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***URBAN REVIVAL AND KNOWLEDGE-INTENSIVE  
SERVICES: THE CASE OF THE ENGLISH  
'CORE CITIES'***

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## **Urban revival and Knowledge-Intensive Services: The case of the English 'Core Cities'<sup>1</sup>**

by

Peter Wood<sup>2</sup>

### **Abstract**

The growth of tradable, expert knowledge intensive business services (KIBS) is a largely urban phenomenon, favouring larger cities and their regions. This has important implications for urban economic development, not just because of the growth and quality of KIBS employment itself, but also their influence on the success of other sectors. The regional development of KIBS reflects demands from other service, manufacturing, and trading functions, MNCs and other large firms, growth-orientated SMEs, regionally distinctive consumer and cultural sectors, and public agencies. The level and range of KIBS supply depends on a regional 'critical mass' of such specialist demands, as well as regional institutional and regulatory support. UK cities outside London face much greater challenges from the KIBS dominance of the capital than do comparable cities elsewhere in Western Europe. They thus need especially effective strategies to promote the coherent development of tradable knowledge-based assets, extending across both the commercial and public sectors. This paper examines the representation of KIBS in these 'core' English cities and their future prospects as nodes in the networked, knowledge-based economy.

### **Context**

The Geography of the New Economy is commonly thought to have been expressed mainly through the emergence of 'New Industrial Districts', or their various near-synonyms (Scott, 1988; Harrison, 1992; Markusen, 1996). As a result, researchers and policy-makers have become preoccupied with fostering clusters of interdependent

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activity, hoping to reproduce the success over 30-50 years of exemplary regions such as Silicon Valley. In the past decade, the Porter 'branding' of the cluster concept has reinforced this process, while incorporating a wider array of conditions, (Porter, 1998, 2000; Martin and Sunley, 2003). 'Evolutionary' concepts have also been adapted to explain the cumulative development and transformation of regional economies. These focus on regional collective learning between key actors and institutions, especially when supporting technological change, based in processes of historical continuity, social networking and chance (Boggs and Rantisi, 2003; Bathelt and Glückler, 2003; Barthelt and Boggs, 2003).

One danger of these various 'regional innovation system' formulations, especially in their policy application, is a tendency for special cases to become the basis for general models, normatively applied to any regional situation (Markusen, 1999, 2003; Martin and Sunley, 2003). Contrary situations tend to be neglected, for example those that create the 'lock-in' to old ways that has been the downfall of many industrial regions. To avoid this fate, the quality of various types of external production and market relations are important to regional adaptability. Technologically successful regions must be able to attract outside investment and adopt imported technologies. Regional knowledge exchange must also draw on outside production and market intelligence, much of it codified, but some personalised and tacit (Sturgeon, 2003). It has also been established analytically that the spatial concentration of production depends as much on trade as on economies of agglomeration (Fujita, et.al., 1999). The interactions between local capacities and these 'extra-regional' sources of competitiveness are all being reinforced by globalisation trends.

Such complementarity between the 'local' and the global' is especially important in urban regions, through the knowledge-intensive exchanges upon which they nowadays most depend (Amin and Thrift, 1992, Swyngedouw, 1996, Scott, 1998, Yeung, 1998). If it is possible to identify elements of a 'new economy' in Europe over the past 20 years, they are concentrated in and around some of its cities. These have been its most

transformed and economically dynamic regions. In the UK, developments have been particularly concentrated into London and nearby regions, but on the continent they have been more dispersed throughout the urban system.

This situation provides the context for the recent 'Core Cities' initiative in the UK, which is attempting to address the lack of economic success in recent decades of the major English cities outside London compared with similar non-capital cities elsewhere in Europe. The initiative has focused on a varied group: Manchester, Birmingham, Leeds, Liverpool, Sheffield, Newcastle, Nottingham and Bristol.<sup>3</sup> These were the core English manufacturing/port cities of the industrial revolution and of post-World War II recovery but, like London, they have been badly affected by deindustrialisation since the 1970s. Recent comparative data suggest that non-capital continental cities are now generally more prosperous and productive, and also lead their national economies in these respects (Office of the Deputy Prime Minister, 2004). In contrast, the English cities appear to have lower per capita GDP than those in Germany, Scandinavia and Italy, and many in France and the Netherlands, and also lag behind national productivity. Figure 1, from the ODPM Report, compares the data for some English cities with a range of European comparators.<sup>4</sup>

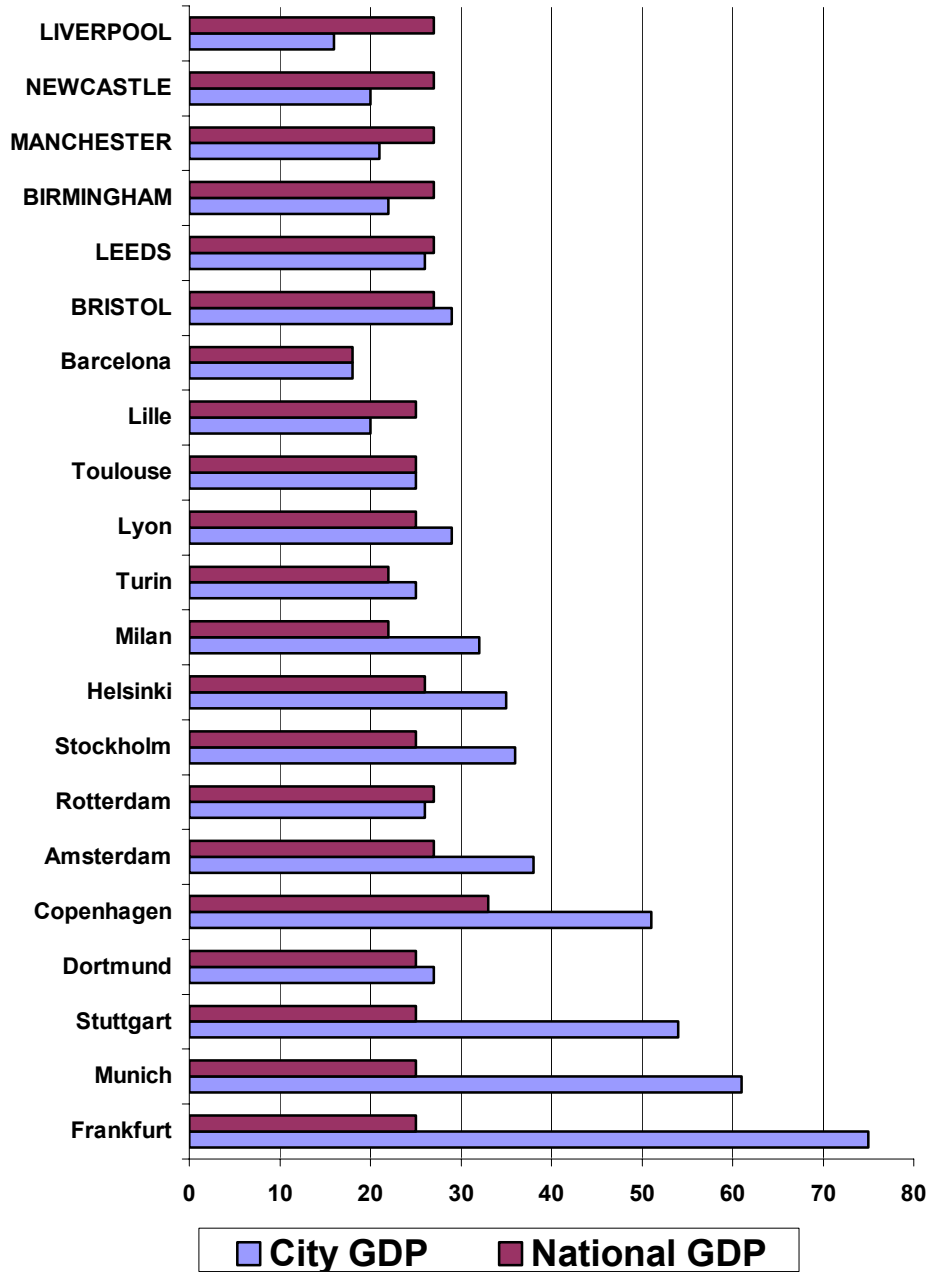
Other characteristics, including workforce skill levels, connectivity, and attractiveness to business, suggest possible reasons for this productivity disparity (Office of the Deputy Prime Minister, 2004). They arise from such structural features as the socio-economic legacy of manufacturing decline, and perhaps the English cities' growing peripherality in modern European economic space. It is also possible that Figure 1 is too pessimistic. The city GDP data used by the OPDM Report also vary widely between the continental cities, reflecting their very different histories and economic functions. Some are capital cities (Helsinki, Stockholm, Copenhagen). Others are dominant national economic centres: Milan, Amsterdam and Frankfurt, for example, engage in some of the

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<sup>3</sup> In Figure 1, the city data are based on a survey by Barclays Bank, with national data from Eurostat. The study does not include Scotland, with its separate administrative arrangements.

<sup>4</sup> London and, in Scotland, Edinburgh have GDP pc above the UK average, comparable to Stockholm and Helsinki, and Glasgow's is higher than Bristol.

**Figure 1: City and National GDP pc ('000Euro) 2001**



same global roles on behalf of their countries that benefit London within the UK. The highest gross productivity is found either in such international trading cities or in the two dominant modern German industrial centres of Stuttgart and Munich. The poor performance of the northern English cities nevertheless appears consistent, particularly in lagging behind national productivity levels. They also seem not to have attracted or developed significant new-technology sectors in manufacturing. As measured by the EU's 'Innovation Scoreboard', only the Bristol region has a technological profile that might resemble the most innovative continental cities (Figure 2).<sup>5</sup> The fortunes of cities, however, are more complex than any one-dimensional explanation might suggest. Technological innovativeness is only one part of urban or regional economic success, and may not even be essential to it.

In 'evolutionary' terms, the core cities need to foster a new suite of tradable activities around which to focus key actors, institutions and relationships. These are unlikely to be based in any specifically technological or manufacturing revival. Cities facing modern economic restructuring, must promote all the knowledge-intensive assets that are likely to guide their future national and global roles.<sup>6</sup>

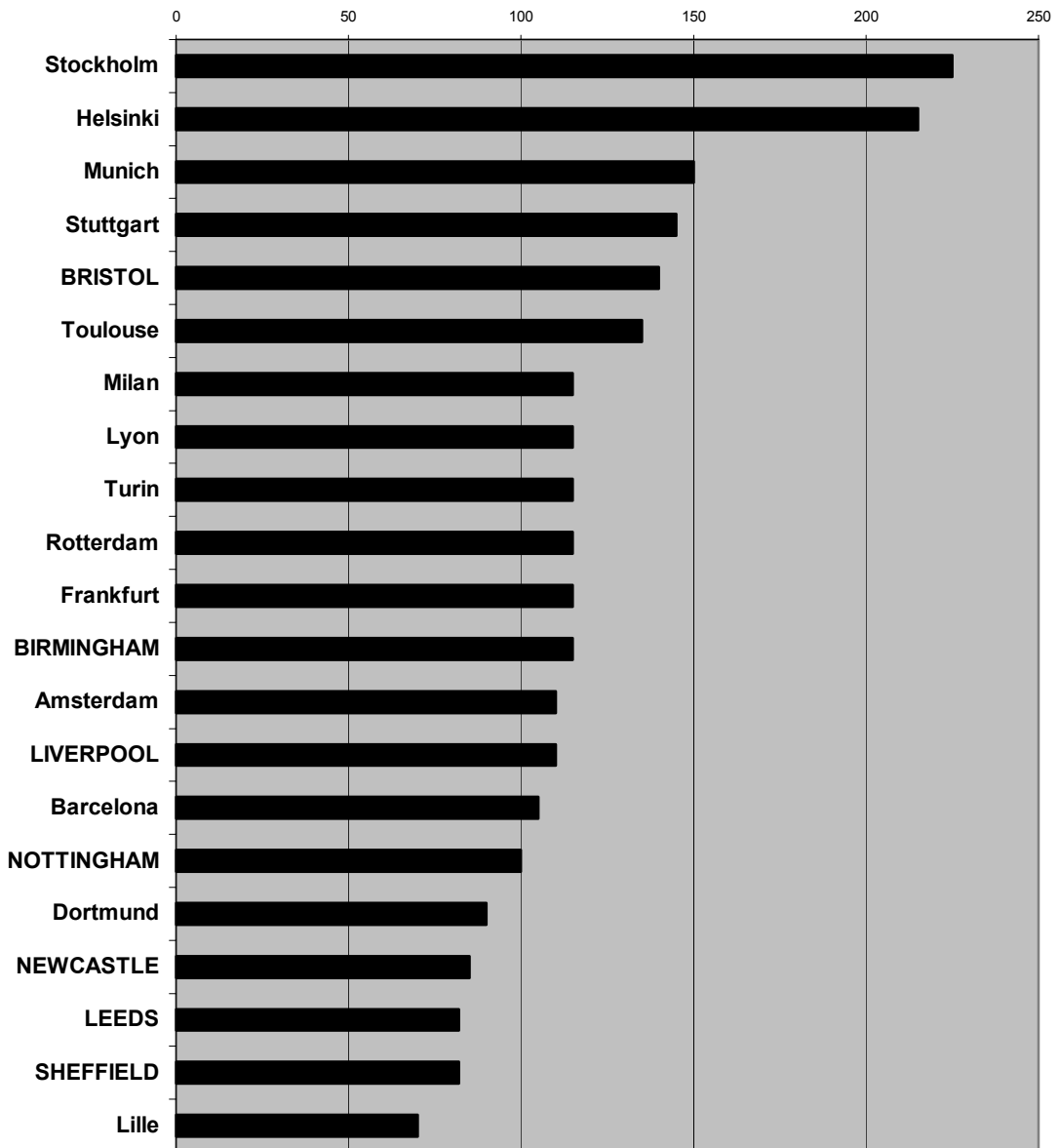
This paper is based on a preliminary analysis of the scale and structure of these assets. The core cities' prospects need to be built on their inherited strengths and weaknesses in knowledge-based adaptability and innovation, which today are predominantly non-technological and service-based (Wood, 2005). New technologies will need to be embraced, but will rarely come from distinctively local sources. London appears to have made the necessary transition since the crisis of the 1980s on the basis of its unique national and international trading inheritance. The Core Cities study argued that the

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<sup>5</sup> See EU (2002). The measures are for the regions in which the cities are located. The Index for London is 100, South East England 150, and Scotland 102.

<sup>6</sup> The UK Office of the Deputy Prime Minister (ODPM) has recently identified six 'drivers' of urban competitiveness: innovation, human capital, economic diversity, connectivity, strategic decision-making capacity, and quality of life factors (ODPM, 2004). These each relate to the capacity to sustain and ability to exploit a wide range of knowledge-based functions, combining local assets effectively with outside ideas, capital and expertise.

Figure 2: EU City regions: Innovation scores





other English cities have yet to make the most of their potential, especially in the light of the recent revival of London. Their future will require a particularly conscious move towards greater private and public sector coordination, for example to ensure an adaptable, trained, high income, socially inclusiveness workforce, and to improve transport connectivity.

## **1. Service skills and the adaptability of cities**

An economy's adaptability to change, whether through technological or non-technological innovation, depends on how effectively new divisions of labour evolve in response to shifting relationships between productive sectors and between these and market opportunities (Beyers, 2002, Wood, 2002b). Regional productivity and competitive differences are therefore likely to reflect different knowledge-based capacities to respond to change in all forms. These processes require new arrays of expertise to be assembled, adapted and applied within and between various agencies.<sup>7</sup> Even for technologically-initiated innovation, technological skills are only one component supporting change. A much more diverse range of inputs are needed to select and adapt technology to its many user applications. The potential for change even of technology therefore depends on the effective application of service skills<sup>8</sup>. This is likely to be even more the case for non-technological management, consumer and regulatory adaptability, especially in service-intensive urban regions.

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<sup>7</sup> At the international scale, after analyzing the widening productivity gap between the USA and Europe in the late 1990s Salvatore defines the 'new economy' as, effectively, 'new technology plus flexibility in the ability to change' (Salvatore, 2003). Feldstein attributes higher US productivity improvements to the faster spread of IT to white collar, management, sales, purchasing, design and accounting functions in the service sector and 'non-production' elements of manufacturing. (Feldstein, 2003).

<sup>8</sup> Information and communications technology (ICT) activities themselves in the UK are dominated by services such as computer-related activities, telecommunications, wholesaling and renting. In 2000 these contributed a GVA at current basic prices of £46bn, compared with less than £14bn from ICT manufacturing. About half of ICT value added goes to intermediate demand in other sectors, a quarter is exported, and one seventh invested, mainly in the service sector. Although much smaller than ICT goods trade, ICT services also showed a £2.8bn export surplus (1.8 exports /4.6 imports), compared with over a £9bn goods deficit (48.0/38.7) (UK Input-Output Analyses, 2002, Office of National Statistics, Section 1).

Analysis of the adaptability of regions is obviously fraught with problems, and various employment-based surrogate measures of their 'knowledge-base' are commonly employed. It is not yet possible to use even these measures for detailed international comparisons within Europe.<sup>9</sup> While, as we shall see, this evidence reveals significant quantitative deficiencies in core city knowledge-based capacities, especially compared to London, much more detailed enquiry would be needed to understand the economic adaptability they now need to foster. London's revival, for example, has been based essentially on a reassertion over the past 20 years of its historic range and flexibility of commercial and public sector expertise, in response to growing international market opportunities. This has been based mainly in business and financial services, transportation and trade, and the cultural and consumer services, including tourism. They have succeeded in an environment that encourages international investment, attracts and effectively deploys a large, well trained and experienced labour force, and encourages competitive management and marketing practices. London's size and diversity also mean that it can support a great deal of competitive failure, and trial and error learning. These qualities arise from the traditional benefits of agglomeration, including the scale of local demand and support for competitive specialisation within the city region, as was the case for the core cities in their industrial heyday. Nowadays, however, they must respond to expanding inter-regional and international tradability in knowledge-based expertise. For this, they require knowledge-based regional specialisations that can also be traded and exchanged with other city regions, internationally as well as nationally.

The English core cities, like their continental equivalents, lack London's degree of scale, scope and slack.<sup>10</sup> This places a greater premium on the effective coordination of

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<sup>9</sup> Eurostat is developing an Urban Audit across the EU, including those countries that joined in 2004, to enable comparability of data between 258 cities with populations of more than 250,000. So far (July 2004) only general and incomplete data for resident economic activity are available, with no workplace data (Eurostat Press Release, 25 June, 2004).

<sup>10</sup> The populations of the defined core cities in 2001 ranged from 976k and 819k each for Birmingham and Manchester to 381k and 439 in Bristol and Liverpool. Central London had 1.4 millions (see Annex 2).

the assets they do possess, drawing on the skills of large and small firms, service and manufacturing sectors, and private and public agencies. In this respect the continental cities seem to benefit from their relative administrative and financial autonomy (Le Galès, 2001). Another advantage may be a high quality of public investment in physical, welfare and cultural infrastructure, which many business surveys show to be important in attracting and retaining investment. In England, where the national urban system is so dominated by the capital, the need for effective urban economic governance is probably even greater. Nevertheless, during the latter half of the twentieth century the English cities became more dependent on central government finance and development directives than cities in any comparable country.<sup>11</sup>

Since the 1980s, the UK has offered the most 'advanced' neo-liberal experiment of all EU member states, most vociferously advocating restructuring towards the 'new economy'. Whatever the benefits in terms of low inflation, measured unemployment, or even international competitiveness, the dominant geographical outcome has been to fuel regional inequality, favouring the London and South Eastern economies (including adjacent areas of East Anglia, the Midlands and the South West). This trend is not simply the 'North' losing its old manufacturing base, while the 'South' structurally benefits from new technology and associated services. Neither has any general technological leadership been created, since the UK remains a relative laggard in the commercial applications of innovation (Department of Trade and Industry, 2003). Instead, the UK now demonstrates the geographical consequences of a politically centralized, deregulated knowledge economy, boosting London's nexus of service exchanges, increasing its economic control over the rest of the UK, and extending its international, including global reach. Since Allen suggested in the early 1990s that a new service-based 'regionalized mode of production' was increasingly detaching the

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<sup>11</sup> UK cities during the 1980s became, 'the most severely constrained in the whole European Union' by financial centralization and privatization (Le Galès, 2001, 250). For example, although there were similar shifts in other countries, including Germany, by 1995 UK local taxes raise only 14% of non-borrowing income, compared with over 40% in Scandinavia, 54% in France, and 25% in Italy.

South East from the rest of UK, the trends he identified have continued, through knowledge-based financial and business services, high technology manufacturing and services, consumer-orientated production, and public sector investment in defence, R&D and infrastructure (Allen, 1992; Simmie, et.al, 2002). This is the challenge that the international status of the English core cities now face. What is their capacity to respond?

## **2. The Knowledge-intensity of the Core City Regions**

The representation of knowledge-intensive functions in the core cities and their regions, including business service, cultural and creative, and high technology activities, is obviously an important starting-point in examining core city economies.<sup>12</sup> Direct comparisons of the scale and structure of the knowledge base of the core cities and their regions, and of central and Greater London, can be made only by using employment data. These are available from the Annual Business Inquiry (ABI) on the basis of 4-digit sector-based SIC classes for 1998-2002.<sup>13</sup> The following components of the 'knowledge economy' in the core city regions have been examined (see Table 1):

- 1) Knowledge-intensive business services (KIBS);
- 2) 'Creative' activities, including publishing, computer and other technical services, artistic and media activities and advertising;
- 3) High technology manufacturing and services (based on Butchard 1987);
- 4) Higher education.

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<sup>12</sup> The study for which an earlier version of this analysis was a part was supported by the UK Office of the Deputy Prime Minister. The project for Manchester City Council and the London Assembly was lead by Professor James Simmie, with Professor John Glasson, of Oxford Brookes University, and incorporates economic analysis by Experian Economic Consultants, as well as inputs from Professor Ron Martin, University of Cambridge.

<sup>13</sup> The Annual Business Inquiry employee analysis, based on a firm survey, has been undertaken on the same basis for this period. Earlier data are available, having been 'rescaled' to be comparable with post-1998 data, but are less reliable for small-scale analyses.

**Table 1: Knowledge-Intensive Activities: % of total employment, Core Cities and regions, 2002**

		Manch.	B'ham	Leeds	Liverp'l	Sheffield	Newcastle	Nott'ham	Bristol	TOTAL	London
<b><u>KIBS</u></b>											
	<b>City</b>	13.3	12.9	13.9	11.7	9.7	9.0	9.8	17.1	12.5	31.6
	<b>Region</b>	7.6	7.1	7.7	6.5	4.0	5.7	6.6	8.3	6.8	10.8
	<b>Total</b>	10.1	9.3	9.9	8.2	5.8	7.1	7.9	12.1	9.0	19.9
<b><u>Creative</u></b>											
	<b>City</b>	5.4	4.2	4.2	3.0	2.8	4.8	4.6	5.7	4.5	12.3
	<b>Region</b>	3.3	2.9	3.1	3.0	1.7	2.2	3.2	4.9	3.0	6.7
	<b>Total</b>	4.2	3.4	3.5	3.0	2.1	3.3	3.8	5.2	3.6	9.2
<b><u>High Tech</u></b>											
	<b>City</b>	1.5	2.0	1.9	2.1	1.7	1.3	1.6	3.4	1.9	1.4
	<b>Region</b>	3.7	1.8	1.6	2.9	1.1	2.7	4.9	3.8	2.6	2.0
	<b>Total</b>	2.8	1.9	1.7	2.6	1.3	2.1	3.5	3.6	2.3	1.8
<b><u>Higher Education</u></b>											
	<b>City</b>	3.5	2.7	2.8	4.8	3.3	3.5	3.6	2.5	3.3	2.3
	<b>Region</b>	0.4	0.7	2.2	0.8	0.7	1.7	1.2	1.8	1.1	1.2
	<b>Total</b>	1.8	1.4	2.4	2.2	1.5	2.4	2.2	2.1	2.0	1.7
<b><u>ALL KNOWLEDGE-INTENSIVE ACTIVITIES (excluding double counting)</u></b>											
	<b>City</b>	20.4	18.8	20.2	20.2	16.7	15.7	15.8	25.5	19.3	42.5
	<b>Region</b>	12.9	10.4	12.8	11.6	6.3	10.8	13.6	15.6	11.6	17.2
	<b>Total</b>	16.1	13.5	15.4	14.5	9.7	12.8	14.5	19.9	14.6	28.3

The detailed categories are listed in Annex 1. Some computer services and the architectural/ engineering related services were included among both the KIBS and creative activities, reflecting their double significance for the modern knowledge economy. The aggregated data for 'All knowledge-intensive activities' in Table 1 includes employment in these sectors only once, to avoid double counting (Table 2 indicates the scale of this adjustment).

These surrogate measures of the 'knowledge economy' are far from satisfactory. All sectors require expert and knowledgeable personnel and it might be argued that the expertise available within traditional manufacturing, and even in the consumer and public services, could be of greater significance for local success than the presence of some knowledge-intensive activities. Nor is everyone employed in the defined sectors particularly knowledgeable. They are nevertheless identified because their core functions include the processing of information to create 'new' knowledge. This covers services whose specialist expertise creates ideas or supports change and innovativeness by others, and manufacturing sectors in which technological innovation is a leading function. ABI data could allow comparisons of shifts between genders and full- and part-time work, but the analysis here is confined to total employment (See Wood, 2002a). The employment measures would also be improved by occupational data for the sectors, to allow examination of the actual profiles of locally employed expertise, but these are not available at this scale. More localised enquiries might well establish whether, in fact, law firms, included in KIBS, make a greater contribution to urban business quality and competitiveness than many engineering and automobile plants that are not classed as 'high technology'.

### *2.1 Core cities and London knowledge-intensive employment, 1998-2002*

In employment terms, the data presented in Table 1 demonstrate a huge gap between London and the core cities.<sup>14</sup> On average, measured 'knowledge economy' activities employed 14.6% of the workforce of the core city regions (CCR: cities and regions

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<sup>14</sup> See Annex 2 for city and region area definitions.

combined) in 2002, only half the proportion in Greater London (28.3%). KIBS are especially dominated by London, as are the creative sectors, making up three-quarters of knowledge-intensive activities, compared with two thirds in the core cities. In contrast, the CCR had relatively more people in high technology activities and higher education than Greater London, although on a much smaller scale. The Bristol region has consistently the largest share of knowledge functions (19.9%), except for higher education. The Manchester (16.1%) and Leeds (15.4%) regions are also marginally more knowledge-intensive than the others, while Sheffield (9.7%) is least so.

CCR knowledge-intensive activities grew slightly faster than in London between 1998 and 2002 (by 7.9% compared to 7.2%: Table 2b). Expansion was generally concentrated into the core cities themselves, rather than the surrounding regions, at a similar average rate to that in central London (11.3% cf. 11.5%). Compared to central London, core city growth was greatest in KIBS (13.9% cf. 10.3%), while higher education employment grew fastest in central London. Such comparisons are affected by the impacts of the 'dot-com boom' and its aftermath from 2000-2002, especially on London's financial and business services. The comparative effect on the core cities is outlined in Table 3, showing year-to-year variations in KIBS employment alone, defined at the slightly more broadly defined 3 digit level than in Tables 1 and 2. This confirms that central London KIBS grew by 7-8% p.a. between 1998-2000, adding over 70,000 jobs. After this, however, the decline, especially in banking, computer services and advertising, withdrew more than 20,000 jobs by 2002. Meanwhile the core cities did not generally follow the London trajectory, showing considerable variability both between the cities and from year to year, while acquiring a total of around 40,000 jobs.

**Table 2a: Knowledge-Intensive activities: Core Cities and regions  
- Employment change, 1998-2002**

		<u>Manch.</u>	<u>B'ham</u>	<u>Leeds</u>	<u>Livp'l</u>	<u>Sheffld</u>
<b><u>KIBS</u></b>						
2002	City	73,568	62,739	55,843	25,693	22,627
	Region	55,719	58,809	57,281	27,302	18,961
	Total	129,287	121,548	113,124	52,995	41,588
% Change	City	15.5	5.4	25.4	22.0	11.7
	Region	8.4	14.3	-0.4	12.9	-4.7
	Total	12.3	9.5	10.9	17.1	3.6
<b><u>Creative</u></b>						
2002	City	29,607	20,254	17,015	6,675	6,660
	Region	23,934	24,185	22,887	12,650	8,032
	Total	53,541	44,439	39,902	19,325	14,692
% Change	City	19.3	3.2	33.6	12.7	7.6
	Region	9.0	26.4	18.4	15.5	11.1
	Total	14.4	14.7	24.4	14.5	9.5
<b><u>High tech</u></b>						
2002	City	8,383	9,777	7,542	4,513	3,971
	Region	26,986	15,176	11,666	12,160	5,426
	Total	35,369	24,953	19,208	16,673	9,397
% Change	City	1.4	5.5	-1.1	-15.0	20.1
	Region	-6.2	-1.6	-4.8	42.4	-24.8
	Total	-4.5	1.0	-3.4	20.4	-10.7
<b><u>Higher Education</u></b>						
2002	City	20,559	12,445	11,908	11,370	9,781
	Region	3,568	7,220	15,963	3,639	3,329
	Total	24,127	19,665	27,871	15,009	13,110
% Change	City	5.7	-3.5	4.4	8.6	26.3
	Region	14.8	18.3	-3.6	6.8	1.8
	Total	7.0	3.5	-0.4	8.1	19.1
<b>ALL KNOWLEDGE-INTENSIVE ACTIVITIES</b>						
<i>(excluding double counting, DC)</i>						
2002	City	112,706	91,353	80,925	44,443	39,041
	DC	-19,411	-13,862	-11,383	-3,808	-3,998
	Region	94,126	85,590	95,195	49,057	30,029
	DC	-16,081	19,800	-12,602	-6,694	-5,719
	Total	206,832	176,943	176,120	93,500	69,070
% Change	City	14.3	2.3	18.3	11.5	17.8
	Region	5.0	9.8	-0.3	22.7	-6.6
	Total	9.9	5.8	7.5	17.1	5.8



**Table 2b: Knowledge-Intensive activities: Core Cities and regions - Employment change, 1998-2002**

<u>Newcastle</u>	<u>Nott'm</u>	<u>Bristol</u>	<u>CC Tot</u>	<u>London</u>
23,757	23,886	41,794	329,907	524,561
21,301	22,318	26,920	288,611	227,515
45,058	46,204	68,714	618,518	752,076
17.5	9.0	8.5	13.9	10.3
13.5	1.6	21.2	7.9	-2.0
15.5	5.3	13.2	11.0	6.3
12,503	11,310	13,868	117,892	204,455
8,306	10,685	15,972	126,651	142,397
20,809	21,995	29,840	244,543	346,852
30.1	1.7	0.3	13.5	12.6
-0.1	-9.8	23.8	13.4	3.2
16.1	-4.2	11.7	13.5	8.7
3,546	3,810	8,232	49,774	22,965
9,898	16,686	12,199	110,197	43,358
13,444	20,496	20,431	159,971	66,323
8.6	-10.6	65.9	7.6	6.4
-30.5	-16.6	-1.6	-7.3	-0.8
-23.2	-15.6	17.7	-3.1	1.5
11,044	8,429	6,577	92,113	48,453
6,597	4,227	6,309	50,852	24,912
17,641	12,656	12,886	142,965	73,365
20.8	-4.5	7.7	7.1	26.7
5.1	8.5	8.8	5.0	-1.6
14.4	-0.5	8.2	6.3	15.4

**ALL KNOWLEDGE-INTENSIVE ACTIVITIES**  
**(excluding double counting: DC)**

41,212	38,596	62,247	510,523	706,262
-9,638	-8,839	-8,224	-79,163	-94,172
40,205	45,960	50,766	490,928	363,430
-5,897	-7,956	-10,634	-45,783	-74,752
81,417	84,556	113,013	1,001,451	1,069,692
15.3	1.3	12.4	11.3	11.5
-3.8	-4.6	13.7	4.5	-0.2
5.0	-2.0	13.0	7.9	7.2

**Table 3: Core cities KIBS Annual change 1998-2002: Total employment\***

	1998	1999	2000	2001	2002	% Change 1998- 2002
<b>Manchester</b>	63022	68170	68624	74119	74235	
<b>% Change</b>		8.2	0.7	8.0	0.2	7.8
<b>Birmingham</b>	59471	56569	61052	64847	62698	
<b>% Change</b>		-4.9	7.9	6.2	-3.3	5.4
<b>Leeds</b>	44111	49300	48561	45269	55310	
<b>% Change</b>		11.8	-1.5	-6.8	22.2	25.4
<b>Liverpool</b>	20404	22966	22091	25102	25808	
<b>% Change</b>		12.6	-3.8	13.6	2.8	26.5
<b>Sheffield</b>	19934	19393	21144	23345	22288	
<b>% Change</b>		-2.7	9	10.4	-4.5	11.8
<b>Newcastle</b>	21902	21201	22740	26139	25475	
<b>% Change</b>		-3.2	7.3	14.9	-2.5	16.3
<b>Nottingham</b>	23497	20920	22056	22376	24014	
<b>% Change</b>		-11	5.4	1.5	7.3	2.2
<b>Bristol</b>	38382	41911	38934	42150	41869	
<b>% Change</b>		9.2	-7.1	8.3	-0.7	9.1
<b>Total</b>	290723	300430	305202	323347	331697	
<b>% Change</b>		3.3	1.6	5.9	2.6	14.1
<b>Central London</b>	480556	518990	556822	547950	533023	
<b>% Change</b>		8	7.3	-1.6	-2.7	10.9

\* KIBS defined according to the 3-Digit SIC groups, and only broadly comparable with other tables.

They here include SIC Groups 650,660,670,703,721,722,723,724,741,742,743, and 744.

These fluctuations may reflect the accuracy of the Annual Business Inquiry at this scale, as well as the local impacts of major corporate decisions. The four-year trend nevertheless suggests that:

- The growth of KIBS in **Liverpool** added over 5,000 jobs. These were mainly in insurance and business services, especially in 1998-9 and 2000-1 (cf. Table 4b).
- **Leeds** gained over 11,000 jobs, after earlier setbacks, mostly in 2001-2, led by the financial services and data processing (cf. Table 4b).
- **Manchester** KIBS also grew strongly, again by over 11,000, showing similarly-timed expansions in 1998-9 and 2000-1 to those in Liverpool.
- After growth in 1999-2001, **Newcastle** suffered a setback 2001-2, but still gained 3,500 KIBS jobs over the four years.
- In contrast, **Birmingham** apparently showed low KIBS growth, but in fact recovered from an initial setback in 1998-9. The losses had mainly been in insurance, business services, and technical testing, (cf. Table 4a), but over 6,000 KIBS jobs were recovered by 2002.
- **Nottingham** experienced similar early job losses in KIBS. These were broadly based, affecting financial services, real estate, and computer and business services (cf. Table 4d), but over 3,000 KIBS jobs returned after 1999.
- **Bristol's** apparently low growth rate reflects a peculiar profile of fluctuations, but it still accumulated 3,500 extra KIBS jobs by the end of the period.

These data confirm that the trajectory of KIBS employment in all the core cities was upwards, in spite of temporary local setbacks. More notably, most do not show the effects of the post-2000 recession, evident in central London. The northern core cities (Liverpool, Leeds, Manchester, Newcastle) also attracted KIBS jobs faster than those nearer to London (Nottingham, Birmingham, Bristol), and much faster than London after 2000.

Returning to the evidence in Tables 1 and 2, and in Tables 4a-e and 5, knowledge-intensive activities in the core cities and their regions may be summarized as follows:

**Table 4a: Employment profiles of Knowledge-Intensive Activities in Manchester and Birmingham cities and regions, 2002, and % change, 1998-2002**

	<u>MANCHESTER</u>						<u>BIRMINGHAM</u>					
	<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch. 98-02</u>		<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch. 98-02</u>	
	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>
<b>Bold:</b> Around half or more of central London's share. <b>Shaded:</b> Equal to or greater than central London's share: ** Confidential data: * Total numbers negligible												
<u>Knowledge-Intensive Business Services</u>												
65 : Financial intermediation, etc	14,174	13,008	2.6	1.8	25.9	10.2	<b>17,233</b>	13,594	<b>3.6</b>	1.6	<b>8.6</b>	2.2
7411 : Legal activities	<b>10,256</b>	5,026	<b>1.9</b>	0.7	<b>31.7</b>	14.2	8,404	4,313	1.7	0.5	33.9	4.3
7420: Architectural/Engineering	<b>7,818</b>	<b>8,012</b>	<b>1.4</b>	<b>1.1</b>	<b>-6.9</b>	<b>1.5</b>	<b>5,736</b>	6,790	<b>1.2</b>	0.8	<b>5.3</b>	9.1
67: Auxiliary financial intermed.	6,684	3,686	1.2	0.5	62.3	50.4	4,417	3,873	0.9	0.5	-0.3	19.8
7220: Software consultancy/ supply	<b>6,244</b>	5,406	<b>1.1</b>	0.7	<b>46.6</b>	14.3	<b>5,444</b>	<b>9,417</b>	<b>1.1</b>	<b>1.1</b>	<b>41.8</b>	<b>79.0</b>
6601 Life insurance	<b>5,901</b>	849	<b>1.1</b>	0.1	<b>-15.1</b>	<b>-47.0</b>	<b>2,672</b>	2,005	<b>0.6</b>	0.2	<b>-14.0</b>	-8.2
6603: Non-life insurance	<b>3,787</b>	2,060	<b>0.7</b>	0.3	<b>-8.9</b>	2.3	<b>2,941</b>	644	<b>0.6</b>	0.1	<b>-19.8</b>	-14.7
7412: Accountancy/book-keeping, etc	5,496	3,772	1.0	0.5	0.7	-4.2	<b>6,162</b>	4,640	<b>1.3</b>	0.6	<b>-14.6</b>	19.5
7414: Business/mgmt. Consulting	3,850	4,954	0.7	0.7	44.0	49.1	2,678	5,509	0.6	0.7	32.2	78.1
<u>'Creative' sectors</u>												
72: Computing and related	<b>10,659</b>	<b>10,014</b>	<b>1.9</b>	<b>1.4</b>	<b>41.6</b>	<b>26.1</b>	7,480	13,492	1.5	1.6	1.2	66.0
7420: Architectural/Engineering	<b>7,818</b>	8,012	<b>1.4</b>	1.1	<b>-6.9</b>	1.5	<b>5,736</b>	6,790	<b>1.2</b>	0.8	<b>5.3</b>	9.1
221: Publishing	1,533	2,161	0.3	0.3	-24.8	18.0	1,728	1,769	0.4	0.2	3.8	2.4
744: Advertising	<b>3,170</b>	1,685	<b>0.6</b>	0.2	<b>18.0</b>	-15.4	1,608	1,195	0.3	0.1	5.7	35.0
9220: Radio and TV activities	<b>2,692</b>	196	<b>0.5</b>	-	<b>118.2</b>	28.9	915	134	0.2	-	0.8	-55.0
9231: Artistic and lit. creation etc.	1,770	872	0.3	0.1	5.6	9.8	604	510	0.1	0.1	334.7	-22.4
9232: Operation of arts facilities	<b>980</b>	207	<b>0.2</b>	-	<b>369.0</b>	73.0	604	195	0.1	-	334.7	447.6
<u>High technology activities</u>												
7620: Other comp. -related activities	<b>2,033</b>	<b>2,593</b>	<b>0.4</b>	<b>0.4</b>	<b>92.4</b>	<b>52.0</b>	1,072	1,931	0.2	0.2	75.6	66.1
3530: Manuf. Aircraft/spacecraft	874	<b>3,426</b>	<b>0.2</b>	<b>0.5</b>	<b>48.8</b>	<b>-32.1</b>	**	<b>1,690</b>	<b>0.2</b>	<b>0.2</b>	<b>-14.0</b>	<b>-10.0</b>
3320: Manuf measuring instruments	<b>1,050</b>	<b>1,798</b>	<b>0.2</b>	<b>0.2</b>	<b>-13.3</b>	<b>-22.5</b>	<b>1,893</b>	<b>1,804</b>	<b>0.4</b>	<b>0.2</b>	<b>23.7</b>	<b>28.1</b>
3120: Manuf elec. distrib apparatus	<b>830</b>	<b>2,063</b>	<b>0.2</b>	<b>0.3</b>	<b>-38.0</b>	<b>-27.5</b>	<b>1,530</b>	<b>1,999</b>	<b>0.3</b>	<b>0.2</b>	<b>-4.7</b>	<b>-22.9</b>
3310: Manuf medical/surgical equip.	264	1,467	0.0	0.2	22.7	19.2	643	603	0.1	0.1	60.8	-35.9
7210: Hardware consultancy	248	376	0.0	0.1	-18.9	26.4	251	677	0.0	0.1	69.2	26.1
244: Manuf pharmac. prods/preps	321	8,206	0.1	1.1	212.6	9.9	538	289	0.1	-	213.5	-41.6
73: Research and development	745	723	0.1	0.1	123.0	41.4	212	394	0.0	-	-18.1	-56.8
<b>8030 : Higher education</b>	<b>20,559</b>	3,568	<b>3.7</b>	0.5	<b>5.7</b>	14.8	<b>12,445</b>	7,220	<b>2.6</b>	0.9	<b>-3.5</b>	18.3

**Table 4b: Employment profiles of Knowledge-Intensive Activities in Leeds and Liverpool cities and regions, 2002, and % change, 1998-2002**

	<u>LEEDS</u>						<u>LIVERPOOL</u>					
	<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch. 98-02</u>		<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch. 98-02</u>	
	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>
<b><u>Knowledge-Intensive Business Services</u></b>												
65 : Financial intermediation, etc	18,360	21,748	4.6	2.9	30.7	5.4	5,845	9,192	2.7	2.2	26.1	16.4
7420: Architectural/Engineering	4,096	5,419	1.0	0.7	15.4	3.6	2,184	1,838	1.0	0.4	61.6	22.5
67: Auxiliary financial intermediation	3,477	3,344	0.9	0.4	7.0	6.5	1,557	1,672	0.7	0.4	400.6	153.1
7220: Software consultancy and supply	4,048	4,167	1.0	0.6	54.0	25.7	1,155	1,838	0.5	0.4	-1.9	22.5
6601 Life insurance	1,623	2,661	0.4	0.4	4.5	81.9	3,243	111	1.5	-	96.4	-87.6
6603: Non-life insurance	5,719	1,088	1.4	0.1	52.3	-78.8	3,163	363	1.4	0.1	31.3	630.4
7412: Accountancy/book-keeping, etc	3,568	3,181	0.9	0.4	-5.2	-7.9	1,310	1,435	0.6	0.3	-8.5	21.0
7414: Business/management consulting	1,993	4,837	0.5	0.6	8.8	53.3	1,449	1,653	0.7	0.4	400.6	57.8
<b><u>'Creative' sectors</u></b>												
72: Computing and related	7,242	8,118	1.8	1.1	81.5	52.0	1,826	7,193	0.8	1.7	25.5	88.1
7420: Architectural/Engineering	4,096	5,419	1.0	0.7	15.4	3.6	2,184	2,909	1.0	0.7	61.6	-37.1
221: Publishing	1,946	5,352	0.5	0.7	5.4	-7.8	877	819	0.4	0.2	-4.8	-23.2
744: Advertising	1,370	1,046	0.3	0.1	16.5	42.8	260	814	0.1	0.2	-17.2	176.8
9220: Radio and TV activities	1,300	498	0.3	0.1	14.5	156.8	**	61	0.3	-	-45.8	-52.9
9231: Artistic and literary creation etc.	917	1,344	0.2	0.2	-2.7	38.9	490	320	0.2	0.1	-9.2	20.6
9232: Operation of arts facilities	**	422	0.0	0.1	60.7	96.3	308	50	0.1	-	319.8	-53.1
<b><u>High technology activities</u></b>												
7620: Other computer related activities	1,140	2,323	0.3	0.3	39.5	123.4	379	4,393	0.2	1.0	70.5	146.0
3530: Manuf. aircraft/spacecraft	981	14	0.2	-	-39.3	-85.9	*	451	0	0.1	-	-13.5
3320: Manuf instruments for measuring	844	670	0.2	0.1	49.9	-6.8	11	1,329	0	0.3	30.4	0.7
3120: Manuf electrical distrib apparatus	724	958	0.2	0.1	-30.1	-16.2	*	631	0	0.1	-	39.7
3310: Manuf medical/surgical equip.	1,362	487	0.3	0.1	40	9.4	285	704	0.1	0.2	-4.7	42.4
7210: Hardware consultancy	153	664	0.0	0.1	-13.2	271.1	*	223	0	0.1	-	15.7
244: Manuf pharmacy. prods/preps	563	503	0.1	0.1	189.6	5.0	1,995	488	1.0	0.1	-0.8	37.9
73: Research and development	475	1,713	0.1	0.2	-28.5	8.6	**	1,172	0.1	0.3	-52.6	-8.5
8030 : <b><u>Higher education</u></b>	<b>11,908</b>	15,963	<b>3.0</b>	2.1	<b>4.4</b>	-3.6	<b>11,370</b>	3639	<b>5.2</b>	0.9	<b>8.6</b>	6.8

**Table 4c: Employment profiles of Knowledge-Intensive Activities in Sheffield and Newcastle cities and regions, 1998-2002, and % change, 1998-2002**

	<u>SHEFFIELD</u>						<u>NEWCASTLE</u>					
	<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch. 98-02</u>		<u>Employment, 2002</u>		<u>% of Total</u>		<u>% Change</u>	
	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>n</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>
<u>Knowledge-Intensive Business Services</u>												
65 : Financial intermediation, etc	7,573	5,180	3.2	1.3	32.3	-4.3	5,557	5,554	2.1	1.5	14.1	33.5
7411 : Legal activities	2,712	2,017	1.2	0.5	12.2	-7.6	3,286	1,755	1.3	0.5	27.0	-1.7
7420: Architectural/Engineering	1,596	3,382	0.7	0.8	-26.3	-4.7	<b>3,387</b>	2,702	<b>1.3</b>	0.7	<b>6.1</b>	-11.9
67: Auxiliary financial intermediation	2,172	1,052	0.9	0.3	93.8	30.4	1,202	684	0.5	0.2	-5.4	-2.2
7220:Software consultancy and supply	1,246	1,400	0.5	0.3	-3.1	27.9	<b>2,685</b>	1,687	<b>1.0</b>	0.5	<b>58.1</b>	78.5
6601 Life insurance	**	285	<b>0.8</b>	0.1	<b>3.7</b>	-56.7	705	263	0.3	0.1	-21.8	-47.3
6603: Non-life insurance	**	511	0.1	0.1	-32.5	49.2	795	638	0.3	0.2	-28.2	104.0
7412; Accountancy/book-keeping, etc	1,635	1,284	0.7	0.3	2.5	-18.8	963	1,187	0.4	0.3	82.4	-47.0
7414: Business/management consulting	663	1,422	0.3	0.3	-25.1	18.7	2,073	1,297	0.8	0.3	8.9	46.3
<u>'Creative' sectors</u>												
72: Computing and related	2,768	2,805	1.2	0.7	29.2	33.9	<b>5,109</b>	3,699	<b>1.9</b>	1.0	<b>98.9</b>	20.8
7420: Architectural/Engineering	1,596	3,382	0.7	0.8	-26.3	-4.7	<b>3,387</b>	2,702	<b>1.3</b>	0.7	<b>6.1</b>	-11.9
221: Publishing	667	768	0.3	0.2	-18.8	2.6	1,448	710	0.6	0.2	17.2	-18.9
744: Advertising	604	391	0.3	0.1	89.7	64.9	1,139	296	0.4	0.1	-5.2	67.9
9220: Radio and TV activities	**	49	0.1	-	49.9	217.4	**	119	0.2	-	-1.2	12.4
9231: Artistic and literary creation etc.	730	346	0.3	0.1	47.4	47.7	390	289	0.1	0.1	1.7	-8.8
9232: Operation of arts facilities	*	110	0	-	-	16.5	85	78	0	-	-9.6	71.4
<u>High technology activities</u>												
7620: Other computer related activities	412	494	0.2	0.1	70.4	33.8	644	834	0.2	0.2	1,892.0	99.6
3530: Manuf. aircraft/spacecraft	*	288	0	0.1	-	-16.2	*	<b>672</b>	0	<b>0.2</b>	-	<b>2.5</b>
3320: Manuf instruments for measuring	**	<b>657</b>	0	<b>0.2</b>	19.3	<b>-4.2</b>	207	482	0.1	0.1	27.2	-43.6
3120: Manuf electrical distrib apparatus	324	519	0.1	0.1	10.2	14.6	<b>495</b>	<b>1,080</b>	<b>0.2</b>	<b>0.3</b>	<b>12.2</b>	<b>-61.9</b>
3310: Manuf medical/surgical equip.	<b>1,152</b>	313	<b>0.5</b>	0.1	<b>35.9</b>	10.6	*	581	0	0.2	-	16.9
7210: Hardware consultancy	109	171	0	-	2.0	50.0	<b>644</b>	129	<b>0.2</b>	-	<b>1,892.0</b>	86.7
244: Manuf pharmacy. prods/preps	*	333	0	0.1	-	-42.7	<b>565</b>	<b>1,420</b>	<b>0.2</b>	<b>0.3</b>	<b>-28.6</b>	<b>-27.2</b>
73: Research and development	<b>526</b>	514	<b>0.2</b>	0.1	<b>84.0</b>	314.9	<b>495</b>	486	<b>0.2</b>	0.1	<b>-12.2</b>	-9.6
8030 : <u>Higher education</u>	<b>9,781</b>	3,329	<b>4.2</b>	0.8	<b>26.3</b>	1.9	<b>11,044</b>	<b>6,597</b>	<b>4.2</b>	<b>1.8</b>	<b>20.8</b>	<b>5.1</b>

**Table 4d: Employment profiles of Knowledge-Intensive Activities in Nottingham and Bristol cities and regions, 2002, and % change, 1998-2002**

	<u>NOTTINGHAM</u>						<u>BRISTOL</u>					
	<u>Employment, 2002</u>		<u>% Total, 2002</u>		<u>% Ch.98-02</u>		<u>Employment, 2002</u>		<u>% Tot. 2002</u>		<u>% Ch. 98-02</u>	
	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>
<b><u>Knowledge-Intensive Business Services</u></b>												
65 : Financial intermediation, etc	5,906	4,072	2.4	1.2	25.4	3.3	10,123	4,703	4.1	1.6	-5.0	10.3
7411 : Legal activities	3,193	1,588	1.3	0.5	8.6	-15.6	4,650	1,543	1.9	0.5	10.9	6.6
7420: Architectural/Engineering	2,678	3,695	1.1	1.1	-2.9	-33.6	3,593	4,794	1.5	1.6	-13.7	30.7
67: Auxiliary financial intermediation	1,231	1,085	0.5	0.3	26.6	-9.6	4,700	2,722	1.9	0.9	10.6	151.2
7220:Software consultancy and supply	2,678	2,191	1.1	0.6	-2.9	4.1	2,795	4,343	1.1	1.5	32	21.0
6601 Life insurance	271	1,064	0.1	0.3	-75.4	70.2	5,413	1,088	2.2	0.4	54.3	-0.5
6603: Non-life insurance	396	145	0.2	-	34.2	-7.6	2,739	416	1.1	0.1	2.0	457.8
7412; Accountancy/book-keeping, etc	1,993	1,757	0.8	0.5	-11.3	28.0	2,336	1,824	1.0	0.6	0.1	-1.9
7414: Business/management consulting	754	1,883	0.3	0.6	13.3	40.5	1,544	2,064	0.6	0.7	55.3	37.7
<b><u>'Creative' sectors</u></b>												
72: Computing and related	6,576	4,615	2.7	1.4	1.5	15.6	4,836	7,413	2.0	2.5	7.6	25.8
7420: Architectural/Engineering	2,678	3,695	1.1	1.1	-2.9	-33.6	3,593	4,794	1.5	1.6	-13.7	30.7
221: Publishing	587	1,043	0.2	0.3	-19.4	-3.4	1,650	1,767	0.7	0.6	69.7	6.2
744: Advertising	336	310	0.1	0.1	-27	-9.2	1,214	642	0.5	0.2	38.1	25.9
9220: Radio and TV activities	622	174	0.3	0.1	-20.2	148.8	1,319	148	0.5	0.1	-44.6	445.0
9231: Artistic and literary creation etc.	453	304	0.2	0.1	53.9	34.0	757	811	0.3	0.3	5.5	71.5
9232: Operation of arts facilities	115	164	0	-	85.9	24.7	114	44	0	-	179.1	-40.0
<b><u>High technology activities</u></b>												
7620: Other computer related activities	337	662	0.1	0.2	3.5	41.3	1,220	1,878	0.5	0.6	1.7	65.2
3530: Manuf. aircraft/spacecraft	535	10,362	0.2	3.1	29.3	-25.0	**	4,348	2.0	1.5	114.6	-31.5
3320: Manuf instruments for measuring	97	624	0	0.2	-58.9	38.0	475	850	0.2	0.3	39.9	-10.3
3120: Manuf electrical distrib apparatus	692	974	0.3	0.3	-2	6.9	190	334	0.1	0.1	25.9	-18.8
3310: Manuf medical/surgical equip.	293	527	0.1	0.2	-16.5	0.3	**	82	0.1	-	23.4	-22.3
7210: Hardware consultancy	202	287	0.1	0.1	63.6	39.2	71	153	0	0.1	125.4	49.0
244: Manuf pharmaceuticals prods/preps	*	442	0	0.1	-	-33.7	286	489	0.1	0.2	733.3	14.8
73: Research and development	337	729	0.1	0.2	3.5	-13.7	314	864	0.1	0.3	66.5	30.0
8030 : <u>Higher education</u>	8,429	4,227	3.4	1.3	-4.5	8.5	6,577	6,309	2.7	2.1	7.7	8.8

**Table 4e: Employment profiles of Knowledge-Intensive Activities in Central London (City) and rest of Greater London (Region), 2002 and % Change, 1998-2002.**

	<u>Employment, 2002</u>		<u>% of Total</u>		<u>% Change 1998-2002</u>	
	<u>City</u>	<u>Region</u>	<u>2002 City</u>	<u>Region</u>	<u>City</u>	<u>Region</u>
<b>Knowledge-Intensive Business Services</b>						
65 : Financial intermediation, etc	140,997	47,109	7.8	2.2	-0.2	-7.2
7411 : Legal activities	69,027	14,765	3.8	0.7	10	6.2
7420: Architectural/Engineering	34,930	<b>24,881</b>	1.9	<b>1.2</b>	20.7	<b>-8.7</b>
67: Auxiliary financial intermediation	85,581	17,456	4.7	0.8	37.2	0.9
7220: Software consultancy and supply	29,985	31,110	1.7	1.5	59.6	9.8
6601 Life insurance	10,256	2,359	0.6	0.1	-1.9	-71.2
6603: Non-life insurance	15,626	10,559	0.9	0.5	3.7	72.5
7412; Accountancy/book-keeping, etc	39,739	15,396	2.2	0.7	6.7	0.2
7414: Business/management consulting	43,316	23,844	2.4	1.1	26.8	29.7
<b>'Creative' sectors</b>						
72: Computing and related	50,240	53,446	2.8	2.5	33.1	1.2
7420: Architectural/Engineering	34,930	24,881	1.9	1.2	20.7	-8.7
221: Publishing	40,885	17,210	2.3	0.8	0.2	4.6
744: Advertising	23,487	9,643	1.3	0.5	-9.6	-1.8
9220: Radio and TV activities	20,625	19,344	1.1	0.9	17.8	36.1
9231: Artistic and literary creation etc.	17,241	10,597	1.0	0.5	13.4	7.2
9232: Operation of arts facilities	4,448	1,056	0.2	-	19.9	8.2
<b>High technology activities</b>						
7620: Other computer related activities	13,068	12,540	0.7	0.6	47.9	15.1
3530: Manuf. aircraft/spacecraft	*	1,300	0	0.1	-	-25.5
3320: Manuf instruments for measuring	6,547	3,489	0.4	0.2	-19.6	-31.5
3120: Manuf electrical distrib apparatus	511	1,848	0	0.1	164.4	-19.2
3310: Manuf medical/surgical equip.	563	1,593	0	0.1	35.5	14.8
7210: Hardware consultancy	846	2,036	0	0.1	-31.3	66.7
244: Manuf pharmac. products/preps	222	5,244	0	0.2	-30.0	54.6
73: Research and development	6,547	7,204	0.4	0.3	-19.6	0.6
8030 : <u>Higher education</u>	48,453	24,912	2.7	1.2	26.7	-1.6



## 2.2 *Knowledge-intensive business services (KIBS)*

- KIBS are most important in the largest core cities, Manchester, Birmingham and Leeds (>12.5 % of total employment), although Bristol (17.1%) has the highest share of all (Table 1). Their surrounding regions, have lower KIBS shares, but still higher than the hinterlands of the other cities (>7%). The low growth rates in Birmingham and Nottingham were compensated for rapid expansion in their hinterlands (Table 2).
- By far the most important KIBS activities in the core cities, as in central London, are the **financial services** (Table 5), especially financial intermediation (SIC 65: e.g. banking, building societies finance houses, investment trusts, etc). There are also significant numbers in their hinterland regions, especially around Leeds (e.g. in Bradford and Halifax), and Liverpool (e.g. Southport). Many of these services play a mainly local consumer role, but some, where they are most concentrated in Birmingham, Leeds and Bristol, have wider regional markets.
- This is probably the case for the '**auxiliary**' financial activities (SIC 67: stock exchanges, fund management, broking, underwriting). Heavily dominated by London, they are also comparatively strong in Manchester (6,700), and especially Bristol (4,700).
- **Life Insurance** (6601) is the most distinctive financial activity in the core cities, although employing many fewer than banking-related functions. Several cities have higher employment shares than central London, including Manchester (5,900), Liverpool (3,200), Bristol (5,400), Sheffield (almost 2k), and the Leeds region (2.7k). These are augmented in Liverpool (3.2k), Bristol (2,700) and also in Leeds (5,700), by **non-life insurance** activity (6603), although the distinction is increasingly blurred, as large companies engage in both.

Core city financial intermediation and life insurance showed striking growth between 1998 and 2002, contrasting with losses in central London (Table 5). Only the two southern cities, Birmingham and especially Bristol, followed London by not expanding banking-related employment (Tables 4a and 4d). Insurance trends were more patchy; growth in Leeds, Liverpool and Bristol, but significant losses in Manchester, Birmingham and Newcastle. These outcomes reflect the local effects of corporate restructuring in UK financial services, overlain by the impacts of the London-based cyclical recession after 2000.

**Table 5: Core cities: Total employment in Knowledge-Intensive Activities and changes, 1998-2000**

Section	1998	% of all empl.	2002	% of all empl.	Core cities change		Central London % Change
						%	
<b><u>KIBS</u></b>							
65 : Financial intermediation, etc	60,584	2.5	70,597	2.8	10,078	16.5	-0.2
7411 : Legal activities	35,103	1.4	43,084	1.7	7,982	22.7	10
7420 : Archit./engineering activities	30,242	1.2	30,738	1.2	500	1.6	20.7
67 : Auxilliary to financial Interm.	21,202	0.9	25,440	1	4,240	20	37.2
7220 : Software consultancy/supply	19,763	0.8	26,295	1	6,534	33.1	59.6
6601 : Life insurance	24,869	1	29,645	1.2	4,777	19.2	-1.9
6603 : Non-life insurance	18,401	0.8	19,759	0.8	1,362	7.4	3.7
7412 : Accounting, etc.	24,572	1	23,463	0.9	-1,106	-4.5	6.7
7414 : Business/manage.consultancy.	11,267	0.5	15,004	0.6	3,737	33.2	26.8
<b><u>Creative</u></b>							
72 : Computing and related activities	36,049	1.5	46,496	1.8	10,448	29	33.1
7420 : Archit/engineering activities	30,242	1.2	30,738	1.2	500	1.6	20.7
221 : Publishing	11,050	0.5	10,803	0.4	-242	-2.2	0.2
744 : Advertising	8,701	0.4	9,821	0.4	1,124	12.9	-9.6
9220 : Radio and television activities	9,081	0.4	9,073	0.4	-3	12.9	17.8
9231 : Artistic/ literary creation	5,958	0.2	6,422	0.3	468	7.8	13.4
9232 : Operation of arts facilities	551	0	2,083	0.1	1,532	278	19.9
<b><u>High Technology</u></b>							
7260 : Other computer related	5,598	0.2	7,283	0.3	1,687	30.1	47.9
3530 : Manuf. Aircraft/ spacecraft	6,240	0.3	8,465	0.3	2,228	35.7	-88.3
3320 : Manuf: measuring insts.	4,600	0.2	5,232	0.2	636	13.7	-19.6
3120 : Manuf:elect. distrib. App.	5,971	0.2	4,789	0.2	-1,176	-19.8	164.4
3310 : Manuf: medical equipment	3,518	0.1	4,319	0.2	763	22.8	35.5
7210 : Hardware consultancy	948	0	1,704	0.1	756	79.7	-31.3
244: Manuf pharmac. Prods/preps	3,993	0.2	4,590	0.2	604	15	-30
73: Research and development	2,369	0.1	2,999	0.1	631	26.6	-19.6
	380,872	15.6	438,842	17.3	58,060	15.2	26.7

Paradoxically, this core city growth tends to reinforce the impression of a functional difference between London-centred international banking, and the administrative and domestic orientation of the regional financial sectors. This is confirmed by trends in the more internationally-orientated stock exchange and fund management activities (SIC 67). Already almost five-times more concentrated in central London than the core cities, their London employment continued to grow at almost twice the core city rate between 1998 and 2002 (Table 4e). The concentration of strategic financial functions in London is thus as strong as ever, even while the core cities benefit from lower labour and land costs in attracting regional and more routine national activities. This pattern, recognized since the 1980s (Leyshon and Thrift, 1989, 1997), continues to raise questions about the quality and security of the information environment represented by nominal core city KIBS growth. In particular, some of this employment may be vulnerable to further ICT-based developments, such as web-based banking and insurance, and competition from offshore locations.

- **Technical services** provide the second, and possibly most strategically significant KIBS focus in the core cities and their regions, including **engineering and architectural consultancy** (7420). In most, their employment share is closer to central London's (1.9%) than other KIBS, especially in Bristol (1.5%) and Manchester (1.4%), but not Sheffield (0.7%). It is also high in the Bristol and Nottingham regions, associated with their high technology manufacturing (see below).

These specialist technical functions have often grown out of local industrial strengths, serving regional manufacturing, commercial and public sector markets. They also often serve the UK more widely and some have international reputations, so offering a potential focus for core city knowledge-intensive developments. Unfortunately, their core city employment levels were virtually stagnant between 1998 and 2002, in contrast to continuing strong growth in central London. Losses were greatest in Manchester, Sheffield, Nottingham and Bristol, and only Liverpool, with its region, and the Bristol region (Bath, south Gloucester) expanded.

- The most dynamic KIBS sector is another technical advisory service: **computer software consultancy**, including systems (7220). Their representation in most

core cities was again more than the KIBS average, except for Liverpool and Sheffield. Once more, however, their growth was disappointing when compared to central London. Although employment expanded by one third (33.1%) in four years, this was much lower than central London (60%), even with its recession. The lowest growth was concentrated into Liverpool, Sheffield and Nottingham, however, and rates were around 50% in the three largest cities and Newcastle. Software consultancy employment was also important in the surrounding regions, especially around Bristol, and especially Birmingham (in Solihull, north Warwickshire and nearby parts of Staffordshire), as well as Newcastle.

- The KIBS profile of all the core cities includes a significant base of **legal activities** (7411), especially in Manchester, Liverpool, Bristol and Birmingham, which generally expanded more rapidly than London's between 1998 and 2002. **Accountancy** (7412) was relatively well represented in Birmingham, but this was the only core city where its employment share was over half that in central London. The numbers were generally stagnant, in line with national trends.
- **Business and management consultancy** (7414) represents a range of specialist business services that remain heavily concentrated into the capital, and core city employment never rises above one third of central London's share.
- More localised KIBS specialisms, at least when compared with the core cities' average, include **data processing** in the Nottingham region and Newcastle; **market research** in Leeds and Liverpool; and **real estate** management in Manchester. There is also higher than average **advertising** employment in Manchester and Bristol (see below), but generally most core cities lack nationally significant employment in most of these functions.

### *The 'Creative' sectors*

The 'creative' activities are services that grow through the imaginative development of computer and other technical capabilities, marketing skills and artistic originality. They interact with KIBS functions, so that the largest 'creative' employment numbers are found in software development (with other computing) and architectural/engineering consultancy. Advertising is here classified as 'creative', although it is also a 'business service'. These unavoidable definitional overlaps indicate the importance in a knowledge-based economy of functions that both create new ideas and approaches, and link them to production methods and employment generation. They may also be important in attuning productive output to social and cultural trends, sometimes setting such trends, especially through the modern media.

- Only Bristol and Manchester among the core cities approach half of central London's share of creative employment (Table 1), but they are also well represented in the wider Bristol region. Newcastle and Nottingham had comparatively high shares, and Liverpool and Sheffield the lowest. There were also divergent trends between 1998 and 2002. Leeds and Newcastle expanded faster than central London, while Birmingham, Nottingham Sheffield, and especially Bristol fell behind (Table 2). For Bristol and Birmingham, their surrounding regions seemed to compensate, as we have seen mainly through computer software and technical services.
- The 'creative' importance of the technically-orientated **engineering and architectural consultancies, and computer services** (Table 4) is even more difficult to represent through employment data than their role as business services. Much more detailed enquiries are needed to pursue such issues. These functions are also not confined to the core cities, but are often equally important in the surrounding regions. Nevertheless, the 33k workers in Manchester and its region certainly suggest a critical mass of urban-based expertise as a focus for growth. The comparable figures for Birmingham and its region are 27k, and for Leeds 21k. Quality is even more critical among the smaller cities. The Nottingham (18k) and Bristol (17k) regions depend heavily on their high technology aerospace activities. For Newcastle (14k), Liverpool (12k) and Sheffield (10k), the focus seems more diffuse.
- **Publishing** is comparatively strong in and around Bristol and Leeds, and there are also local clusters of **Radio and TV activities**, often regarded as important in projecting an alternative to the London-dominated media. Numbers are significant, however, only in Manchester (almost 3k), followed by Leeds and Bristol (1.3k). **Advertising** is nationally London-dominated, and only the Manchester numbers (3k) suggest any distinctive local capacity. Activities directly involved in **artistic production** (9231, 9232), although expanding in recent years and qualitatively important, still employ relatively few people. The main concentration is in the Manchester region, with almost 4k employees, followed by Birmingham (less than 2k), and Leeds and Bristol, with just over 1k each.

### High technology

In general, conventionally defined high technology activities are not very important in the core cities, and even less so in London. Such activities are found more in some hinterland regions, especially around Bristol, Nottingham and Manchester. Computer hardware and service provision provide the most widespread and rapidly growing high

technology functions. With software consultancy, and in association with other manufacturing and services, they offer the most potentially creative sources of technologically-based innovation in the wider core city regions.

- The **Manchester** region possesses distinctive technological variety, including pharmaceuticals, aerospace, instrumentation and electrical distribution manufacturing, and computer services. While employment in aerospace and engineering declined sharply between 1998 and 2002, there was some compensating growth in health-care equipment and computer related activities.
- In contrast, high technology activities around **Bristol** and **Nottingham** are dominated by aerospace (at Filton and Derby, respectively). This is augmented by specialist engineering, and computer-related manufacturing and services, as well as by separate R&D establishments near Bristol and pharmaceuticals and electrical equipment around Nottingham.
- The other core city regions show similar mixes of technologically-orientated engineering and electrical manufacturing. The **Birmingham** region has only modest employment in high technology sectors, which reflect its traditional contribution to instrumentation, electrical equipment, aerospace and medical equipment. This perhaps emphasizes the importance of promoting innovativeness in such a diverse industrial region across all its industries.
- The **Leeds** region has significant numbers in specialist engineering, surgical instruments and, like Liverpool, in specialist R&D establishments.
- **Liverpool** also manufactures broadcast transmission equipment, instrumentation, and pharmaceuticals.
- The **Newcastle** region's high technology focus is on computer activities, electrical equipment and pharmaceuticals, although there were some significant losses of employment between 1998 and 2001.
- **Sheffield** showed a similar trend, although with some compensating growth in medical and industrial instrumentation.

None of the core city regions, except Bristol and perhaps Liverpool, showed much evidence of significant employment growth in high technology sectors in the four years under review, and several suffered marked setbacks. Of course, employment in nominally high technology functions is often most at risk because of the intensity of competition in such activities, often from abroad, and the quite distinct location

requirements of the innovation and production stages of development. The mere presence of high technology functions is not enough – they have to be **successful**, supported locally by corporate capital and integrated with other aspects of the regional economy. Even in **London**, growth has been largely focused on market-driven computer-related production and services, with other activities, such as pharmaceuticals, engineering, and electrical equipment, stagnant or declining. Nationally, of course, South East England outside both London and the core cities dominates the pattern of technologically innovative activities.

### Higher Education

Research and teaching in higher education institutions represent major public investments in scientific and other intellectual innovation and advanced workforce training. Many studies have been carried out of the urban and regional impacts of such investment (Goddard, 1997; Chatterton, 1997), but little is known about these in the English core cities or London.

- The largest core city concentration of higher education employment is in Leeds and its region (28k), followed by Manchester (24k) and Birmingham (20k).
- Higher education occupies the highest proportions of the regional workforce in Leeds, as well as Newcastle, followed by Liverpool (Table 1).
- Highly rated research departments (awarded 5 and 5\* assessments in 2001) are relatively concentrated in Manchester, Nottingham and Sheffield, with the share of science and engineering departments amongst these highest in Leeds and Liverpool, and lowest in Birmingham and Manchester (and London).

All the core cities therefore possess substantial resources of high quality scientific research, and this may be of special significance in Leeds and Liverpool.

### Knowledge-intensive activities and economic policies for Core Cities

It has been emphasized that this type of employment analysis cannot indicate the quality of work carried out by knowledge-intensive functions or their potential for innovative

change and growth. The evidence nevertheless undoubtedly demonstrates the continuing dominance of London over the commercial knowledge economy of Britain. If anything, the gap appears to be cumulative and widening, even without allowing for the quality of London-based knowledge exchange, and its export-earning capacity in association with the concentration of corporate functions in the South East region.

This does not mean, however, that successful knowledge-based functions cannot be identified in the core cities and their regions, any less than other successful corporate and entrepreneurial activity. Direct economic comparison with London will always place smaller UK cities in a poor light, if only because of the disparities in their size and historical roles. More realistic and fruitful as indicators for economic development would be detailed comparisons between the core cities, and between them and similar cities elsewhere in Europe. One lesson for economic development policies nevertheless seems clear. Any strengths they may possess in KIBS draw on the success of other regional businesses, by providing them with support to continue being successful. Such inter-dependent relationships present both challenges and opportunities for policy. Most obviously, they should not be focused on particular sectors, but encompass the quality of all the local knowledge-intensive inputs likely to support success.

Further important relationships depend on the access of core city businesses to London-based KIBS. This might appear to detract from local KIBS development, but it should also be a major asset for UK-based companies generally, especially when operating in international markets. There is nevertheless evidence that, where there is sufficient regional demand, specialist KIBS firms with particular specialist and 'local' knowledge develop to serve it (O'Farrell, et.al., 1992; Wood, et.al. 1993). Competition from London-based KIBS may even encourage the quality of regional KIBS firms, not least through niche technical, organisational or marketing specialisation, which in turn provides a basis for serving wider markets (O'Farrell, et.al., 1996). Regional KIBS are also often able to offer lower prices for comparable levels of expertise. So, national and regionally-based KIBS in Manchester and Leeds, for example, may serve the needs of northern England, even including the multinational companies based there. Over-



concentration in the South East has also encouraged some KIBS to disperse to other regions, especially in and around Birmingham, Nottingham and Bristol. Thus, either by responding to and supporting regional potential, or by spinning-off from London's strengths, the core city regions may develop various KIBS-related roles, including serving overseas markets in association with major clients. Cross-sectoral urban policies are needed that recognise these evolving spatial relationships within the national knowledge-intensive economy.

More systematically in relation to the patterns described above, the general requirements of future developments in the knowledge base of the core city regions may be summarised as:

- 1) KIBS employment is dominated by the **financial services**, but these cannot be relied upon to grow significantly in the future. Their 'knowledge-intensive' role is submerged in a much greater volume of routine consumer and business banking and related activity (as is also the case, if to a lesser extent, in London). Some financial services, especially in the larger cities, do offer specialist expertise to regional business and no doubt might serve wider national and even international markets. The 'auxiliary' services (SIC Division 67) provide one index of this quality, but remain small and dominated by London. Also, **life insurance** is the only KIBS activity occupying a higher employment share in most core cities than London. But the insurance sector is traditionally provincially-based, and again largely involved in the routine management of UK life and non-life funds. It is not particularly innovative and, as for the financial services as a whole, corporate restructuring and ICT-driven rationalisation (some offshore) threaten to reduce future employment.
- 2) The most distinctive strength of the core cities, compared with other KIBS, is in the various types of '**technical consultancy**', including construction, architectural, engineering and computer systems and software. These have often grown out of the city regions' traditional industrial, commercial and construction strengths, often reinforced by local higher education institutions. They employ substantial numbers, including generally high proportions of 'knowledge-intensive' staff. Some have the potential for independent growth by serving national and international clients, building on the quality of regional technical specialisation. Such consultancy services often play a multiple economic role, combining commercial, technological and potentially creative knowledge to serve manufacturing, construction, transportation and trading, commercial and consumer services, as well as the public sector. They also generally offer a relatively secure basis for technologically advanced work, not necessarily tied to

specific production processes, products, markets or clients. The employment trends between 1998 and 2002 nevertheless suggest that such opportunities are not generally being grasped in the core city regions, at least to an extent that can counter the attraction of London as a location for the more internationally-orientated business.

- 5) **Legal and accountancy and real estate** functions will continue to play a significant employment role in the larger core cities. Although primarily orientated to regional needs, clients increasingly expect access to national and international (especially EU) standards of legal, accountancy, property management and other expertise. Core cities need to sustain the quality of such business, both to retain employment and ensure that the regional business environment is as supportive as other cities, including London.
- 6) There may be some potential for development among the avowedly '**creative**' sectors, including media activities, such as TV and radio, film and the arts, and advertising, which together support significant employment in the cities and their regions: about 14k in the Manchester and Leeds regions, 8-9k in and around Birmingham and Bristol, and 4-5k each in the smaller city regions. This contribution is still modest, and subject to many unpredictable creative, technological, corporate and policy trends. The quality of work and the stimulus of regional demand are undoubtedly most significant in sustaining such work in the future, but growth in recent years seems to reflect some benefits from the recent cultural revival in the core city regions.
- 7) The future of **technological innovation** in the core cities depends on the focus, technical sophistication and corporate context of local business. Even where these create successful outcomes, however, beneficial employment impacts cannot be guaranteed. Some core city regions possess significant employment in high technology manufacturing, including aerospace, computer hardware, electrical equipment, precision instruments, and pharmaceuticals. The most creative and secure high technology base, however, lies in local associations between the corporate and R&D functions of manufacturing firms and various types of expert technical, including computer consultancies. These may spawn growth-orientated SMEs, but must also involve active exchanges with national and international technological, business and market expertise.
- 8) Such strategies must also benefit in various ways from one of the most distinctive strengths of the core cities, in quality **higher education**, especially in Leeds and Liverpool.

### 3. Conclusions

In summary, the key **knowledge-based potential** of the core cities rests in policies to develop:

- Strategies that combine the potential of **core cities and their hinterlands**. Many KIBS are likely to remain located in the cities, but the critical mass of demand required to support their specialist knowledge-intensive growth requires at least a region-wide approach to economic development. The technical and creative services are already relatively dispersed into the surrounding regions.
- Conditions that will support the ability of some **regional financial and business services** to develop national and international markets. Such policies should be directed to enhancing international connectivity and the quality of life, as much as directly encouraging such investment by major firms in the cities.
- A concerted effort to promote the core cities as **centres of excellence in technical knowledge and practice**, developing international-class engineering, construction, architectural, design, computer and IT consultancies. This also requires a close association with high technology components of the regional manufacturing, construction, business and consumer services base, and the higher education and public sectors. This important legacy of the core cities' economic past does not seem currently to be being promoted sufficiently to resist the drift of such tradable functions to London.
- A high quality of **legal, accountancy and real estate services** to support the success of local business and public sector activity, and serve inward investment projects.
- Further encouragement of the **creative sectors**, in association with knowledge-based business functions, growing out of local consumer and cultural needs, supported by modern media, radio/TV, and publishing enterprise.
- Close links with the innovative potential created by the scale and quality of local **university** research, through both technological development and economic and social intelligence. National higher education policies are currently encouraging such regional spin-off, to which locally-based agencies need to respond. This may also encourage the retention of high quality local graduates.

The English core cities remain major regional centres, still possessing great intellectual, economic and cultural resources. They appear to have enjoyed some renaissance over the past twenty years, at least as indicated by city centre revivals and associated real estate development. Major new cultural, entertainment, sporting and retailing facilities have promoted a veneer of wellbeing. But, when their engagement with the emerging knowledge-intensive basis of the UK's international competitiveness is examined, they appear to be making only limited progress. There seems also to be a real danger of

further marginalisation, for example, if financial services employment declined further, or the regions fail to build a technical service basis out of their current capacities and industrial traditions. To avoid this outcome, a greater capacity will be required to co-ordinate the promotion and development of KIBS and creative services, innovative manufacturing, and higher education. The examples of London, through its international position and scale of activity, and of the continental non-capital cities, with their localized capacity to manage development, show the competition faced by the core cities.

They also need to exploit not only the complementary assets of the cities and their surrounding regions, but also of neighbouring cities, such as Manchester and Liverpool, or Leeds and Sheffield and, even the 'trans-Pennine' potential of northern England more broadly.<sup>15</sup> Some regions, such as Bristol, Birmingham and Manchester, may possess a stronger knowledge economy base and potential than others although, as our data show, the dynamic basis of each may be different. But all would benefit from active local agencies, focusing on the knowledge-intensive economy as a whole, rather than on manufacturing compared with services; the private rather than the public sector; high technology innovation rather than adoption; or specialist innovation 'winners' rather than a healthy network of expert functions to generate and support all types of new ideas. In this, the experience of the European non-capital cities offer some indication of the direction in which the core cities might move if they are to reverse a trajectory of longer-term decline in the era of the 'new knowledge economy'.

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<sup>15</sup> In 2004, the Regional Development Agencies for the North East, North West and Yorkshire established a task group to develop a 'Northern Way' strategy to coordinate growth assets across the three regions.

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**Annex 1 : SIC definitions of knowledge-intensive functions at 4-digit level**

- 1) Knowledge-intensive business services (KIBS)**
- i) The wholesale **financial** services:
- 65: Financial intermediation
  - 6601/2: Life Insurance/Pension funding
  - 6603: Non-life insurance
  - 67: Auxiliary to financial intermediation
- ii) Business-orientated **property development and management** (excluding estate agencies):
- 7011: Development and selling real estate
  - 7032: Management of real estate
- iii) Knowledge-intensive '**Other business activities**', excluding functions such as catering, security, cleaning, packaging, secretarial agencies and labour recruitment.
- 7210: Hardware consultancy
  - 7220: Software consultancy
  - 7230: Data processing
  - 7240: Data base activity
  - 7411: Legal activities
  - 7412: Accounting, book-keeping, etc.
  - 7413: Market research/public opinion polling
  - 7414: Business/management consultancy
  - 7415: Management activities; holding companies.
  - 7420: Architectural/engineering activities
  - 7430: Technical testing and analysis
  - 7440: Advertising
- 2) The 'creative industries'**  
(Technical and artistic, some overlapping with KIBS)
- 221: Publishing
  - 72: Computing and related activities
  - 742: Architectural/engineering activities
  - 744: Advertising
  - 7481: Photographic activities
  - 9211: Motion picture and video production
  - 9220: Radio and television activities
  - 9231: Artistic and literary creation, etc.
  - 9232: Operation of arts facilities
- 3) High technology sectors** (Adopting definition of Butchard 1987):
- 2416 Manufacture of plastics
  - 3330 process contr. equip. .
  - 2417 synthetic rubber
  - 3340 optical instruments, etc



2441	pharmaceuticals
3530	aircraft and spacecraft
2441	pharmaceutical preparations
7210	Hardware consultancy
3001	office machinery
7260	Other computer related activities
3002	computers, etc.
73	Research and development
3110	electric motors/generators
3120	electrical distribution apparatus
3162	electrical equipment nec.
3210	electronic valves, etc.
3220	TV/radio transmitters, etc.
3310	medical/surgical equipment
3320	measuring instruments, etc.
3330	industrial process control equipment

**4) Higher education** 803: Higher Education

**Annex 2: Area definitions and population, '000s, 2001.**

**Local authority areas**

<b>Manchester City:</b>	Manchester, Trafford, Salford:	858
<b>Manchester region:</b>	Bolton, Bury, High Peak, Macclesfield, Oldham, Rochdale, Rossendale, Stockport., Tameside, Wigan:	2,789
	<b>TOTAL</b>	<b>3,647</b>
<b>Birmingham:</b>	Birmingham	976
<b>Birmingham region:</b>	Bromsgrove, Cannock Chase, Dudley, Lichfield, North Warwickshire, Redditch, Sandwell, Solihull, South Staffordshire, Tamworth, Walsall, Wolverhampton, Wyre Forest.	2,927
	<b>TOTAL</b>	<b>3,903</b>
<b>Leeds:</b>	Leeds	715
<b>Leeds region:</b>	Bradford, Calderdale, Harrogate, Kirklees, Selby, Wakefield, York	2,489
	<b>TOTAL</b>	<b>3,204</b>
<b>Liverpool:</b>	Liverpool	439
<b>Liverpool region:</b>	Halton, Knowsley, Sefton, St Helens, West Lancashire, Wirral	1,588
	<b>TOTAL</b>	<b>2,027</b>

<b>Sheffield:</b>	Sheffield	513
<b>Sheffield region:</b>	Barnsley, Bassetlaw, Bolsover, Chesterfield, Doncaster, NE Derbyshire, Rotherham	1,642
	<b>TOTAL</b>	<b>2,155</b>
<b>Newcastle:</b>	Gateshead, Newcastle upon Tyne	451
<b>Newcastle region:</b>	Alnwick, Blyth Valley, Castle Morpeth, Derwentside, Durham, North Tyneside, South Tyneside, Sunderland, Tynedale, Wansbeck	1,530
	<b>TOTAL</b>	<b>1,721</b>
<b>Nottingham:</b>	Broxtowe Gedling, Nottingham	485
<b>Nottingham region:</b>	Ashfield, Mansfield, Erewash, Derby, Amber valley, Rushcliffe, South Derbyshire	1,332
	<b>TOTAL</b>	<b>1,443</b>
<b>Bristol:</b>	Bristol	381
<b>Bristol region:</b>	Bath and N E Somerset, Mendip, N Somerset, South Gloucestershire	1,091
	<b>TOTAL</b>	<b>1,472</b>
<b>Central London:</b>	City, Westminster, Tower Hamlets, Kensington & Chelsea, Camden.	
	Islington, Southwark, Lambeth	1,432
<b>'London region':</b>	Rest of Greater London	5,769
	<b>TOTAL</b>	<b>7,192</b>