 26% | 20 | 32% | 31 | 42% |
| 50-99 | 4 | 13% | 9 | 15% | 11 | 15% |
| 100-249 | 2 | 6% | 7 | 11% | 8 | 11% |
| 250 or more | 0 | 0% | 12 | 19% | 3 | 4% |
| Total responses | 31 | 100% | 62 | 100% | 73 | 100% |
| Missing responses | 1 (excluded) | | 1 (excluded) | | 1 (excluded) | |
| Average local employment | 27 | | 262 | | 73 | |

2.5 In terms of the type of ITCE firms responding to our survey, in both the Cambridge sub-region and the M4 area, a large proportion of respondents were the headquarters operation for a multi-site firm. Mature single site firms were prevalent in all three areas. Interestingly, respondents from the M4 area were three times more likely than those from the other two areas to have an overseas HQ while those from the North West Central Belt were more likely to be business units with an HQ operation based elsewhere in the UK. Comparatively few respondents from the Cambridge sub-region had HQs elsewhere (whether in the UK or abroad).

Table 2.3: Profile of survey respondents, by type of firm

| Type of firm | Cambridge sub-region | | M4 area | | North West Central Belt | |
|---|----------------------|------|--------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| Firm with overseas HQ | 2 | 7% | 13 | 21% | 5 | 7% |
| Firm with UK HQ | 0 | 0% | 3 | 5% | 10 | 14% |
| HQ of multi-site firm | 13 | 43% | 20 | 32% | 21 | 29% |
| Mature single site firm | 11 | 37% | 18 | 29% | 27 | 38% |
| New start - after 1997 (and not a branch) | 4 | 13% | 8 | 13% | 9 | 13% |
| Total responses | 30 | 100% | 62 | 100% | 72 | 100% |
| Missing / uncodable responses | 2 (excluded) | | 1 (excluded) | | 2 (excluded) | |

2.6 The distinction between in-movers and local starts is widely regarded as an important one and – on the basis of our survey information – we can make some observations. We have defined in-movers as firms that were first established somewhere else before they were established in this area. As a definition, this is not perfect, but it does suggest a decision by an established enterprise to move into an area (whether through relocation or expansion) and is thus qualitatively different from being a new-start in a local economy. On this basis, Table 2.4 shows the distribution of survey respondents. It demonstrates that across the M4 area, we can observe a larger number of in-movers, whereas respondents from the Cambridge sub-region are more likely to be local starts.

Table 2.4: Deducing firms' origins in the local area

| Firms' origins | Cambridge sub-region | | M4 area | | North West Central Belt | |
|----------------|----------------------|------|---------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| In-mover | 7 | 23% | 22 | 42% | 21 | 33% |
| Local start | 24 | 77% | 31 | 58% | 42 | 67% |
| Total | 31 | 100% | 53 | 100% | 63 | 100% |
| Missing | 1 (excluded) | | 10 (excluded) | | 11 (excluded) | |

2.7 A further “cut” concerns the age profile of firms (Table 2.5). We have measured this in terms of the year in which the firm was first established in the relevant geographical area: this does not necessarily therefore equate with the year in which the firm was first established at its current site (which may be later). Again, we can observe some clear variations. Respondents from the North West are typically the longest established while those from the Cambridge area tend – in these terms at least – to be the youngest. This is consistent with the observation made above that the latter tend to be the smallest business units and – as we observe later – this has important explanatory implications in terms of the incidence of clustering activity.

Table 2.5: Year established in either the M4 area, the Cambridge sub-region or the North West Central Belt

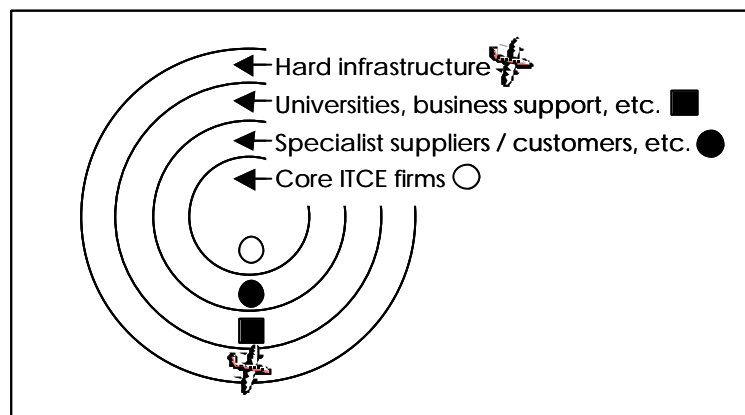
| Year established in this area | Cambridge sub-region | | M4 area | | North West Central Belt | |
|-------------------------------|----------------------|------|---------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| Before 1975 | 1 | 3% | 8 | 15% | 6 | 10% |
| 1975-84 | 6 | 21% | 8 | 15% | 16 | 27% |
| 1985-94 | 9 | 31% | 14 | 27% | 21 | 35% |
| 1995 or later | 13 | 45% | 22 | 42% | 17 | 28% |
| Total responses | 29 | 100% | 52 | 100% | 60 | 100% |
| Missing / uncodable responses | 3 (excluded) | | 11 (excluded) | | 14 (excluded) | |

2.8 The data reported above provide some insights as to the characteristics of our survey respondents and they have an important contextual value. However they say very little as to the extent or nature of clustering activity or the extent to which firms are ensconced within their locale. It is to this issue that we now turn.

Unpacking the tiers of interaction with a “cluster”

2.9 Figure 2.1 below seeks to unpack the different elements of an area-based industry cluster. Apart from anything else, it highlights the multi-faceted nature of clustering: there certainly is a “core” comprising collaborative relationships between similar – and potentially competing – firms. But this may be nested within networks of suppliers and customers (Tier Two) and close interactive relationships with local universities, providers of business support and the like (Tier Three). Fourth, the hard infrastructure potentially also has a role to play in facilitating and lubricating the activities of firms and organisations within the higher order Tiers. Theoretically, in a well-functioning cluster, there should be evidence for significant interaction between core firms and all of these different Tiers. How then should we best characterise ITCE firms’ activities across our three comparator areas?

Figure 3.1: Tiers within a theoretical cluster



Tier One: Relationships between core ITCE firms

2.10 In seeking to capture the nature and character of the relationships between core ITCE firms, a first immediate observation surrounds the degree of variation – both sectorally and spatially - within and between the North West, M4 area and the Cambridge sub-region. In the North West, for instance, mainstream ITCE systems and services companies are located in a belt across south Manchester and north Cheshire; groups of high tech firms are focussed on Manchester Science Park (and other science parks) and creative/new media firms are based principally – although not exclusively – in central Manchester. Moving to the M4 area, we can observe in the west of the area (Swindon) a local concentration of microchip design and

manufacture; in Newbury/Basingstoke, a proliferation of broadcasting and new media firms; a concentration of IT hardware, software, systems and computing in and around Reading; a group of ITCE firms concerned with the avionics market to the south (Farnborough, Fleet and Bracknell); and finally, many headquarters operations and systems companies to the east and immediately adjacent to Heathrow airport. The pattern in Cambridge is different again: software activity is very much focused on the city itself (and here the so-called “bicycle economy” still seems to have cogency) while electronics firms are more scattered across the outer parts of the sub-region. The clear implication from this is that each of the three areas – and the ITCE sector within it – is internally differentiated and this should be taken into account.

2.11 But to what extent have firms within the ITCE sectors developed close and/or collaborative relationships with other core local firms? From our questionnaire survey, just under 30% of respondents agreed or strongly agreed with the statement that “*over time, this firm has built up relationships with nearby firms for the exchange of information/expertise*”; and this figure was somewhat higher among firms in the Cambridge sub-region than those based elsewhere (Table 2.6). Across our survey respondents, the largest proportion disagreeing with this assertion was found among those from the North West Central Belt.

Table 2.6: Responses to the statement “*over time, this firm has built up relationships with nearby firms for the exchange of information and expertise*”, by area

| Firms' responses | Cambridge sub-region | | M4 area | | North West Central Belt | |
|-------------------------------|----------------------|------|--------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| Strongly agree | 2 | 6% | 3 | 5% | 5 | 7% |
| Agree | 10 | 31% | 17 | 27% | 12 | 17% |
| Neutral | 11 | 34% | 24 | 39% | 21 | 29% |
| Disagree | 8 | 25% | 14 | 23% | 28 | 39% |
| Strongly disagree | 1 | 3% | 4 | 6% | 6 | 8% |
| Total responses | 32 | 100% | 62 | 100% | 72 | 100% |
| Missing / uncodable responses | 0 (excluded) | | 1 (excluded) | | 2 (excluded) | |

2.12 When asked to indicate the benefits that were derived from “*being located to other similar firms*”, three broad explanations were proffered by firms:

- the availability of skilled and experienced staff
- the fact that business support services were more likely to be attuned to their needs
- the possibility of close collaboration in development: as one firm put it, “*it is better and easier to talk if firms are local*”.

- 2.13 The initial reasons for firms' locations within our three areas of study provide another perspective on these issues: arguably, *if* firms sought a location because (a) they wanted to collaborate with other firms in the area (active) or (b) similar firms were located within the vicinity (passive), then this could provide supporting evidence for the possibility of (or potential for) collaboration within Tier One:
- in fact, across our 169 respondents, four firms claimed that the *principal* reason for their location was that “*we wanted to collaborate with other firms in the area*” while eleven respondents recognised this as a secondary location factor. Across these 15 respondents, some two-thirds (double the average figure for all respondents) also agreed or strongly agreed that “*over time, this firm has built up relationships with nearby firms for the exchange of information/expertise*”. This suggests strong evidence of clustering activity but only amongst a small group of ITCE businesses
 - just one survey respondent (based in the Cambridge sub-region) claimed that the *principal* reason for its location was that “*other similar firms were already based in the area*” while something over 10% of firms cited this as a secondary location factor; across both groups, 33% also agreed or strongly agreed that “*over time, this firm has built up relationships with nearby firms for the exchange of information/expertise*”.
- 2.14 For a minority of respondents (18 firms in total), the initial location was chosen for reasons that relate to collaboration *and* there was an acknowledgement that relationships with similar firms had subsequently been developed for the exchange of information and expertise. On this basis there is some evidence for collaborative relationships within Tier One. From our survey evidence, there was some suggestion that relationships of this type were more likely to be found among Cambridge firms than those elsewhere, although the number of observations was too small to draw this conclusion with total confidence.
- 2.15 Consultations conducted during the course of this assignment were similarly ambivalent in terms of the extent to which firms were actively collaborating with nearby businesses. Across much of the North West, our consultations suggested that co-location was driven principally by the attraction of the area and/or the transport infrastructure, particularly the proximity of Manchester airport¹. Similarly our interviews in the M4 area suggested that the majority of firms were independent and insular. However there were exceptions; for instance, firms seeking to supply IT systems (where firms needed to play complementary roles in designing and implementing a system) and – in the M4 area – the broadcasting and new media companies.

¹ This is an explanation that really sits within Tier Four of the cluster model

- 2.16 On balance, collaboration and co-operation within Tier One seems to be a characteristic of a minority of firms within the ITCE sectors. It is not entirely absent from any of the geographical areas under consideration but nowhere is it a particularly strong characteristic.

Tier Two: Relationships with specialist suppliers and customers

- 2.17 What, then, of supply chain relationships within our three areas of ITCE co-location? In this domain, the evidence for functional local relationships seems somewhat stronger. From our survey of firms, just under 40% of respondents agreed or strongly agreed that they had *“built up a network of major suppliers based in the area”*. In one case, the comment was made that having local suppliers was *“extremely beneficial”* such that maximum use was made of local firms. Another respondent explained that a local supply base was associated with *“reduced time to market, collaboration on marketing initiatives and shared quality processes”*.
- 2.18 Just over 40% of survey respondents claimed that the firm had developed *“a significant group of local customers based in the area”*. Again, a range of explanations were proffered. One respondent made the point that *“there is still a lack of understanding of what we offer and so constant and regular meetings with current and prospective customers are essential”*. More generally, the point was made that proximity to customers was simply convenient and cost effective, particularly when software engineers and the like had to travel to work at clients’ premises. A third firm – based in the Cambridge sub-region – commented that *“the local area is full of significant customers and it is the major reason for being in this area”*.
- 2.19 In reporting these observations on local supply chain relationships, we can observe some important spatial variations. Although not significant in a statistical sense, these do corroborate findings from other strands of work and are therefore noteworthy:
- respondents from the Cambridge sub-region were more likely than the average to claim to have developed a network of major suppliers based in the area; and from Table 2.7 this seems to be especially apparent in terms of specialist manufacturing capacity
 - close to 50% of respondents from the North West agreed or strongly agreed that they had developed a significant group of local customers; this figure was almost 20% higher than the equivalent for firms based in the Cambridge sub-region
 - nearly a quarter of ITCE respondents in the North West agreed or strongly agreed with *both* of the statements about local suppliers *and* customers; this figure was about 10% higher than that for either of the other two regions.

Table 2.7: Proportion of respondents agreeing totally or partly with statements about specialist suppliers in their area

| | Cambridge sub-region | | M4 area | | North West Central Belt | |
|---|----------------------|-------------------|---------|------|-------------------------|------|
| | % | base ² | % | base | % | base |
| there is a satisfactory range of specialist suppliers based in this area for our needs | 70% | 27 | 73% | 56 | 62% | 66 |
| within this area, there is a satisfactory range of firms with specialist manufacturing capabilities for our needs | 76% | 21 | 60% | 42 | 43% | 46 |

- 2.20 The importance of the regional market for ITCE firms in the North West was a theme that emerged during our programme of consultations. Specifically, among the group of firms located in the South Manchester / Cheshire belt, there were a good number of subsidiaries of major national and international companies. Consultees reported that these had been established in the area in order to serve the regional market. For the most part, they focused on marketing and technical support while the full range of corporate functions (R&D, human resource development, and so on) often took place elsewhere.
- 2.21 Overall then, firms attached some importance to local customers and suppliers and this is consistent with the hypothesis that co-location is indicative of genuine clustering. However it is also important to acknowledge that even if they have a strong local customer/supplier base, many firms are also operating in an international market. And indeed, if co-location generates cluster benefits, then strong export performance should follow: our survey suggested that just over 30% of respondents rely on exports for at least 25% of sales but as Table 2.8 reveals, this average figure masks some important spatial variations.

Table 2.8: Exports as a proportion of sales, by area

| | Cambridge sub-region | | M4 area | | North West Central Belt | |
|-------------------------------|----------------------|------|--------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| less than 5% | 13 | 45% | 27 | 47% | 35 | 56% |
| 5-24% | 5 | 17% | 11 | 19% | 12 | 19% |
| 25-74% | 6 | 21% | 10 | 17% | 11 | 17% |
| 75% or over | 5 | 17% | 10 | 17% | 5 | 8% |
| Total responses | 29 | 100% | 58 | 100% | 63 | 100% |
| Missing / uncodable responses | 3 (excluded) | | 5 (excluded) | | 11 (excluded) | |

- 2.22 Two notable observations from Table 2.8 concern the relatively weak export performance amongst the North West firms and the comparatively strong performance from the Cambridge sub-region firms. We saw earlier that our Cambridge respondents were typically smaller and

² Across this table, the base figures exclude firms that did not answer the question (i.e. missing responses) and firms that claimed that the element of business support was "not applicable"

younger than those from the comparator areas and in this context, the relatively strong export profile is noteworthy for the age and size profile would typically militate against it. Arguably then, this could be seen as indicative of the potential value to be added through a location within an area-based cluster.

Tier Three: Relationships with universities and the providers of specialist business support

2.23 The third tier within our cluster model is concerned with relationships between core ITCE firms and what we have described as the soft infrastructure: namely, universities and other providers of specialist business services. While existing outside the functional supply chains, these technology sources may do much to enhance both firms’ performance and their functional attachment to the place in which they are based.

Links with universities and research institutes

2.24 Overall, a quarter of survey respondents either agreed or strongly agreed that they had built up “close links with universities / research organisations in the area”. Again, across our survey respondents, we were able to observe some important spatial variations: the figure among respondents from the Cambridge area was double that for firms from the North West Central Belt.

Table 2.9: Responses to the statement “over time, this firm has built up close links with universities/research organisations in the area”, by area

| Firms' responses | Cambridge sub-region | | M4 area | | North West Central Belt | |
|-------------------------------|----------------------|------|--------------|------|-------------------------|------|
| | No. | % | No. | % | No. | % |
| Strongly agree | 5 | 16% | 4 | 6% | 3 | 4% |
| Agree | 7 | 22% | 10 | 16% | 11 | 15% |
| Neutral | 6 | 19% | 16 | 26% | 20 | 28% |
| Disagree | 11 | 34% | 25 | 40% | 31 | 43% |
| Strongly disagree | 3 | 9% | 7 | 11% | 7 | 10% |
| Total responses | 32 | 100% | 62 | 100% | 72 | 100% |
| Missing / uncodable responses | 0 (excluded) | | 1 (excluded) | | 2 (excluded) | |

2.25 From our survey, we observed that around a quarter of respondents agreed – in whole or in part – that “universities within this area are willing and able to collaborate on R&D”. Again, the proportion of respondents responding affirmatively to this statement was noticeably higher in the Cambridge area than elsewhere (Table 2.10).

Table 2.10: Responses to the statement “universities within this area are willing and able to collaborate on R&D”, by area

| Firms' responses | Cambridge sub-region | | M4 area | | North West Central Belt | |
|--------------------------|----------------------|------------|---------|------------|-------------------------|------------|
| | No. | % | No. | % | No. | % |
| totally agree | 4 | 17% | 4 | 9% | 4 | 7% |
| partly agree | 8 | 35% | 10 | 21% | 10 | 18% |
| Disagree | 3 | 13% | 8 | 17% | 12 | 21% |
| no opinion | 8 | 35% | 25 | 53% | 30 | 54% |
| Total | 23 | 100% | 47 | 100% | 56 | 100% |
| missing / not applicable | 9 | (excluded) | 16 | (excluded) | 18 | (excluded) |

2.26 Table 2.11 reports the results of a different question that relates to the importance of different organisations in terms specifically of external sources of technology and innovation. In this context, a number of important and consistent observations may be made:

- overall, the proportion of respondents from the Cambridge area claiming that local universities / research institutes are important or crucially important is higher than in the M4 area or the North West
- respondents from the M4 tended to rely more on non-local universities and research institutes than those elsewhere
- in terms of corporate sources of technology and innovation, respondents from the M4 and Cambridge areas were more likely to rely on overseas sources than those in the North West.

Table 2.11: Proportion of respondents claiming that different sources of technology and innovation are either important or crucially important for their business

| | Cambridge sub-region | | M4 area | | North West Central Belt | |
|---|----------------------|------|---------|------|-------------------------|------|
| | % | base | % | base | % | base |
| Universities, research institutes and RTOs within this area | 52% | 31 | 32% | 60 | 39% | 72 |
| RTOs based outside this area | 47% | 32 | 43% | 60 | 26% | 72 |
| Other UK universities and research institutes | 35% | 31 | 50% | 60 | 33% | 72 |
| Technology-orientated companies within this area | 71% | 31 | 68% | 60 | 54% | 72 |
| Technology-orientated companies elsewhere in the UK | 61% | 31 | 68% | 60 | 57% | 72 |
| Universities and research institutes outside the UK | 34% | 32 | 34% | 58 | 21% | 71 |
| Technology-orientated companies outside the UK | 61% | 31 | 66% | 61 | 42% | 72 |
| Membership-based organisations within the area | 29% | 31 | 18% | 60 | 31% | 70 |
| Average | 48.8% | | 47.4% | | 37.9% | |

2.27 Respondents were then asked to name the two universities/other organisations they regarded as the most important sources of technology and innovation for their businesses. The results were fully consistent with those outlined above and reveal some intriguing inter-regional differences:

- of the respondents from the Cambridge area that named specific sources, nearly 80% mentioned Cambridge University as the first or second most important source
- of the M4 respondents that cited specific sources, just over 10% mentioned universities from within the area; rather more firms mentioned DERA; and just over 20% cited only corporate sources
- among the North West respondents, just over 40% mentioned a regional university (of which UMIST and Manchester University were the most frequently cited). Interestingly, some 20% mentioned a local business grouping (e.g. Federation of Small Businesses) as one of the two most important sources in this context.

2.28 In terms of engaging with the soft infrastructure in the context of universities and other sources of technology and innovation, our survey does therefore reveal some important inter-regional contrasts and these are further borne out by our consultations.

2.29 In the M4 area, for example, a marked finding from the interviews – and one that was fully consistent with the survey results – was the extent to which firms were not well connected with the local universities. None of the firms we talked to cited universities from within the M4 area as being an important source of technology and innovation and only rarely were references made to other universities in this respect. The dominant view was that developments in the leading edge and core technologies of ITCE are more likely to come from technology-based organisations that are typically outside the UK. Arguably, this observation reflects the global nature of the ITCE industry – particularly within the M4 area (see for example Table 2.3) - and the dominant role played by firms from the West Coast of the USA. In our survey, 7 of the 16 respondents from the M4 area that specified the location of their head office said it was based on the West Coast of the USA.

2.30 However our consultations with firms from the M4 area also suggested that firms desired to get closer to universities in order to establish whether greater benefits could be derived from technological research and technology transfer. Specific candidates in this context included: Brighton, Bournemouth and Bradford (broadcasting and media); Cambridge and Manchester (chip design); and Brunel and Aston (neural networks). References were also made by consultees in the M4 area to Edinburgh, Imperial, Oxford, Durham and Warwick. Noteworthy, however, was the dearth of references to universities within the area itself.

2.31 On the basis of our survey evidence, links between firms in the North West and the region's universities appear to be comparatively weak. This was a finding that was corroborated through our consultations, particularly in the context of the 'mainstream ITCE' firms based in the South Manchester/ Cheshire belt. Consultees reported that links between these firms and

the regional universities were modest apart from general interest in recruiting suitable graduates (however this recruitment interest was also relevant to universities throughout the UK). The apparent lack of linkages between mainstream ITCE firms and universities is probably related to the fact that most of these firms do not undertake R&D and product development functions in the North West. Nevertheless, in some specialist niches, the region does seem to have a strong infrastructure in this regard and certainly, our consultations (if not the survey) pointed to important developments across this domain. Specifically consultees referred to:

- *linkages with companies on the science park that had either spun out of universities or had research and project interactions:* these were mainly high technology companies involved in specialised software or computer services/hosting
- companies in the *new media field* that had been formed by graduates of the MMU or which had developed through university projects / demonstration facilities and networks in the new media / computer graphics field
- a wide range of active networks in Manchester and Liverpool that provide practical support to existing and start up firms (particularly in the new media field).

Links to the provision of business support

- 2.32 Overall, just over a third of survey respondents agreed or strongly agreed with the statement that “*over time, this firm has built up close links with providers of business support based in this area*”. In this context, there was comparatively little variation in the responses from firms in the three different regions.
- 2.33 Business support, however, covers a great range of potential interventions. It varies from support provided by public sector organisations such as Business Links, much of which is fairly generic in character, to highly specialist support provided – for example – by IPR lawyers and business angels. Arguably a well functioning cluster could be expected to address firms’ needs across all of these different fields.
- 2.34 From our survey, it was apparent that close to 60% of respondents agreed in whole or in part with the view that specialist legal support is available in the area; this figure was particularly high among respondents from the Cambridge area (Table 2.12). Assessments of accountants were similarly positive and displayed little spatial variation. Overall, the support provided by banks was reviewed in somewhat less favourable terms. Respondents from the Central Belt of the North West were more likely than the average to assess support from TECs and Business Links in positive terms.

Table 2.12: Proportion of respondents agreeing totally or partly with statements about business support services in their area

| | Cambridge sub-region | | M4 area | | North West Central Belt | |
|--|----------------------|-------------------|---------|-------------------|-------------------------|-------------------|
| | % | base ³ | % | base ³ | % | base ³ |
| seed and venture capital has been available on realistic terms | 24% | 21 | 16% | 37 | 17% | 59 |
| Clearing banks provide specialist support within this area | 39% | 28 | 39% | 44 | 39% | 59 |
| specialist legal advice is available within this area | 72% | 25 | 63% | 48 | 56% | 63 |
| accountants are providing specialist support | 56% | 25 | 62% | 50 | 57% | 63 |
| TECs and Business Links are useful to us | 42% | 26 | 36% | 53 | 49% | 68 |

- 2.35 Our programme of consultations added some qualitative perspectives to this picture. In the North West, for instance, the relationships between mainstream ITCE firms and banks, providers of legal services, etc. was often governed by the policies of the parent firm. Conversely, among those ITCE firms located on the region's science parks, there was a tendency to develop special relationships with science park managers who provided preferential services to new and start-up firms.
- 2.36 In the M4 area, consultees had differing views on the adequacy and effectiveness of support from professional organisations. Notwithstanding the fact that all of the big-five accountancy firms and three of the leading legal practices have now opened offices in the Reading area, it remains the case that the area as a whole is still over-shadowed by London in terms of specialist professional support. For instance, in seeking sources of venture capital, all of the smaller firms that we interviewed had gone straight to London-based providers. Similarly, the majority of interviewees used London sources for specialist IPR work. However, there was a view that over the short to medium term, this situation could well change and ITCE firms from within the area might look to more local providers.

Links through recruitment

- 2.37 Within the four-tiered model of clustering, the issue of the labour market and associated recruitment is really a cross-cutting theme. Although – arguably – in institutional terms it sits most easily in Tier 3 (particularly insofar as it involves specialist recruitment agencies), labour market and recruitment issues are an important component of Tiers 1 and 2. Indeed, as Table 2.13 reveals, over 70% of respondents from within the M4 corridor claimed that “*firms in this area with activities similar to us*” were either important or crucially important in terms of recruitment.

³ Across this table, the base figures exclude firms that did not answer the question (i.e. missing responses) and firms that claimed that the element of business support was “not applicable”

Table 2.13: Proportion of respondents claiming that different sources for recruiting skilled labour are either important or crucially important for their business

| | Cambridge sub-region | | M4 area | | North West Central Belt | |
|---|----------------------|------|---------|------|-------------------------|------|
| | % | base | % | base | % | base |
| Firms in this area with activities similar to us (Tier 1) | 60% | 30 | 74% | 61 | 54% | 72 |
| Firms in this area upstream or downstream in our supply chain (Tier 2) | 45% | 31 | 51% | 61 | 22% | 72 |
| Professional services and consultancy firms in this area (Tier 3) | 50% | 30 | 51% | 61 | 33% | 72 |
| Universities and colleges in this area (Tier 3) | 45% | 31 | 39% | 61 | 51% | 72 |
| Average | 50% | | 53.8% | | 40% | |

- 2.38 The results from our employee survey corroborated this finding. Overall, around 90% of employees were not in their first job, suggesting that their skills base and experience had been derived in part from other employers. Of these respondents, over 60% had (immediately) previously worked for another ITCE firm. And within the M4 area (for example), just over 60% of this sub-group had worked immediately previously at another location within the M4 area. Overall, just over 40% of respondents had been in their current job for less than two years. This all suggests considerable labour market mobility across ITCE firms within the area of co-location.
- 2.39 Despite the potential benefits from clustering, relationships through Tiers 1 and 2 in terms of recruitment are, however, double-edged. Although firms might derive significant benefits in terms of securing a key resource, they can also suffer through the poaching of staff. Our work on the Cambridge Phenomenon suggested that small ITCE firms in particular suffered from poaching by larger local firms that were able to compete with higher salaries. And comments made by firms in the course of this assignment were entirely consistent: poaching of highly skilled staff seems to be a feature of all three areas. Nevertheless, on balance, our consultations – and indeed, comments on the postal questionnaires – suggested that the advantages of being able to recruit outweighed the disadvantages of losing people.
- 2.40 In the M4 area in particular, the ITCE labour market has arguably achieved critical mass and as such represents a significant resource for the area’s ITCE businesses. Consultees regarded it as effective because:
- there is a pool of ITCE people already living and working in the area from which to recruit
 - many of these people are already working for similar companies and are experienced with the required specialist skills

- the area is so well known for its concentration of ITCE activities that people can be recruited in from other areas with the knowledge that there are alternative employment options should the need arise.
- 2.41 Elsewhere, the specialist labour market is smaller and the extent to which critical mass has been achieved is less. The findings in Table 2.13 bear this out. In the Cambridge area, the labour market is arguably starting to achieve critical mass, not least because links with London and the possibility of tapping into the London labour market have improved significantly over the last few years. Similarly, in the North West, the co-location of ITCE firms, particularly in the south Manchester / Cheshire belt, is beginning to create a pool of specialist labour.
- 2.42 But what of the institutional infrastructure associated with the local labour market and that part of the equation that fits within Tier 3? Our consultations suggested that across all three areas, recruitment methods varied from word of mouth to direct advertising and the use of recruitment agencies. In the M4 area, one curious anomaly was that very few recruitment agencies were said to be based in the M4 Corridor itself. One informed observer quoted eight companies in a league table of high growth recruitment agencies before finding one based in the area, others being based in London, Edinburgh and Sussex.
- 2.43 As Table 2.13 also reveals however, local universities and colleges are an important source of personnel and, on the basis of the available evidence, this seems to be an especially important feature of the North West area. In total, 50% of respondents from the region acknowledged the importance as a source and as one respondent asserted, there are significant benefits in *“being able to find and use talented individuals from these establishments”*.
- 2.44 To sum up, across all three areas – albeit to varying degrees - the specialist labour market is a significant benefit that derives from co-location.

Tier Four: The hard infrastructure

- 2.45 In explaining the value of particular locations, much importance was attached by ITCE firms to the hard infrastructure. From our postal survey, amongst respondents from the M4 area, some 10 firms claimed that the nature of *“communications infrastructure”* was the main initial reason for firms’ location; interestingly no firms from the Cambridge sub-region cited this as the principal location factor. In the M4 area, a further 18 respondents cited *“communications infrastructure”* as a secondary factor. Thus for over 40% of respondents from that area of co-location, the issue of communications possibilities was clearly important; the corresponding figures for the Cambridge sub region and the North West Central Belt were noticeably lower – 25% and 14% respectively.

- 2.46 In the context of the M4 Corridor, the importance of the hard infrastructure was also reported consistently through our programme of consultations: the development of the M4, M3 and M25, the high-speed rail link to Paddington and access to Heathrow have been vital factors in the growth of the ITCE industry in the Corridor. However, many of the interviewees also spoke of frustrations with all of these modes of transport. Insights from the North West were similar in this regard: great importance was attached to Manchester Airport, the M60 and M56, but growing problems of congestion were also noted.
- 2.47 Another element of the hard infrastructure that was noted by firms concerned the provision of appropriate premises. In all three areas – but particularly the M4 area and the Cambridge sub-region – specialist science parks, business parks and/or innovation centres have played an important role in the development of the ITCE sector. Specific schemes include:
- in the *M4 area*: Brunel University Science Park, Farnborough Innovation Centre, Milton Park, New Greenham Park, Stockley Park, Reading University Innovation Centre and Silwood Science Park
 - in the *Cambridge sub-region*: Cambridge Science Park, St John’s Innovation Centre and – more recently – Granta Park, Cambridge Research Park and Vision Park
 - in the *North West*: Manchester Science Park, Wavertree Technology Park and Concord Business Park.
- 2.48 But despite this, premises issues are a major – and apparently growing - concern for a good number of the responding firms: overall, about a quarter claimed that the lack of suitable premises was constraining the growth of their business⁴; this figure was higher in the M4 than in the other areas.
- 2.49 Table 2.14 provides an indication of firms’ relative assessments of different elements of the hard infrastructure. In all three areas, the score for the assessment of the IT/Telecomms infrastructure (i.e. how good it is currently perceived to be) is lower than the score attached to its importance, suggesting an infrastructure deficit in this domain. Interestingly across the road and rail infrastructure, only in the M4 area is this same relationship apparent.
- 2.50 Across the three areas, greatest importance was attached to international communications by respondents from the M4 area; this is fully consistent with the high incidence of multinational firms’ branch plants that we noted earlier. With the proximity of Heathrow airport, it is perhaps unsurprising that respondents from the M4 assessed this aspect of their

infrastructure more positively than firms elsewhere. Firms in the Cambridge area were more positive about their business location vis-à-vis premises requirements than firms in the other two areas.

Table 2.14: Relative assessments of current business location and importance of different features: average scores where 5 represents excellent/very important and 1 signifies poor/unimportant

| | Cambridge sub-region | | | | M4 area | | | | North West Central Belt | | | |
|---------------------------------|----------------------|------|------------------|------|------------------|------|------------------|------|-------------------------|------|------------------|------|
| | Assessment score | base | Importance Score | base | Assessment score | base | Importance score | base | Assessment Score | base | Importance score | base |
| Road and Rail Infrastructure | 3.9 | 32 | 3.9 | 32 | 3.6 | 58 | 4.1 | 57 | 3.8 | 37 | 3.5 | 34 |
| IT and telecomms infrastructure | 3.9 | 31 | 4.3 | 31 | 3.9 | 56 | 4.1 | 57 | 3.6 | 37 | 4.3 | 35 |
| Premises | 3.6 | 30 | 3.2 | 32 | 3.4 | 56 | 3.5 | 56 | 3.3 | 38 | 3.2 | 36 |
| International communications | 3.4 | 30 | 3.3 | 32 | 3.6 | 56 | 3.5 | 56 | 3.3 | 37 | 3.3 | 36 |

2.51 Overall then, the evidence from the postal survey and consultations suggests that the hard infrastructure has been an important factor in terms of the co-location of ITCE firms in each of the M4 area, the North West and the Cambridge sub-region. Moreover, in all areas it is currently under pressure and the suggestion is that further investment may be required in order to accommodate and sustain growth within the ITCE sectors.

Conclusion

2.52 The foregoing discussion of interactions and behaviour across the different Tiers within the Cambridge sub-region, the M4 area and the Central Belt of the North West has demonstrated – from the perspective of firms – that all three places display at least some of the characteristics of a functioning cluster. On balance, the evidence seems to be strongest with respect to the Cambridge area and perceptions there of the central role played by the University are especially (and differentially) strong. The M4 area also seems to display some of the features that we might expect to be associated with a dynamic cluster, not least an acknowledgement of the value attached to “*firms in the area with activities similar to us*” as a source of skilled labour. On the basis of our survey evidence, the argument to suggest that the Central Belt of the North West should be regarded as an ITCE cluster are probably weakest.

⁴ However this figure was invariably lower than the proportion of businesses claiming that difficulties recruiting staff are constraining growth

3. Patterns and processes of co-location amongst firms from the ITCE sectors: cluster as “verb”

3.1 The discussion in Chapter 2 considered interactions and behaviour across the different Tiers within an area-based cluster and it revealed some evidence of some firms engaging in some forms of activity that could be associated with genuine clustering behaviour. But how strong is this evidence and what can we conclude about the importance of clustering for business competitiveness vis-à-vis the other forms of co-location that were depicted in Figure 1.2?

3.2 In order to examine this issue, and to consider “cluster” as *verb* rather than *noun*, it is necessary to categorise respondents to our business survey according to their relationships with the various Tiers of interaction according – broadly – to the relationships depicted in Table 3.1. From this table, it is clear that there is a significant “grey area” around Tier 3 and we must therefore consider whether evidence of interaction in this domain should be seen as indicative of clustering or agglomeration. In our view, evidence for interaction in Tier 3 only suggests agglomeration behaviour, but evidence of close links in Tier 3 and Tier 1 and/or 2 would suggest clustering behaviour.

Table 3.1: Indicators of clustering, agglomeration and co-location

| | Co-location | Agglomeration behaviour | Clustering behaviour |
|---|-------------|-------------------------|----------------------|
| Tier 1: relationships with local, core ITCE firms | No | No | Yes |
| Tier 2: relationships with specialist suppliers / customers, etc. | No | No | Yes |
| Tier 3: relationships with local universities, providers of business support, etc. | No | Yes | Yes |
| Tier 4: locational benefits through the hard infrastructure | No | Yes | Yes – by inference |

3.3 On the basis of our questionnaire responses, we devised criteria relating to clustering behaviour and agglomeration as summarised in Table 3.2⁵. Firms that met neither set of criteria were regarded as “co-locators⁶” with no immediate evidence to suggest that they derived functional benefits from their locale. There was overlap between the groups that display evidence of clustering behaviour and agglomeration benefits: 82 firms met both sets

⁵ The value of this approach became apparent after the questionnaire had been designed. The identification of criteria was not straightforward and was not perfect. However we cross checked the characteristics of the co-locators and, with the exception of one or two somewhat anomalous responses, we are with hindsight comfortable that none of these should have been categorised as clusters or agglomerators

⁶ This group included both firms that definitely did not meet all the criteria as well as those that provided insufficient information to establish whether or not criteria were met; the number of respondents in this second group was small.

of criteria. However given our primary focus on the implications of clustering, it was appropriate – for analytical purposes – to group the “pure” clusterers with the clusterer-agglomerators. The reasons for this were two-fold. First, we suspect that in practice all clusterers are deriving some agglomeration benefits (whether they acknowledge them or not), but the reverse may not hold: it is possible to derive agglomeration benefits without any purposive clustering. Second, in policy terms, an important question is whether it makes sense to seek to encourage clustering behaviour. It is therefore important to identify those firms that are not currently engaged in clustering behaviour (in other words, the co-locators and those that enjoy agglomeration benefits without evidence of clustering behaviour).

Table 3.2: Patterns of co-location: defining criteria

| Clusterers | Firms enjoying agglomeration benefits | Co-locators |
|--|---|-------------------------------|
| <p>Firms meeting a selection of the following criteria:</p> <p>EITHER</p> <ul style="list-style-type: none"> • Relationships with nearby firms for the exchange of information and expertise <p>and</p> <ul style="list-style-type: none"> • Network of major suppliers based in the area; and/or • Significant group of customers in the area; and/or • Links with technology -oriented companies in the area as a source of technology and innovation; and/or • Importance of similar firms (or firms in their supply chain) within the area as a source of recruiting skilled labour; and/or • Effective local channels for recruiting specialist staff; and/or • Close links with universities/ research organisations locally. <p>OR</p> <ul style="list-style-type: none"> • Local universities / RTOs are crucial sources of technology and innovation <p>and</p> <ul style="list-style-type: none"> • Network of major suppliers based in the area; and/or • Significant group of customers in the area; and/or • Links with technology -oriented companies in the area as a source of technology and innovation; and/or • Importance of similar firms (or firms in their supply chain) within the area as a source of recruiting skilled labour; and/or • Effective local channels for recruiting specialist staff | <p>Firms meeting a selection of the following criteria:</p> <p>EITHER</p> <ul style="list-style-type: none"> • Road and rail infrastructure is good and important <p>and</p> <ul style="list-style-type: none"> • Effective local channels for recruiting specialist staff; and/or • Close links with universities/ research organisations locally; and/or • Professional services and consultancy firms within the area are important for recruitment; and/or • Universities and colleges in the area are important for recruitment <p>OR</p> <ul style="list-style-type: none"> • Premises in area are good and important <p>and</p> <ul style="list-style-type: none"> • Effective local channels for recruiting specialist staff; and/or • Close links with universities/ research organisations locally; and/or • Professional services and consultancy firms within the area are important for recruitment; and/or • Universities and colleges in the area are important for recruitment <p>OR</p> <ul style="list-style-type: none"> • Other multiple responses to questions concerning the value of recruitment locally | <p>Other co-located firms</p> |

3.4 The distribution of respondents across our three areas of study according to these criteria is set out in Table 3.3 below. From this it is apparent that among respondents from the Cambridge area there were relatively more clusterers, while the M4 area could claim more respondents deriving agglomeration benefits. The highest incidence of co-locators was found among respondents from the North West.

Table 3.3: Distribution of respondents according to their revealed behaviour with regard to different forms of co-location

| Nature of co-location | Cambridge sub-region | | M4 area | | North West Central Belt | |
|------------------------|----------------------|------|---------|------|-------------------------|------|
| Clusterers | 13 | 41% | 23 | 36% | 21 | 28% |
| Agglomeration benefits | 8 | 25% | 20 | 32% | 21 | 28% |
| Co-locators | 11 | 34% | 20 | 32% | 32 | 43% |
| Total | 32 | 100% | 63 | 100% | 74 | 100% |

What are the characteristics of “clustering” firms?

3.5 From Table 3.3, it is apparent that the number of observations in each cell is really too small to consider the similarities and differences between (say) co-locators and clusterers in the Cambridge area or clusterers in the M4 area vis-à-vis clusterers in the North West. However we can make some comparative observations across all firms that exhibit clustering behaviour, firms that derive agglomeration benefits and other co-locators. In so doing, we are addressing the implications of business behaviour; in other words, we are considering cluster as *verb*.

Are there sectoral differences between the three groups?

3.6 On the basis of our survey evidence, the suggestion is that there are few apparent sectoral differences across the three groups. The incidence of clusterers is marginally higher within the group we have labelled “electronic components / hardware / equipment” and this may be because firms within this group are more likely to be producing a physical product – but the differences are negligible.

Table 3.4: Distribution of respondents by sector

| | Clustering firms | | Agglomeration benefits | | Co-locators | | Totals | |
|---|------------------|-----|------------------------|-----|-------------|-----|--------|------|
| | No | % | No | % | No | % | No | % |
| Electronic components / hardware / equipment | 18 | 41% | 11 | 25% | 15 | 34% | 44 | 100% |
| IT services / sales / consultancy | 16 | 30% | 18 | 34% | 19 | 36% | 53 | 100% |
| Software / content / internet / systems / telecom | 21 | 32% | 19 | 29% | 25 | 39% | 65 | 100% |
| Other | 2 | | 1 | | 4 | | 7 | |
| Totals | 57 | | 49 | | 63 | | 169 | |

Are there differences between the three groups on the basis of the type of firm?

3.7 An observation that we can make in this context is that amongst our survey respondents, firms that are themselves head offices with sites elsewhere are less likely to be clusterers and more likely to derive agglomeration benefits, suggesting that operating in an area of co-location is indicative of benefits from the hard or soft infrastructure, rather than relationships with other firms; indeed in this instance, it is quite plausible that relationships with other parts of the same firm are more important. However – contrary to conventional wisdom – among our respondents, there are certainly some assiduous clusterers among the branch plants, whether their HQ is in the UK or abroad. Among the new starts (that are not branches) and/or single site firms, an interesting point to note is that respondents tend either to be passively co-located or engaged in clustering behaviour.

Table 3.5: Distribution of respondents by type of firm

| | Clustering firms | | Agglomeration benefits | | Co-locators | | Totals | |
|---|------------------|------------|------------------------|------------|-------------|------------|--------|------|
| | No | % | No | % | No | % | No | % |
| Firm with overseas HQ | 8 | 40% | 7 | 35% | 5 | 25% | 20 | 100% |
| Firm with UK HQ | 3 | 23% | 3 | 23% | 7 | 54% | 13 | 100% |
| HQ of multi-site firm | 14 | 26% | 23 | 43% | 17 | 31% | 54 | 100% |
| Mature single site firm | 22 | 39% | 11 | 20% | 23 | 41% | 56 | 100% |
| New start - after 1997 (excl. branches) | 8 | 38% | 5 | 24% | 8 | 38% | 21 | 100% |
| Total | 55 | | 49 | | 60 | | 164 | |
| (Inconsistent data with regard to type) | 2 | (excluded) | 0 | (excluded) | 3 | (excluded) | 5 | |

Are there differences between the three groups on the basis of the size of the firm at this site?

3.8 From Table 3.6, it is apparent that firms operating from small employment units are most likely to be clusterers; indeed, this is the only sizeband in which the number of respondents showing evidence of clustering activity exceeds both those benefiting from agglomeration effects and the other co-locators. The implication may be that clustering is predominantly a small *unit* phenomenon. Although we have insufficient data to test the hypothesis rigorously, we cannot conclude that clustering is therefore a small *firm* phenomenon: the inference from Table 3.5 is that included within this group of micro business units are sites with a distant HQ as well as stand-alone enterprises.

Table 3.6: Distribution of respondents by size (in terms of employment) at this site

| | Clustering firms | | Agglomeration benefits | | Co-locators | | Totals | |
|----------------|------------------|------------|------------------------|------------|-------------|------------|--------|------------|
| | No | % | No | % | No | % | No | % |
| less than 10 | 22 | 43% | 11 | 22% | 18 | 35% | 51 | 100% |
| 10-49 | 19 | 32% | 20 | 34% | 20 | 34% | 59 | 100% |
| 50-99 | 6 | 25% | 5 | 21% | 13 | 54% | 24 | 100% |
| 100-249 | 5 | 29% | 8 | 47% | 4 | 24% | 17 | 100% |
| 250 or more | 4 | 27% | 5 | 33% | 6 | 40% | 15 | 100% |
| Total | 56 | | 49 | | 61 | | 166 | |
| (missing data) | 1 | (excluded) | 0 | (excluded) | 2 | (excluded) | 3 | (excluded) |

Are there differences between the three groups on the basis of age of firm?

3.9 From Table 3.7, it is also apparent that clustering firms tend to be younger than the average, certainly in terms of the length of time since they were established in their area. Close to half of all clustering firms trace their origins in their current geographical area to the last five years whereas 4% were established locally before 1975: this second figure is between a third and a quarter of the corresponding proportion for the other two groups. It could then be that clustering behaviour is a phenomenon that characterises small, and comparatively young business units.

Table 3.7: Distribution of respondents by age (in terms of year established at this site)

| Year established in this area | Clustering firms | | Agglomeration benefits | | Co-locators | |
|-------------------------------|------------------|------------|------------------------|------------|-------------|------------|
| | No | % | No | % | No | % |
| Before 1975 | 2 | 4% | 5 | 12% | 8 | 16% |
| 1975-84 | 7 | 15% | 8 | 19% | 15 | 30% |
| 1985-94 | 18 | 38% | 17 | 40% | 9 | 18% |
| 1995 or later | 21 | 44% | 13 | 30% | 18 | 36% |
| Total | 48 | 100% | 43 | 100% | 50 | 100% |
| Missing data | 9 | (excluded) | 6 | (excluded) | 13 | (excluded) |

Does clustering add value?

3.10 But does clustering behaviour matter and does it add value? Arguably these are the key questions in terms of whether cluster development initiatives should be pursued in order to enhance the competitiveness of the UK’s ITCE industries. On the basis of our survey evidence, we can derive proxies for “value added”; five are identified and discussed below.

Are clustering firms more likely to generate spin-outs or to be derived from spin-outs?

3.11 Spin-outs are – potentially – an important source of economic growth⁷: their formation may mean that emerging technologies (or technologies that are peripheral to the core firm’s business) are commercialised quickly and in a focused manner. Spin-outs are initially – by

⁷ Although in some cases the spin-out process may weaken the parent firm

definition – new and small enterprises and thus the “ties that bind” associated with clustering behaviour could be functionally beneficial. However as Table 3.8 below reveals, there is little evidence from our survey that potential “parent” firms that exhibit clustering behaviour are more likely to spawn spin-outs than other types of business. That said, among both clustering firms and firms which acknowledge the benefits of agglomeration, any spin offs that develop are more likely to be established locally than is the case for other co-locators.

Table 3.8: Distribution of respondents according to spin-out activity

| | Clustering firms | | Agglomeration benefits | | Co-locators | |
|--|------------------|------------|------------------------|------------|-------------|------------|
| | No | % | No | % | No | % |
| Spin-off businesses established in this area | 9 | 17% | 7 | 16% | 3 | 5% |
| Spin-off businesses established either in this area or elsewhere | 1 | 2% | 2 | 4% | 4 | 7% |
| Spin-off businesses established elsewhere | 1 | 2% | 3 | 7% | 5 | 9% |
| No spin-off businesses established | 41 | 79% | 33 | 73% | 46 | 79% |
| Total | 52 | 100% | 45 | 100% | 58 | 100% |
| (missing data/respondent does not know) | 5 | (excluded) | 4 | (excluded) | 5 | (excluded) |

3.12 But are clustering firms, themselves more likely to have a local genealogy? Although the number of observations is small, the inference from Table 3.9 is that of those firms that were originally founded in the local area, clustering firms are more likely than the average to trace their origins to a local firm or university while firms which now enjoy agglomeration benefits are more likely to be corporate spin-outs, whether the “source” firm was based locally or elsewhere – but the differences are marginal.

Table 3.9: Distribution of respondents that were originally founded in their local area, according to origin

| Immediately before setting up this firm, the founder(s) was employed in a... | Clustering firms | | Agglomeration benefits | | Co-locators | |
|--|------------------|------------|------------------------|------------|-------------|------------|
| | No | % | No | % | No | % |
| University / research organisation in this area | 2 | 6% | 0 | 0% | 0 | 0% |
| University / research organisation / ITCE firm in this area | 2 | 6% | 0 | 0% | 0 | 0% |
| ITCE firm in this area | 13 | 41% | 12 | 50% | 13 | 42% |
| ITCE firm in this area / other | 0 | 0% | 0 | 0% | 2 | 6% |
| ITCE firm elsewhere | 2 | 6% | 5 | 21% | 2 | 6% |
| Other | 13 | 41% | 7 | 29% | 14 | 45% |
| Total | 32 | 100% | 24 | 100% | 31 | 100% |
| Missing / respondent does not know | 3 | (excluded) | 2 | (excluded) | 5 | (excluded) |

Are clustering firms more likely to be growing firms?

3.13 An increase in employment is not on its own an ideal measure of growth, for it can mask falling productivity and inefficiency. However for the ITCE sectors, it is a reasonable proxy:

the sectors are highly competitive and increased employment should equate with increased output and growth.

- 3.14 Clusterers account for about 30% of firms with a profile of employment growth. This figure is somewhat less than the average for the sample as a whole. Interestingly though, clustering activity seems to be an important feature among the recent start-ups / in-movers: this is consistent with the earlier observation that clustering is most prominent amongst smaller business units. An important observation from Table 3.10 is the prevalence of firms enjoying agglomeration benefits within the group of growing firms: respondents that derive benefits from the hard and soft infrastructure (and are thus functionally related to their area) without demonstrating functional local inter-firm relationships.

Table 3.10: Distribution of respondents by growth profile (in terms of employment at this site)

| Growth profile 1997-2003 | Clustering firms | | Agglomeration benefits | | Co-locators | | Totals |
|------------------------------|------------------|------------|------------------------|------------|-------------|------------|--------|
| | No | % | No | % | No | % | No |
| Decline | 4 | 7% | 2 | 4% | 7 | 12% | 13 |
| Growth | 29 | 52% | 38 | 79% | 31 | 52% | 98 |
| Recent start-up/in-mover | 10 | 18% | 5 | 10% | 8 | 13% | 23 |
| Static | 13 | 23% | 3 | 6% | 14 | 23% | 30 |
| Total | 56 | 100% | 48 | 100% | 60 | 100% | 164 |
| Inconsistent or missing data | 1 | (excluded) | 1 | (excluded) | 3 | (excluded) | 5 |

Are clustering firms more likely to be strong exporters?

- 3.15 On the basis of our survey responses, there is no evidence to suggest that clustering firms perform better than the average in terms of their export profile. That said, given the high incidence of small and/or new firms within the group of clusterers, it may be that because of clustering, their export profile is stronger than we might otherwise expect. From Table 3.11, it is apparent that it is the firms which enjoy agglomeration benefits that appear to have the strongest export performance.

Table 3.11: Distribution of respondents by export profile

| Exports as a proportion of sales at this Site | Clustering firms | | Agglomeration benefits | | Co-locators | |
|---|------------------|------------|------------------------|------------|-------------|------------|
| | No | % | No | % | No | % |
| less than 5% | 26 | 51% | 18 | 42% | 31 | 55% |
| 5-24% | 10 | 20% | 8 | 19% | 10 | 18% |
| 25-74% | 7 | 14% | 13 | 30% | 7 | 13% |
| 75% or over | 8 | 16% | 4 | 9% | 8 | 14% |
| Total | 51 | 100% | 43 | 100% | 56 | 100% |
| Missing | 6 | (excluded) | 6 | (excluded) | 7 | (excluded) |

Are clustering firms more likely to engage in research and development?

3.16 On this measure – albeit with smaller numbers of respondents – there is some evidence to suggest that clustering firms are likely to devote rather more of their turnover to R&D than the average. This might suggest stronger growth performance over the longer term, even though it really does not come through our analysis of firms’ current growth profiles. Conversely, over half of the group we have labelled “co-locators” – firms with no apparent clustering behaviour or agglomeration based benefits – devote less than 5% of the site’s turnover to R&D activity.

Table 3.12: Distribution of respondents by R&D profile

| Proportion of turnover at this site devoted to R&D activity | Clustering firms | | Agglomeration benefits | | Co-locators | |
|---|------------------|------------|------------------------|------------|-------------|------------|
| | No | % | No | % | No | % |
| less than 5% | 19 | 37% | 13 | 33% | 26 | 51% |
| 5-24% | 20 | 38% | 22 | 56% | 18 | 35% |
| 25-74% | 8 | 15% | 2 | 5% | 4 | 8% |
| 75% or more | 5 | 10% | 2 | 5% | 3 | 6% |
| Total | 52 | 100% | 39 | 100% | 51 | 100% |
| Missing | 5 | (excluded) | 10 | (excluded) | 12 | (excluded) |

Are clustering firms more likely to have developed international collaborative relationships?

3.17 Although defined on the basis of local relationships, there is some evidence to suggest that firms ensconced in local networks are also more likely to be enjoying international collaborative relationships. We can see from Table 3.13 that over half of the clustering firms agree or strongly agree that international collaborative relationships have been established. This is marginally higher than the corresponding figures for the other two groups, but its significance is arguably greater when the size (small) and age profile (young) of the clustering firms is also taken into account.

Table 3.13: Responses to the statement “over time, this firm has built up international collaborative relationships”

| Firms’ responses | Clustering firms | | Agglomeration benefits | | Co-locators | |
|-------------------------------|------------------|------------|------------------------|------------|-------------|------------|
| | No. | % | No. | % | No. | % |
| Strongly agree | 10 | 18% | 9 | 18% | 7 | 12% |
| Agree | 19 | 33% | 14 | 29% | 16 | 27% |
| Neutral | 11 | 19% | 12 | 24% | 15 | 25% |
| Disagree | 14 | 25% | 10 | 20% | 17 | 28% |
| Strongly disagree | 3 | 5% | 4 | 8% | 5 | 8% |
| Total responses | 57 | 100% | 49 | 100% | 60 | 100% |
| Missing / uncodable responses | 0 | (excluded) | 0 | (excluded) | 3 | (excluded) |

Conclusions

- 3.18 This chapter has sought to compare and contrast the character and performance of firms that are known – on the basis of particular criteria – to be clustering or enjoy agglomeration benefits or co-locating.
- 3.19 On the basis of the available evidence, it appears that a third of our survey respondents are “clusterers”, just over a quarter are “agglomerators” and the remainder do not see themselves as benefiting actively or passively from where they are located in terms of the facets of location we have identified. Across these three groups, the firms that enjoy agglomeration benefits (but are not clusterers) appear to be performing most strongly (although the differences are probably not statistically significant). They are:
- most likely to have spun-off a business
 - most likely to be growing (in terms of local employment)
 - typically likely to have the strongest export profile.
- 3.20 However, as we saw earlier, the firms that are associated with the advantages of agglomeration are also likely to be
- a corporate HQ in their own right
 - a comparatively large business unit (in terms of employment at this site).
- 3.21 So is encouraging clustering behaviour an irrelevance and should policy, in fact, invest in the infrastructure that enhances agglomeration from which clusterers also benefit? On the basis of our consultations, there can be little doubt that infrastructural issues are a major concern for many firms: motorway congestion, access to Heathrow airport and issues with regard to premises featured strongly.
- 3.22 But to make this deduction may well involve a fallacy because our view is a snapshot and does not explore the evolution of behaviour over time. To dismiss clustering altogether would, we suspect, be flawed. On the basis of the evidence available to us, we have not been able to *demonstrate* convincingly that firms’ competitive performance has been enhanced by clustering activity. On the other hand, there are grounds for suggesting that it may still be important.

- 3.23 Clustering firms are typically young and small business units – close to 40% employ fewer than ten people – and most are single site firms. Inevitably, this group will embrace some “lifestyle” businesses with few aspirations for growth. Our dataset was not sufficiently large to filter out this group of firms, suffice to note that they would inevitably have had a dampening effect on overall growth performance. Indeed, in the fiercely competitive arena of ITCE, it could be that clustering behaviour has been the basis of these firms’ survival. In this context and even though the number of observations is small, the relatively high incidence of R&D expenditure together with the positive assessment of international collaborative relationships should be regarded as important findings. Moreover the fact that clustering businesses are more likely than the average to trace their origins to local university connections is also noteworthy.
- 3.24 Second, as demonstrated in Table 3.14 overleaf, the majority of respondents to our survey – whether clusterers or not – belong to some form of business grouping. Membership of these groups is not compulsory and the implication therefore is that firms are deriving some kind of benefit through some level of collaboration. Although there were respondents claiming that they brought no specific benefit (and in at least one case the respondent, based in the North West, admitted this was “*because this firm is lazy in pursuing these lines*”), others explained (unprompted) the value of group memberships from a whole range of different perspectives:

“we recently relocated within our area and this has been of assistance in meeting new business partners” (ITCE firm from the Cambridge sub-region)

“I joined the Cambridge Network to build up local contacts. However I have so much export work that I haven’t needed them yet! However I will do in the future” (ITCE firm from the Cambridge sub-region)

“Chamber of Commerce is good for lobbying the local authority” (ITCE firm from the M4 area)

“80% of business is referral” (ITCE firm from the North West)

“being locked in a room for 2 hours and made to talk to people who are in the same daily struggle” (ITCE firm from the North West)

“we are now working closer with pro-active suppliers and our Business Link, and anticipate better growth from these partnerships” (ITCE firm from the North West).

Table 3.14: Membership of business groupings (e.g. networking / cluster / sector groups)

| Types of business group to which respondents belong | Clustering firms | | Agglomeration benefits | | Co-locators | |
|---|------------------|------|------------------------|------|--------------|------|
| | No. | % | No. | % | No. | % |
| None | 24 | 42% | 20 | 43% | 28 | 47% |
| Generic grouping (e.g. Chamber of Commerce) | 16 | 28% | 12 | 26% | 19 | 32% |
| Generic and ITCE-specific groupings | 6 | 11% | 7 | 15% | 5 | 8% |
| ITCE-specific groupings | 11 | 19% | 7 | 15% | 7 | 12% |
| Total responses | 57 | 100% | 46 | 100% | 59 | 100% |
| Missing / uncodable responses | 0 (excluded) | | 3 (excluded) | | 4 (excluded) | |

3.25 Moreover, over a quarter of the survey respondents that expressed an opinion suggested that they would like to see new business groupings being developed. The proposals were diverse in character and a range of responses is presented below:

“blue sky innovative thinking – what will be the new replacement technologies in 3 years, 5 years and 10 years” (ITCE firm from the Cambridge sub-region)

“internet process skills and internet content exchange – does not need to be locationally specific” (ITCE firm from the Cambridge sub-region)

“dinner meetings of companies (chief exec level) to discuss common local problems” (ITCE firm from the Cambridge sub-region)

“mentoring for people running companies and starting up ” (ITCE firm from the Cambridge sub-region)

“telecomms sector to offer range of high performance broad band networking capabilities” (ITCE firm from the M4 area)

“web affiliate groups that can maximise customer satisfaction by providing complete solutions without raising costs” (ITCE firm from the M4 area)

“groups to continue IR35 campaign” (ITCE firm from the M4 area)

“a local grouping of IT companies would be useful. Although each company has its own focus, discussion on issues and general direction would be good. Also we occasionally need or could use specialist services and it would be good to know somewhere local to go” (ITCE firm from the North West).

4. Cambridge as a value-added cluster

4.1 In many respects, the firms, organisations and individuals that collectively define the building blocks of the Cambridge economy provide one of the closest approximations to a functioning high tech cluster in the UK. The early growth of high tech industry in the Cambridge area was reported in SQW's 1985 study of the Cambridge Phenomenon. This highlighted the central role of Cambridge University which initially provided an important market for the manufacturers of scientific instruments and later evolved to become a prolific source of technology-based spin-outs. Since the mid 1980s, the Cambridge Phenomenon has become a good deal more complex and while the role of the University remains prominent, a number of other factors have been brought to bear. In particular, over the last twenty years, Cambridge – and the firms within it – have become much more accessible in terms of both national and international communications. In functional terms, they are now firmly ensconced in a global arena and it is on this wider stage that the value and significance of cluster-like behaviour should be assessed.

4.2 SQW has recently completed a revisit of the Cambridge Phenomenon. In concluding this work we commented on three dimensions of Cambridge as a cluster across a broad range of high tech activity. These dimensions are largely intangible in character and they seem to exist over and above any one constituent. They include:

- the “*brand*” associated with Cambridge and the internationally recognised connotations of innovation and excellence
- a distinctive “*culture*” which is epitomised by a buzz of entrepreneurialism and the possibility of informal collaboration
- the area’s “*functionality*” insofar as the Cambridge area is – at present at least – an area which “works”: highly qualified people choose to work in the sub-region, to educate their children in the area’s schools, to enjoy a relatively good standard of living, and so on.

4.3 On the face of it then, many of the “ingredients” of a high tech cluster are in place: a top rank University for science and engineering; a culture of entrepreneurialism in which individual endeavour is encouraged through both informal networking and the formal provision of specialist support (e.g. specialist property, business services, etc.); and a genuine “sense of place” in which Cambridge itself is implicated in the competitive performance and prospects

of firms. But within this overall picture, how might we characterise activity within the ITCE sectors?

ITCE within Cambridge's high tech cluster

- 4.4 Intentionally, there were similarities in research design between our 1998 survey of high tech firms in the Cambridge sub-region and the survey work undertaken in the course of this assignment and reported in Chapters 2 and 3. The former survey generated some 344 responses and of these, some 195 derived from firms within the Information Technology, Communications and Electronics sectors⁸. Below we consider the extent to which these display evidence of clustering behaviour vis-à-vis other high tech Cambridge firms. First though – and by way of context – it is useful to illustrate some of the characteristics of respondents from the ITCE sectors and to consider these across the two surveys and in relation to other high tech sectors.
- 4.5 From the 1998 survey, it was apparent that something over 80% of respondents from across the ITCE sectors employed fewer than fifty people while 42% employed less than ten. In the Cambridge area, then, the sectors were dominated by small business units. As Table 4.1 reveals, this size distribution was broadly similar to that observed in the 2000 survey. It was also similar to that observed across other sectors in the Cambridge area: when we turn to consider the extent and nature of clustering behaviour, these similarities should be taken into account.

Table 4.1: Size profile of ITCE firms in the Cambridge sub-region

| Employment at local sites | 1998 survey respondents | | 2000 CBI survey respondents | |
|---------------------------|-------------------------|------------|-----------------------------|------------|
| | No. | % | No. | % |
| less than 10 | 81 | 42% | 17 | 55% |
| 10-49 | 81 | 42% | 8 | 26% |
| 50-99 | 13 | 7% | 4 | 13% |
| 100-249 | 14 | 7% | 2 | 6% |
| 250 or more | 4 | 2% | 0 | 0% |
| Total responses | 193 | 100% | 31 | 100% |
| Missing responses | 2 | (excluded) | 1 | (excluded) |

- 4.6 Our larger 1998 survey suggested that 14% of respondents from the ITCE sectors were in-movers to the Cambridge area; this figure was somewhat lower than that reported in Chapter 2 on the basis of the 2000 survey but both point to the high incidence of indigenous firms.

⁸ Respondents which indicated that one or more of the following represented their primary or a secondary sector of activity: telecommunications hardware, electronics and audio, computer hardware, software, telecommunications services

4.7 Similarly, both surveys point to a high incidence of comparatively young firms within the ITCE sectors across the Cambridge area. In interpreting the 1998 survey, it is important to acknowledge that these data are now over 2 years old and this in itself probably explains the apparently lower incidence of firms with origins in the area after 1995. On the basis of the 1998 survey, Table 4.2 also reports the age structure of biotechnology/pharmaceuticals firms – an interesting group against which to contrast. Relative to the ITCE respondents, the younger age profile of this sectoral group is noteworthy. Again, it has implications for the cluster-based analysis that follows.

Table 4.2: Year established in the Cambridge sub-region

| Year established in this area | ITCE firms (2000 responses) | | ITCE firms (1998 responses) | | Biotech/pharma firms (1988 responses) | |
|-------------------------------|-----------------------------|------|-----------------------------|------|---------------------------------------|------|
| | No. | % | No. | % | No. | % |
| Before 1975 | 1 | 3% | 24 | 12% | 0 | 0% |
| 1975-84 | 6 | 21% | 34 | 17% | 6 | 16% |
| 1985-94 | 9 | 31% | 101 | 52% | 19 | 51% |
| 1995 or later | 13 | 45% | 36 | 18% | 12 | 32% |
| Total responses | 29 | 100% | 195 | 100% | 37 | 100% |
| Missing / uncodable responses | 3 (excluded) | | 0 (excluded) | | 0 (excluded) | |

4.8 Another potentially important perspective can be derived by examining the nature of company founders *among those firms that claimed to have been established locally*. In Table 4.3, we have sought to compare the results from the two datasets and also to compare the picture in the ITCE sectors with that in biotechnology. This comparison is not straightforward and the messages from it are not clear, suffice to note that the incidence of university spin-outs seems to be highest among biotechnology/pharmaceuticals firms.

Table 4.3: For respondents that claimed to have been first established in the Cambridge sub-region, characteristics of company founders

| Source(s) of founder(s) where one source was specified | ITCE firms (2000 responses) | | ITCE firms (1998 responses) | | Biotech/pharma firms (1988 responses) | |
|--|-----------------------------|------|-----------------------------|------|---------------------------------------|------|
| | No. | % | No. | % | No. | % |
| University or local research establishment | 1 | 8% | 26 | 17% | 8 | 27% |
| Local firm | 9 | 69% | 55 | 36% | 12 | 40% |
| Other Cambridge organisation | N/A | N/A | 17 | 11% | 2 | 7% |
| Founder from outside Cambridge | 3 | 23% | 56 | 36% | 8 | 27% |
| Total responses | 13 | 100% | 154 | 100% | 30 | 100% |
| Missing / don't know / other / multiple responses | 11 (excluded) | | 12 (excluded) | | 1 (excluded) | |

4.9 The comparison of the 1998 and the 2000 datasets from the Cambridge sub-region’s ITCE sectors suggests broad similarities. Thus we can have reasonable confidence that the nature and pattern of clustering behaviour should be similar. Moving to the larger dataset, we are able to consider the nature and extent of clustering behaviour in the ITCE sector vis-à-vis other high tech sectors from the Cambridge sub-region.

Clustering behaviour in Cambridge’s high tech cluster (based on the 1998 survey)

4.10 As with the survey work reported in Chapter 3, in seeking to analyse responses from our larger dataset, we categorised respondents into three groups depending on the apparent functionality of their relationships to the different tiers within the theoretical cluster. “Co-locators” were again regarded as the residual category while clusterers and firms enjoying agglomeration benefits were defined on the basis of meeting some or all of the following criteria:

Table 4.4: Patterns of co-location: defining criteria

| <i>Clusterers</i> | <i>Firms enjoying agglomeration benefits</i> | <i>Co-locators</i> |
|---|---|------------------------|
| Firms meeting a selection of the following criteria: <ul style="list-style-type: none"> • actively seek to share best practice with local companies • agree totally or partly that there is a satisfactory range of locally based specialist suppliers for our needs • links with technology oriented companies in this area as a source of technology and innovation are important or crucially important • links with Cambridge University / RTOs as a source of technology and innovation are important or crucially important | Firms for which at least half of their workforce comprises graduate scientists/engineers <i>And</i> Agreed in whole or in part with at least one of the following: <ul style="list-style-type: none"> • clearing banks provide specialist support locally • specialist legal advice is available locally • accountant are providing specialist support | Other co-located firms |

4.11 Again there was overlap between the firms labelled “clusterers” and those that met the characteristics of agglomerators: 63 respondents met both sets of criteria. As with the other survey, we opted to group the “pure” clusterers with the clusterer/agglomerators for analytical purposes and for the reasons outlined in Chapter 3.

4.12 Based on these categories of co-location, we can examine the sectoral distribution of respondents according to different patterns of co-location across high tech Cambridge. From Table 4.4, we can observe that some 65% of biotechnology/pharma firms may be regarded as clusterers compared with 46% of firms in the ITCE sectors. The highest incidence of respondents enjoying agglomeration benefits independently of clustering behaviour was seen within the ITCE sector. However it is also noteworthy that on this measure, over 40% of

ITCE respondents were co-located for no apparent functional reason; this proportion was close to double that observed within the biotech/pharma sector.

Table 4.5: Patterns of co-location across different sectors within the Cambridge sub-region

| 1998 Survey | | | | | | |
|------------------------|------|------------|----------------|------------|-------------------------|------------|
| | ITCE | | Biotech/Pharma | | Other high tech sectors | |
| | No. | % | No. | % | No. | % |
| Clusterer | 90 | 46% | 24 | 65% | 56 | 50% |
| Agglomeration benefits | 25 | 13% | 4 | 11% | 9 | 8% |
| Co-locator | 80 | 41% | 9 | 24% | 47 | 42% |
| Total | 195 | 100% | 37 | 100% | 112 | 100% |
| Missing | 0 | (excluded) | 0 | (excluded) | 0 | (excluded) |

- 4.13 There is then a relatively high incidence of clustering behaviour among respondents drawn from biotech/pharma across the Cambridge sub-region. This finding is consistent with other evidence: Lord Sainsbury’s work on biotechnology clusters for instance highlighted – in these terms – the national significance of the Cambridge sub-region while schemes such as the Eastern Region Biotechnology Initiative have attracted a good deal of interest from the business community. A high incidence of clustering behaviour among biotech/pharma respondents is exactly what we would expect and thus a source of confidence vis-à-vis our interpretation of the data for respondents from the bigger and more diffuse ITCE sectors.
- 4.14 But what can we deduce about the nature, pattern and implications of clustering behaviour amongst responding firms from within Cambridge’s ITCE sectors? And within the Cambridge context, is there any evidence to suggest that clustering adds value? On the basis of the larger dataset, we consider the same five proxies as were used in Chapter 3.

Are clustering firms more likely to generate spin-outs or to be derived from spin-outs?

- 4.15 Despite the high incidence of young, small firms within the group of respondents we have defined as “clusterers”, there does seem to be some evidence to suggest that these firms are more likely than others within the ITCE sectors to have spun out businesses; indeed, they were almost twice as likely to have spawned spin-outs as compared to the co-locators which are not apparently functionally linked to the local economy.

Table 4.6: Responses to the question “has anyone left your company and subsequently set up a new business?”

| | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|-----------------------|--|------------|------------------------|------------|-------------|------------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No. | % | No. | % | No. | % |
| No spin-outs | 60 | 67% | 19 | 79% | 66 | 83% |
| One or more spin-outs | 30 | 33% | 5 | 21% | 14 | 18% |
| Total | 90 | 100% | 24 | 100% | 80 | 100% |
| Missing responses | 0 | (excluded) | 1 | (excluded) | 0 | (excluded) |

4.16 Equally, while around 70% of clusterers (and, indeed, firms that derive agglomeration benefits) claim to have local founders (and thus are themselves local spin-outs), the corresponding figure for other co-locators is close to 40%. The inference, then, is that a functional relationship with the local economy (whether through clustering or agglomeration) is more likely within firms that can claim a local genesis.

Table 4.7: Responses to the question “Did any of the company founder(s) come directly from employment with Cambridge University, a Cambridge Research Establishment or another company in the Cambridge area?”

| | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|--|--|--------|------------------------|--------|-------------|--------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No. | % | No. | % | No. | % |
| No company founders from Cambridge | 28 | 31% | 7 | 29% | 43 | 57% |
| Some of the company founders came from Cambridge | 62 | 69% | 17 | 71% | 33 | 43% |
| Total | 90 | 100% | 24 | 100% | 76 | 100% |
| Missing responses | 0 | (excl) | 1 | (excl) | 4 | (excl) |

Are clustering firms more likely to be growing firms?

4.17 On the basis of our survey evidence, over 60% of respondents from the Cambridge sub-region’s ITCE sectors have a profile of employment growth. However there are some noticeable variations across our three categories of co-location. On the face of it, the growth profile is strongest amongst those firms deriving agglomeration benefits. However, as Table 4.8 confirms, there is a high incidence of recent start-ups/in-movers amongst the group of clusterers. If the recent start-ups/in-movers are excluded, the growth profiles of the clusterers and the firms deriving agglomeration benefits are actually very similar. The group that is quite different is the co-locators with no functional relationship to the local economy. As Table 4.8 reveals, nearly a third of respondents in this group have an employment growth profile characterised by stasis or decline: the corresponding figures for clusterers and agglomerators are 13% and 12% respectively. Functional relationships with the local economy – whether active or passive – do then seem to be correlated with a positive growth performance.

Table 4.8: Distribution of respondents by growth profile (in terms of employment at this site)

| Growth profile 1996-2001 | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|------------------------------|--|-----------|------------------------|-----------|-------------|-----------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No | % | No | % | No | % |
| Decline | 3 | 4% | 0 | 0% | 8 | 10% |
| Growth | 53 | 62% | 20 | 80% | 47 | 60% |
| Recent start-up/in-mover | 21 | 25% | 2 | 8% | 6 | 8% |
| Static | 8 | 9% | 3 | 12% | 17 | 22% |
| Total | 85 | 100% | 25 | 100% | 78 | 100% |
| Inconsistent or missing data | 5 | (exclude) | 0 | (exclude) | 2 | (exclude) |

Are clustering firms more likely to be strong exporters?

4.18 The analysis of export performance largely corroborates the findings above. The firms which derive agglomeration economies appear to have the strongest profile while nearly half of the co-locators rely on exports for less than 5% of sales. Almost a third of clusterers rely on exports for over half their sales. And given the high incidence of small and young firms, arguably this may suggest a stronger export profile than might have been achieved had functional relationships with local firms and institutions been weaker.

Table 4.9: Distribution of respondents by export profile

| Exports as % of sales | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|-----------------------|--|-----------|------------------------|-----------|-------------|-----------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No | % | No | % | No | % |
| Less than 5% | 24 | 30% | 5 | 22% | 32 | 44% |
| 5%-20% | 17 | 21% | 5 | 22% | 20 | 28% |
| 21%-50% | 14 | 18% | 4 | 17% | 9 | 13% |
| 51%-75% | 11 | 14% | 3 | 13% | 6 | 8% |
| More than 75% | 14 | 18% | 6 | 26% | 5 | 7% |
| Total | 80 | 100% | 23 | 100% | 72 | 100% |
| Missing | 10 | (exclude) | 2 | (exclude) | 8 | (exclude) |

Are clustering firms more likely to engage in R&D?

4.19 In terms of R&D the findings are again similar: clusterers and firms deriving agglomeration benefits from a location in the Cambridge area are more likely to devote a higher proportion of turnover to R&D than co-located firms. Indeed, across respondents from the ITCE sectors, close to half of the latter group devote less than 5% of their turnover to R&D in a typical year. The implication, *ceteris paribus*, is that over the medium-long term, investment in R&D should fuel enhanced growth and thus the long term performance of firms with a functional relationship to the Cambridge economy should outpace that of firms whose attachment to the place is – apparently – much less.

Table 4.10: Distribution of respondents by R&D profile

| R&D as % of sales | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|-------------------|--|------------|------------------------|------------|-------------|------------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No | % | No | % | No | % |
| Less than 5% | 26 | 29% | 7 | 33% | 36 | 49% |
| 5-24% | 40 | 45% | 6 | 29% | 32 | 44% |
| 25-74% | 12 | 13% | 4 | 19% | 5 | 7% |
| 75% or over | 11 | 12% | 4 | 19% | 0 | 0% |
| Total | 89 | 100% | 21 | 100% | 73 | 100% |
| Missing | 1 | (excluded) | 4 | (excluded) | 7 | (excluded) |

Are clustering firms more likely to have developed international collaborative relationships?

4.20 On the basis of our 1998 survey evidence, there is some evidence to suggest that clusterers and firms deriving agglomeration benefits attach greater importance to international collaboration than do other groups of co-locators (Table 4.11). Coupled with the insights regarding export performance and growth (reported above), this does suggest that rather than being the ingredients of parochialism, strong links with the local economy actually equip firms to perform more strongly on a global stage. And if it is to be regarded as significant in terms of UK industrial policy, this finding should be seen as an important one in terms of the implications of clustering and agglomeration effects.

Table 4.11: Distribution of respondents according to the importance attached to international collaboration

| Importance of international collaboration | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|---|--|------------|------------------------|------------|-------------|------------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No | % | No | % | No | % |
| Very important / important | 41 | 47% | 13 | 52% | 24 | 33% |
| Quite important / neutral / Quite unimportant | 27 | 31% | 7 | 28% | 17 | 23% |
| Unimportant / Very unimportant | 20 | 23% | 5 | 20% | 32 | 44% |
| Total | 88 | 100% | 25 | 100% | 73 | 100% |
| Missing | 2 | (excluded) | 0 | (excluded) | 7 | (excluded) |

Does clustering add value and what are the implications?

4.21 On the basis of the evidence derived from our 1998 survey of high tech businesses in the Cambridge sub-region, there is evidence to suggest that, within the ITCE sectors, firms which engage in clustering behaviour and/or derive agglomeration benefits do perform better – across a range of measures – than firms with few functional linkages to the local economy. This finding largely corroborates the arguments of the previous chapter. However on the basis of the larger dataset and in the Cambridge context, we have been able to unpack these relationships further. This is useful because we can explore more closely the characteristics

of “the place” from which the groups of Cambridge clusterers/agglomerators apparently derive competitive advantage.

4.22 At the start of this chapter, we summarised three characteristics of the Cambridge high tech cluster *in toto*: brand, culture and functionality. By way of conclusion, it is useful to reflect further on these from the perspective of our different groups of ITCE firms. In this way, we are able to derive some insight into two critical questions:

- what are the pressure points within the Cambridge high tech cluster that could – in time – undermine its performance?
- are the defining characteristics of the cluster - brand, culture and functionality – spatially circumscribed? What are the implications in terms of drawing general policy inferences from the specifics of Cambridge?

Limits to the Cambridge cluster: accommodating pressures from within

4.23 On the basis of the survey evidence presented above, ITCE firms with the characteristics of clusterers and/or agglomerators seem to perform better than the group we described as co-locators. *Ceteris paribus*, then, we would expect external growth constraints to be a bigger issue for the first two groups than the third. From our survey, we have some evidence to test this proposition. However, as the data presented in Table 4.12 reveal, the severity of external pressures does seem to be rather different:

- external constraints seem to be strongest for the firms we have labelled “agglomerators” – the firms that rely on the local economy but in a more passive sense. In part this is explicable in terms of their growth profile. But it may also be explicable through the absence of mechanisms to address the constraints which are external to the firm and beyond its ability to influence directly but characteristic of the area as a whole (a “public” good)
- external constraints are an issue for a smaller proportion of *clustering* firms. This may be because of a weaker growth profile from a lower base. However it is also conceivable that at least some of these firms – through clustering behaviour – have developed mechanisms to address these constraints. It is however beyond the scope of the survey evidence to test causality in this manner.

Table 4.12: Firms' responses to constraints on the growth of their business

| | ITCE Sectors in the Cambridge sub-region (1998 survey) | | | | | |
|---|--|--------|------------------------|--------|-------------|--------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No | % | No | % | No | % |
| Lack of premises is constraining growth | 23 | 26% | 9 | 36% | 19 | 25% |
| Lack of premises is not constraining growth | 67 | 74% | 16 | 64% | 58 | 75% |
| Total | 90 | 100% | 25 | 100% | 77 | 100% |
| Missing | 0 | (excl) | 0 | (excl) | 3 | (excl) |
| Recruitment difficulties are constraining growth | 44 | 49% | 18 | 72% | 42 | 55% |
| Recruitment difficulties are not constraining growth | 46 | 51% | 7 | 28% | 35 | 45% |
| Total | 90 | 100% | 25 | 100% | 77 | 100% |
| Missing | 0 | (excl) | 0 | (excl) | 3 | (excl) |

Limits to the Cambridge cluster: spatial perspectives

4.24 The hypothesis that clustering firms have developed mechanisms through which the constraints of Cambridge's tight labour market and premises deficit are being addressed is potentially an important one and it arguably deserves further investigation. However although clustering behaviour might effectively delay the point at which "Cambridge is full", the spectre of an absolute limit to growth remains a real one. The issue that we must then confront is the extent to which the clustering/agglomeration benefits associated with a Cambridge location are restricted to Cambridge itself (i.e. the city), the wider sub-region (up to a radius of, say, 20 miles) or – potentially – a wider geographical area. Our survey evidence can provide two useful insights.

4.25 The first, as reported in Table 4.13, concerns the current locations of firms from within the different categories of co-location. Across the ITCE sectors, about 50% of clusterers and agglomerators are either located in Cambridge itself or on Cambridge Science Park or St John's Innovation Centre (both of which are about two miles from the city centre). The corresponding figure for the co-locators is 30%. Conversely, over 60% of co-locators are situated in the geographical periphery of the Cambridge sub-region compared to around a third of clusterers and agglomerators. The implication then is that it is not impossible to derive cluster/agglomeration benefits from outer locations but that it is much more likely (and probably much easier) to do so from a more central location.

Table 4.13: Current location of ITCE firms

| Location | ITCE Sectors (1998 survey) | | | | | |
|-------------------|----------------------------|--------|------------------------|--------|-------------|--------|
| | Clusterer | | Agglomeration benefits | | Co-locators | |
| | No. | % | No. | % | No. | % |
| Cambridge | 34 | 38% | 9 | 36% | 21 | 26% |
| CSP/SJIC | 10 | 11% | 4 | 16% | 3 | 4% |
| Inner villages | 13 | 15% | 4 | 16% | 6 | 8% |
| Outer - NW/NE | 18 | 20% | 3 | 12% | 31 | 39% |
| Outer - SW/SE | 14 | 16% | 5 | 20% | 19 | 24% |
| Total | 89 | 100% | 25 | 100% | 80 | 100% |
| Missing responses | 1 | (excl) | 0 | (excl) | 0 | (excl) |

4.26 Our 1998 survey also sought to examine whether firms were intending to accommodate any of their growth elsewhere. In the context of their stronger growth profile, it is perhaps unsurprising to report that clusterers and agglomerators were more likely to be considering re-locating growth than co-locators. Although the data on the destination locations was patchy, we were nevertheless able to observe that the proportion of clusterers aiming to expand at other local sites was higher than among agglomerators and for the latter group, destinations abroad were cited more frequently. Although inconclusive, this suggests a continuing commitment to the Cambridge area amongst clustering firms and is consistent with the notion of a spatial limit to clustering; our data is insufficiently detailed to be able to specify this more precisely.

Brand, culture and functionality

4.27 What, then, are the implications in terms of branding, culture and functionality? From the arguments presented in this chapter, we can make a number of concluding observations:

- our evidence seems to suggest that clustering behaviour is integral to the functionality of Cambridge. Local linkages do seem to enhance competitiveness and to equip comparatively small and young firms to operate on a global stage. Moreover, the fact of clustering may help to address some of the underlying constraints (e.g. recruitment problems); at any rate, firms which do not actively cluster are more likely to regard the constraints as a problem despite their weaker growth profile
- in the ITCE sectors, there seems to be a high level of attachment to Cambridge city (and CSP/SJIC). This is consistent with the notion of a “bicycle economy” and we know that this is a particular feature of the software sector: a tight labour market and a plethora of local firms reduces the risks of entrepreneurialism and this is a critical foundation for the culture of innovation that defines the cluster as a whole

4.28 The relationship between clustering behaviour and Cambridge as a brand, culture and a source of functionality is a mutually reinforcing one. Without dynamic businesses and new start activity, the perceived attributes of the place will quickly lose content and their value to firms will erode. Agglomerators reap the benefits of the key Cambridge attributes in a relatively passive manner but, arguably, are only able to do so because clusterers have created those attributes and are now sustaining them.

4.29 This, however, begs a wider question that emerged strongly from the consultation seminars held to discuss the findings of our work. How realistic is it to draw conclusions on business and spatial dynamics based on analysis that is, in most respects, grounded at a point in time? The specific point that emerged from our consultations, in which we engaged senior figures

with an overview of the evolving business scene over many years, is that it seems highly likely that:

- a number of the sizeable and established firms that are now performing strongly as agglomerators were, at an earlier stage in their business development, actively engaged in cluster behaviour, i.e. networking strenuously within the local area.

4.30 Thus, as well as recognising that many of the policies which respond to the needs of agglomerators will also be of direct help to clusterers, we may also suppose that policies specifically aimed at clusterers will, indirectly at least, be to the benefit of agglomerators – roughly doubling the number of firms that they may, over time, impact upon.

5. Messages for public policy

Overview

5.1 The size of the samples that we were able to achieve and the inherent complexities of the topics being explored, inevitably, mean that there are caveats attached to many of our findings and preliminary conclusions. Nonetheless we believe that they justify the following propositions as the basis for policy:

- encouraging and assisting smaller and younger ITCE firms to develop networking skills and build relationships within Tiers 1, 2 and 3 is likely to be of benefit in most locations where there is an appreciable concentration of relevant firms. Indeed the development of competence in networking is also likely to be valuable for firms in areas with a lower density of ITCE businesses
- firms that currently are content to enjoy the agglomeration benefits that clusterers sustain may need to be encouraged/assisted to engage more actively into key networks. The specifics of the case will vary from area to area, but the underlying logic is that agglomerators can themselves benefit indirectly
- firms of less strategic relevance to their neighbours, should be encouraged to consider the benefits that they could derive from fuller participation in local networks. This requires awareness raising and keeping co-locators informed rather than actively courting them
- the specific approaches that are appropriate will vary from area to area depending on their current endowments of firms, institutions and other key resources. There is no standard answer, though there may well be a standard checklist of likely participants
- specialist property provision is important for clusterers and agglomerators, partly because of its functionality and partly because of its visibility.

Varieties of place

1. *Different places “work” as a focus of ITCE activity for quite different reasons:*

For example, in the M4 area, the national and international communications infrastructure is functionally important whereas on-going University linkages are more prominent in the Cambridge sub-region ⇒ Need to respond to the particular needs of particular places: the temptation to have a single policy approach to “places that are (or could be) clusters” should be avoided

2. *Critical questions surround the spatial scale at which clusters are best identified and nurtured:*

For example, we have talked of the “M4 area” as a whole, yet within it we have identified much more localised specialisms – microchip design in Swindon, ITCE activity associated with avionics in Farnborough, Fleet and Basingstoke, and so on ⇒ Different aspects of the “place as cluster” need to be supported at different spatial scales. For example, “place as brand” justifiably embraces the M4 area as a whole whereas initiatives to develop business networking should probably reflect the more localised specialisms

3. *Approaches to infrastructure development and policies for the provision of premises and houses have an important bearing on the effectiveness with which ITCE firms can engage in clustering behaviour:*

In the Cambridge area (Chapter 4), it was apparent that ITCE firms located in the centre of Cambridge were more likely to engage in clustering activity than firms elsewhere. However physical constraints may render *in situ* expansion impossible. It is unclear that clustering behaviour would occur as effectively from more peripheral locations ⇒ Firms’ needs to engage in clustering activities should be regarded as a material factor in determining planning permissions (this point emerged very clearly from our consultation workshops)

Varieties of place (cont)

4. *Flagship science and/or business parks can do much to support the brand/image of “ the place” and – as a result – the development of the cluster:*

Our study has revealed that in each of the three comparator areas, science and/or business parks have been a spur to cluster development: Manchester Science Park (in the North West), Stockley Park (in the M4 area) and Cambridge Science Park are three examples ⇒ Science Park developments should continue to be supported in a manner which is consistent with local cluster potential from within the business base

5. *The effectiveness of the communications infrastructure is integral to cluster performance:*

Particularly in the M4 area, cluster development has been premised on the communications infrastructure. Should this cease to operate effectively, the continued dynamism of the cluster as a whole could be threatened and this would have important implications for the UK as a whole ⇒ Notwithstanding the importance of local linkages within cluster dynamics, the communications infrastructure must be functional

6. *The functionality of “clusters as place” depends in part on the social infrastructure; the surrounding issues should not be overlooked:*

Our work in the Cambridge area suggests that the cluster’s functionality is in part attributable to the fact that highly skilled (and potentially highly mobile) individuals consider the quality of life to be good. Housing availability and its quality/cost equation is a key element in this ⇒ In seeking to develop clusters, it is important not to neglect housing and the social infrastructure – schools, hospitals, leisure amenities and so on. These may be critical in terms of retaining the workforce on which business competitiveness depends

The business model

1. *Firms which nurture and harness clustering and/or agglomeration benefits generally perform better than those that do not:*

In Chapters 3 and 4, across a variety of performance criteria, we observed that firms which are functionally related to their local economy generally have the strongest long and short term growth prospects ⇒ Networking and other initiatives could be developed so as to encourage co-locators to engage in clustering behaviour. The Eastern Region Biotechnology Initiative (ERBI) provides one example of an approach that has worked, but there are others

2. *The benefits deriving from clustering behaviour seem to be especially important for small and/or new firms:*

The argument has been made that the advantages to be derived from clustering behaviour might be especially strong among new and small businesses ⇒ Policies to support entrepreneurialism and small firm development should nurture the opportunities within the clustering model. In particular, the new SBS should be encouraged to respond

3. *The benefits of agglomeration that are enjoyed by larger firms within the ITCE sector can be created through the clustering process:*

Many larger firms are assiduous agglomerators, harnessing the functionality of a local economy but without contributing to it in a proactive sense ⇒ Larger firms should be encouraged to engage in clustering behaviour, not least because it would help to create the agglomeration benefits they are seeking to harness

4. *Clustering behaviour is not synonymous with parochialism; rather, it can enhance firms' behaviour on a global stage:*

We have seen that clusterers are generally strong exporters and many also claim to have developed strong international collaborative relationships ⇒ The development of local clustering behaviour should be encouraged as a means of equipping firms to operate effectively in an international arena

5. *Networking groups and initiatives have an important role to play but – apart from a pump priming role – they should be led by the private sector:*

Our survey evidence suggested that many firms are already part of networking groups and that there is scope for the development of new ones ⇒ Measures should be put in place to kick-start the formation of new groups. However these must be “owned” by the private sector otherwise there is a danger that they are simply regarded as “talking shops”

The limitations of analysis and advantages of action

- 5.2 The research reported here has called for substantial research resources and involved the time of busy people in ITCE firms. It has developed a way of looking more closely at concentrations of sectoral activity that have been identified through mapping exercises. It explores whether assistance, to cluster behaviour through business processes and cluster development through positive frameworks for physical growth, can be justified. Our conclusion, in both instances, is that they can be justified and should be pursued, but through a pragmatic rather than a strictly prescriptive approach – perhaps guided by the RDAs’ Regional Economic Strategies.
- 5.3 This does not imply, however, that our research work should simply be replicated as a first step in considering the specific needs of particular areas. Rather, we suggest that the approach to the **business model** should be characterised as learning through doing – using some of the concepts that have emerged from our work and that of others – as a basis both for firms to understand their own situations better and for policy makers to observe what focused initiatives on target firms and institutions in defined areas are achieving as they are being implemented.
- 5.4 So far as the **policies for places** are concerned, we have given some pointers that should be taken into account by those responsible for developing and operating the regional, structure and local plan framework. But again there are no simple prescriptions. Dynamic ITCE firms are not keen to espouse a slash and burn approach to development. They need to attract and retain internationally mobile staff and they in turn are attracted by a quality environment in a rounded sense, encompassing social considerations, environmental factors, workplace amenity and mobility. However, we feel that our work does indicate that the approach should be to enable growth through investment in, broadly-defined, infrastructure and that there will be substantial costs if the attempt is made to constrain the business dynamic.