BIS | Department for Business Innovation & Skills

The distribution of innovation activity across UK industry

Final Report

Richard Adams
University of Exeter

MAY 2011

The views expressed within this paper are those of the authors and should not be treated as Government policy.

The distribution of innovation activity across UK industry

Final Report

Richard Adams
University of Exeter
Department of Business, Innovation and Skills

Contents

Contents– Tables

Contents– Figures

Contents– Maps

The distribution of innovation activity across UK industry

Final Report

EXECUTIVE SUMMARY

This document is the final report resulting from ESRC Research Placement Fellowship (RES-173-27-0178) between the University of Exeter Business School and the Department for Business, Innovation and Skills.

The purpose of the Fellowship has been, through the exploitation of the datasets of recent UK Innovation Surveys (UKIS 2005, 2007 and 2009), to investigate the distribution of innovation in the UK. Particular emphasis has been placed on uncovering 'innovation hotspots', geographical and/or industrial concentrations of highly innovative activity, and to examine the possibility of highly innovative firms in unexpected places – notably in sectors commonly thought not to be innovative and amongst firms that do not engage in R&D.

Reflecting the diversity of conceptualisations of innovation in industry, amongst policy-makers and in the academic literature, a range of measures of innovation underpin this study, including: inputs to innovation, outputs of innovation, innovation activities that firms engage in and the degree of novelty generated by innovators.

The study presents a relatively fine-grained analysis of UKIS data, exploring innovation distribution at the level of 3 digit SIC Codes (n=181) and spatial distribution in terms of Post Code areas (n=124 (see appendixes 1 and 2).

The results of the study confirm some preconceptions, some of the 'taken-for-granteds', about the distribution of innovative activity and performance in the UK, and challenges others. Because of this, the study has relevance for policy makers for whom it is important to understand which are the country's innovative industries and where they are located, including:

- Analysis at the level of the individual survey points to great heterogeneity and dynamism.
- Six 3 digit SIC Code categories are found to be persistently high performing over the three periods of the survey
    - 24.4 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products
    - 32.3 - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
    - 72.2 - Software consultancy & supply

    - 72.6 - Other computer related activities
    - 73.1 - Research and experimental development on natural sciences and engineering
    - 74.5 - Labour recruitment and provision of personnel
- Two Post Code areas are found to be persistently high performing over the three periods of the survey
    - Cambridge
    - London NW
- Whilst high performance in a single period can be observed in a diversity of industry sectors and Post Code areas, over the long terms it is evasive and difficult to sustain
- High performers can be differentiated from other firms on the basis of the activities they engage in and the use of information sources for innovation
- Approximately one quarter of highly innovative firms do not engage in internal R&D
- Up to 10% of firms in sectors traditionally thought not to be innovative are found to be high performers

However, there are several reasons why the results of this study should be treated with caution. The results of this study are based on unweighted responses to the UK Innovation Survey, and so cannot be taken as being representative. Although this analysis attempts a longitudinal perspective, panel data has not been used and there is not necessarily any continuity of respondent for the three periods. Also, as the analysis becomes more disaggregated some observations at the level of 3 Digit SIC Code and Post Code Area become quite small and are discounted from study.

INTRODUCTION

This report presents a factual and descriptive summary of data drawn from the three most recent UK Innovation Surveys, covering the periods 2002-2004, 2004-2006 and 2006-2008, respectively referred to as UKIS 2005, UKIS 2007 and UKIS 2009. These data are utilised to explore the industrial and geographical distribution of innovation in the UK.

The focus of this Fellowship has been to map the industrial and geographic distribution of innovation in the UK, with particular respect to high performance - hotspots. Relatively little research has been directed toward a wider understanding of the distribution of innovation in the UK. Where investigations have occurred, they have focused either on one industrial sector (particularly high technology) or specific locales. Oakey and Pearson (1996) focus, for instance, on the contribution to innovation and regional growth of high technology based firms and observed a tendency, following a period of strong agglomeration in well-known concentrations, for dispersal to more peripheral development locations.

The study of the geography of innovation, or territorial innovation, has focused primarily on the spatial clustering of firms in regions exploiting resource inputs (especially knowledge) and cluster linkages to support innovative activity. Innovation and industry agglomeration have been studied in a variety of conceptualisations of

spatial concentration, from hotspots through industrial districts, innovative milieu, technology districts, and clusters to regions. Competing definitions exist and a lack of clarity pertains, but all tend to have in common a set of firms in related or supporting industries exhibiting some degree of geographical proximity.

Notwithstanding the contribution of the regional agglomerations literature, the notion of well-defined geographically-determined boundaries and/or same industry membership can be constraining in innovation research. It has its limitations because it imposes exclusions from its analysis: for example highly innovative firms in the same industry , nationally-distributed rather than geographically proximal may be overlooked by the cluster perspective; or, geographically distinct areas that are highly innovative but whose incumbent firm structure does not cohere with the *same industry* criterion; or even small pockets of high performing innovators hidden or buried in areas of activity not generally held to be innovative. As Canina et al (2005; 579) note, proximity is not necessarily confined to geography; it can be measured across many organizational dimensions or traits. By relaxing some of the constraints of the agglomerations literature, particularly geographic proximity and same industry representation, but not sacrificing the search for shared characteristics, a new set of interesting questions arise, notably *How is innovation distributed across the UK, and what characterises its pattern?*

Hotspots, then, are different from clusters. Clusters, according to the DTI (2002) have two key elements. Firstly, firms in the cluster must be linked. Secondly, groups of inter-linked companies locate in close proximity to one other. Hotspots do not share these underpinning conditions that so characterise definitions of clusters (e.g. Porter, 1998). Rather, the emphasis in this report is simply on identifying geographical areas and industries characterised by relatively higher concentrations of innovative firms. At an industry level, assessment is determined regardless of firms' geographical proximity to each other and at the spatial level assessment is made regardless of industry type. In this way, the report focuses on the distribution of innovation *per se* rather than limiting the search only to clusters.

Thus, the purpose of this study has been, through the examination of UK Innovation Survey data dating back to 2005, to generate a picture of the distribution of innovation in the UK with a particular focus on uncovering 'innovation hotspots', geographical and/or industrial concentrations of highly innovative activity, and to examine the possibility of highly innovative firms in unexpected places – notably in sectors commonly thought not to be innovative and amongst firms that do not engage in R&D.

Innovation activities are not spatially equally distributed, and a considerable body of literature has been dedicated to understanding this distribution, its causes and effects (Acs, Anselin & Varga, 2002). Such analysis has taken place at the national or regional level. 'Region' is a rather ill-defined term and, as Howells (2005) points out, has been used to include the 'nations' that comprise the UK or administrative government regions. Few studies have taken a micro-geographic perspective particularly with reference to a wider range of indicators of innovation beyond the

traditional patent counts and measures of R&D activity. It is this gap that this report aims to address. Reflecting the diversity of conceptualisations of innovation current in industry, amongst policy-makers and in the academic literature, a range of measures of innovation underpin this study, including: inputs to the innovation process, outputs of innovation, innovation activities that firms engage in and the degree of novelty generated by innovators.

Distribution is conceived in two ways, first according to industrial activity: in which industrial sectors are the most innovative firms to be found? And secondly, by spatial distribution across the country: where are the innovative firms physically located? A disaggregated approach is adopted, to the level of 3 digit SIC codes (n=181) at the industry level, and Post Code area (n=124) in terms of spatial distribution. This is the principal contribution of this report, providing a finer-grained analysis of the distribution of innovation, across a number of indicators of innovation, than has previously been achieved. In addition, because data from the three most recent UK Innovation Surveys has been available, it has been possible to develop a sense of the dynamism of the distribution of innovation across the UK.

In the wake of the credit crunch and as a response to re-building the national economy following a recessionary period, great emphasis is placed on the importance of innovation. Even during periods of relative prosperity, the importance of innovation to continued growth is well understood and this is reflected in successive governments' attention to the development and implementation of policy to support innovation.

Amongst other things, policy statements can be characterised by their use of illustration that draws on exemplars of industry practice and achievement and by drawing attention to locations differentiated by their innovative dynamism. Yet, in spite of these illustrations little work has previously been done that identifies where, in a spatial sense, innovation occurs in the UK or who, in terms of which industry sectors, are the most innovative.

The work of this fellowship has been designed to address these gaps and identify and map the distribution of innovation across the country so that policy-makers, amongst others, may be better informed to develop and maximise the country's innovative potential through a better understanding of where innovation occurs and which firms are doing it. Previous analyses of UKIS data have shown innovation to vary considerably over industrial and commercial sectors (see Robson & Haigh, 2008; Robson & Kenchatt, 2010; Robson & Ortmans, 2006). Through its finer-grained analysis, this report builds on this previous work.

DATA

This report utilises data drawn from UKIS 2005, UKIS 2007 and UKIS 2009. The UK Innovation Survey is part of the wider Community Innovation Survey (CIS) designed to allow member states to monitor their progress on a series of innovation indicators. The framework for the survey, as with many national surveys of

innovation, follows the guidelines set out in the Oslo Manual[1]. Although it has its origins in a manufacturing/product-oriented view of innovation, modifications over the years mean that the current instrument investigates a much wider conceptualisation of innovation including, alongside product and process innovation, innovations in organisational design, marketing strategy, management techniques and corporate strategy.

Since UKIS 2005, data has been collected biennially, but prior to this every four years. In the UK, the survey is voluntary and conducted by means of a postal questionnaire. The survey covers enterprises with 10 or more employees in sections C-K of the Standard Industrial Classification (SIC) 2003, and the sample (approximately 28,000 enterprises) drawn from the ONS Inter-Departmental Business Register (IDBR). Table1 presents data on response rates to the three surveys UKIS 2005, UKIS 2007 and UKIS 2009.

The survey explores a range of factors relating to enterprise-level innovation including, inputs to and outputs from innovation, innovation activities, constraints felt by UK businesses in their innovation efforts and enterprises' connections with the science base and their wider collaborations in pursuit of innovation. It also touches on aspects of the wider innovation process, such as the introduction of new management techniques and organisational redesign.

Table 1: UK Innovation Surveys 2005, 2007, 2009 response rates

	Period covered	Response rate %	Responses
UKIS 2005	2002-2004	58	16,445
UKIS 2007	2004-2006	53	14,872
UKIS 2009	2006-2008	50	14,281

METHOD

Historically, one constraint to the study of the geographical distribution of innovation has been lack of data. Previous studies have relied on the use of patent data, the identification of R&D activity and bibliometric methods. For example, the spatial or geographic distribution of innovation has been investigated using patent data as a proxy for innovativeness (Acs, Anselin, & Varga, 2002).

Indeed, one method of investigating the geographical dimension of innovation has been to exploit the regionally-localisable capacity of patent data (Ejermo, 2009). However, arguments exposing the limitations of using patent data as a measure of innovativeness (that not all patents are commercially useful, the services sector is less-inclined to use patents than other sectors, that they are oriented toward technological innovations and may under-report innovation in SMEs and services etc.) have been well-rehearsed. Similarly, this techno-centric perspective is reflected

[1] OECD (undated) Oslo Manual: The measurement of scientific and technological activities. http://www.oecd.org/dataoecd/35/61/2367580.pdf

in another approach which takes R&D expenditure and/or activity as a proxy for innovativeness. However, exclusively use of patent data and indicators of R&D is likely to underestimate innovative activity.

The UK Innovation Survey, whilst limited in other respects, addresses these limitations and offers the opportunity to develop a country-wide picture of innovation from nationally collected data.

In this document, analysis is predominantly by descriptive statistics, and high innovativeness is determined on the basis of proportions. SIC Code categories and Post Code areas are considered to be highly innovative based on an analysis of the innovation profiles of respondent firms that fall within each category.

First, scores for individual respondents, across a range of innovation measures (see below), are calculated. Some respondents fail to register a score, for example, because they had no innovation output, and are automatically excluded from further analysis. The remaining respondents can then be ranked in terms of their individual score on each innovation measure. Once ranked, the respondents that comprise the upper decile of each innovation measure can be identified: and, it is respondents in the upper deciles that form the basis of identifying highly innovative sectors and Post Code areas. The most highly innovative SIC Code categories and Post Code areas are deemed to be those that contain the greatest proportions of top decile innovators. A worked example of this process can be found on page 15.

So, highly innovative sectors and areas are those that appear at the top of a list of rankings which are based on the proportions of respondents that come from the upper deciles of a series of innovation measures. But, how far down the list of rankings is it reasonable to travel in order to assign the label ‘highly innovative’? This is a subjective decision and the selection, in this case, has been made on what might be called ‘relative criteria’ (Gordon, 1996) which require the researcher to decide which of the various solutions or configurations is better in some sense, such as being more stable or appropriate for the data. Other criteria include that the selection should be manageable and make sense in the context of the data. Nevertheless, it is a subjective process and it is feasible that a different set of thresholds would lead to a different set of conclusions. Further research would help to validate these findings.

The analysis in this report utilises unweighted data and, notwithstanding the observation above contains several limitations.

- The survey is voluntary and respondents are self-selecting, and so data are not representative and respondents differ across the periods. In this analysis, unweighted data have been used.
- For the most part, analysis is based on the three separate UKIS surveys of 2005, 2007 and 2009. Whilst every effort is made to ensure consistency between questionnaires, modifications, reflecting user needs, have been made over the course of time. These modifications include new and

expanded questions as well as the re-routing of questions: it is not always possible to compare like with like.

- This study attempts a finer-grained analysis than has previously been undertaken with UKIS data. The benefit of this approach has been to permit the drawing of a richer picture of the distribution of innovation across the UK. The disadvantage is that applying a range of innovation measures at the level of 3 Digit SIC codes and Post Code area occasionally results in small cell counts – i.e. ≤10 respondents per SIC Code category or Post Code area for any particular innovation measure - which can distort analysis. Cell counts where the number of respondents is ≤10 have been excluded from the analysis.
- In 2007, sectoral coverage was widened to include the creative industries – SIC Code category 92.1. Their absence from the 2005 survey may skew some of the results.

MEASURING INNOVATION

Various approaches to the assessment of innovation performance have been proposed and operationalised. The innovation performance of sectors, regions and nations is generally assessed by individual metrics or aggregations of individual metrics into a single index (c.f. FORA, 2004; European Commission, 2008). Typically, these consist of input measures (e.g. expenditure on R&D) and output measures (e.g. proportions of companies introducing new or significantly improved products, patent counts, impact of innovation on revenues).

The preponderance of these measures originate in the techno-centric literature and are somewhat biased in that direction (NESTA, 2009), and the same observation applies in the assessment of firm level innovation performance which, typically, has tended to be measured using output innovation measures – usually an interpretation of the innovation/turnover relationship (e.g. Arvanitis, Sydow, & Woerter, 2008) in terms of R&D inputs, patent counts, patent citations, and new product announcements. Increasingly, however, the importance of non-technical innovations to firm performance across multiple sectors of activity, not exclusively manufacturing, is being recognised (Adams, Neely, Yaghi, & Bessant, 2008; Howells & Tether, 2004).

Classically, analysis of UKIS data has included the operationalisation of a variable constructed to enable the identification of enterprises that are *innovation active*. Innovation active enterprises are those that

- have introduced a new or significantly improved product, service or process;
- were engaged in innovation projects not yet complete or abandoned;
- incurred some expenditure associated with innovation activity such as internal research and development, training, and the acquisition of external knowledge or machinery and equipment

Whilst it is useful to be able to identify innovation active firms by means of this measure, it is limited in its application due to its dichotomous nature: respondents

either are or are not innovative, and so it does not allow for the ranking of respondents in terms of their innovation performance.

Because innovation can be pursued in a variety of ways, it can be characterised by an array of different inputs, activities and outputs: many analyses have operationalised a range of such indicators. Typically, these consist of resource allocation measures such as expenditure, activity measures and, output measures such as new products or processes introduced. The advantage they offer is that they capture a range of types of innovation and also permit enterprises to be ranked in terms of different conceptualisations of innovativeness.

The UK Innovation Survey includes a number of questions that permit the exploration of firm level innovation across a variety of technical and non-technical dimensions. To identify which might be the highly innovative firms, seven different metrics focusing on inputs, activities, outputs and novelty are variously applied: these are elaborated upon below, and descriptive statistics presented in Table 2.

Input: The enterprise's financial commitment to innovation in terms of expenditure

1a. *expenditure per employee*[2]*(Innovation Measure 1a)*and
1b. *expenditure as proportion of firm turnover*[3]*(IM1b)*

Output: The enterprise's financial performance resulting from innovation. Although UKIS 2005 carries a set of questions relating to the type of innovation output firms generate, these are largely dichotomous (yes/no) and, because they receive no further quantification, it is not possible to distinguish between high and low innovativeness. To measure firms' innovation output:

2a. percentage of turnover from innovation[4](IM2a) and
2b.percentage of turnover from innovation per employee[5]*(IM2b)*

Innovation activity: We include activities as a measure as an indication of the commitment to innovation that respondent firms make. Respondents are asked to indicate whether or not they have engaged in any of 7 (or 12) different activities[6] that are fundamentally important to innovation. The greater the number of innovation activities the firm engages in, the more it is considered to be innovative

[2] UKIS items: (1410+….1470)/2520
[3] UKIS items: (1410+…1470)/2420
[4] UKIS items: 0810+0820+0830
[5] UKIS items: (0810+0820+0830)/2520
[6] UKIS 2005 investigates 7 activities, UKIS 2007 and 2009 12 activities. For the purposes of comparison, analysis is limited to7 common activities.

3. *Activities*(IM3)

Novelty: Because radical innovation has an important impact on firm performance (Laursen & Salter, 2006; Tellis, Prabhu, & Chandy, 2007) two novelty variables are operationalised:

4a. *proportion of the firm's turnover relating to products new to the market*[7]*(IM4a)*
4b. *proportion of the firm's turnover pertaining to products new to the firm and products significantly improved*[8] (IM4b)

Table 3compares the occurrence of innovative enterprises across the 3 periods of the survey and selected innovation measures. Because of its broad definition, *innovation active* enterprises are the most numerous. Because of its relative rarity, *new-to-market* innovators are least numerous. Relatively speaking, greater numbers of enterprises report having inputs to innovation than have an output from innovation. The data appear broadly stable with not a great deal of period-on-period variation. At the country level, the period covered by UKIS 2007 (the three year period 2004-2006) has the highest proportion of respondents identifiable as innovative, in some form or other, in three of the six measures presented.

However, these data reflect the picture at a national level, to develop a more localised view, or the distribution of these innovator categories across the UK, the data can be disaggregated to a regional level or down to the level of Post Code area. It is evident that, at the level of the Post Code area and SIC Code category, wide variation is present (columns 3 and 4). For example, in UKIS 2005 one Post Code area had as little as 9% of its respondents reporting new-to-the-market innovation whilst another as much as 32% of its respondents.

[7] UKIS item: 0810
[8] UKIS item: 0820+0830

Table 2: Descriptive statistics

		Innovation measurement category						
		1a	**1b**	**2a**	**2b**	**3***	**4a**	**4b**
No. of firms	2009	6,503	4,246	3,145	3,138	8,162	1,548	2,885
	2007	8,844	6,048	3,376	3,259	10,089	1,695	3,088
	2005	8,621	6,399	4,305	4,013	9,777	2,374	3,900
Upper decile n=	2009	651	425	404	313	1,053	159	289
	2007	887	644	405	327	1,215	184	310
	2005	863	676	449	402	1,068	248	427
Range	2009	0.01-13,158.95	0.01-534.94	1-100	0.01-100	1-12	1-100	1-100
	2007	0.01-543.5	0.01-10.05	1-100	0.01-100	1-12	1-100	1-100
	2005	0.01–1,150.00	0.01–269.05	1-100	0.01-100	1-7	1-100	1-100
Upper decile lower limit	2009	9.83	0.17	90	54.23	9	45	77
	2007	8.33	0.14	90	3.81	9	40	79
	2005	11.14	0.18	100	4.05	6	50	80
Mean	2009	10.59	0.35	38.32	21.83	4.68	17.43	32.49
	2007	3.93	0.06	37.69	1.48	4.67	16.70	32.04
	2005	6.20	0.26	40.43	1.60	3.08	18.59	33.32
S.D.	2009	235.33	9.35	30.87	24.18	2.90	21.17	27.21
	2007	15.77	0.17	30.77	3.62	2.82	20.17	27.34
	2005	34.13	4.40	31.74	4.23	1.72	22.49	27.89

NOTE: * In UKIS 2005 7 innovation activities were measured. In UKIS 2007 and UKIS 2009, 12 activities were measured.

Table 3: The occurrence of innovative enterprises across 3 periods

Innovator category	UKIS date	UK %	Range across Post Code areas %	Range across SIC categories %
Enterprises identified as innovation active	2005	62	43-73	26-100
	2007	69	51-82	40-95
	2009	61	50-77	32-100
Enterprises with innovation input (1a)	2005	52	33-68	17-88
	2007	59	39-75	29-89
	2009	46	28-59	11-100
Enterprises with innovation output (2a)	2005	26	15-43	0-81
	2007	23	13-37	0-68
	2009	22	15-41	0-71
Enterprises engaged in innovation activities (3)	2005	59	38-72	26-96
	2007	68	49-81	40-93
	2009	57	41-70	22-100
Enterprises with new-to-market innovation (4a)	2005	14	9-32	0-54
	2007	11	6-27	0-46
	2009	11	6-19	0-47
Enterprises identified with new-to-firm innovation (4b)	2005	24	15-34	0-75
	2007	21	13-36	0-68
	2009	20	14-41	0-65

FINDINGS: THE DISTRIBUTION OF INNOVATION IN THE UK

HIGHLY INNOVATIVE INDUSTRIAL SECTORS

One simple, but discounted, method of identifying highly innovative industrial sectors is illustrated below in appendix 5. This method relies on determining what proportion of each SIC category is accounted for by respondents registering any level of activity in any of the innovation measures.

Of course, even with the application of the general rule of including only those SIC categories with ≥10 respondents, this approach is subject to several limitations. The most notable of these is that this method fails adequately to capture and reflect the highest levels of innovation. As Table 2 indicates, for each innovation measure there exists a long tail of lower performers and it may be the case that a SIC Code area comprising of a high proportion of qualifying enterprises consists principally of respondents from the long tail of lower performers – an example of such an analysis is presented, for illustrative purposes, at appendix 5. Due to these limitations, an alternative approach to identifying high performing SIC Code categories that focuses on respondents constituting the upper deciles of innovation measures is preferred. This has already been outlined and is further described below.

The objective of this report is to map the distribution of innovation in the UK along dimensions of geographic area and economic activity, with a particular focus on higher performance.

Highly innovative industrial sectors (3 digit SIC Code categories) were determined to be those with the greatest proportion of respondents in the upper decile of performers in any of the seven measures of innovation, than others.

The upper decile of respondents was chosen as the basis for identifying high performers because the upper decile of enterprises in each innovation measure account for significant proportions of either expenditure on or earnings from innovation in that measurement category.

For example, UKIS 2005 comprises of data from 16,445 firms. In total, these firms accounted for £9.87 billion expenditure on innovation. Of this, the firms in innovation measure 1a (n=8621) accounted for expenditure of £9.69 billion on innovation, and the top decile of this performance category (n=863) for £6.47 billion or 66.8 % of the performance category total.

Similarly, UKIS 2009 comprises of data from 14,281 firms. In total, these firms accounted for £8.82billion expenditure on innovation. Of this, the firms in performance category 1a (n=6503) accounted for expenditure of £8.73billion on innovation, and the top decile of this performance category (n=651) for £7.00 billion or 80.2% of the performance category total.

The process for identifying high performers, facilitated by SPSS® was as follows:

- Calculate innovation measure score for all respondents (1a, 1b, 2a, 2b, 3, 4a, 4b)
- Isolate 'qualifying' respondents (i.e. those that report a level of expenditure on and or income from innovation, innovation activity or a degree of innovative novelty)
- Calculate lower limit of the upper decile and populate with qualifying respondents
- Determine population profile of upper decile in terms of *n* from each SIC Code category
- Calculate the proportions of firms each SIC Code category has (as a proportion of its 'qualifying' population) in the upper decile of each innovation measure, or

$$\frac{N_{judk}}{N_{jimk}}$$

Where, for each 3 digit SIC Code category

N_{jud} is the number of respondents from SIC Code category *j* in the upper decile of innovation measure *k*, and

N_{jimk} is the number of respondents from SIC Code category *j* in the innovation measure *k*

- Finally, rank SIC Code categories in terms of proportions in the upper decile

For example, in UKIS 2005, 8,621 respondents were identified as achieving a level of expenditure on innovation per employee ≥0.01 (innovation measure 1a). The range for IM 1a in 2005 was 0.01 – 1,150.00, with a lower limit for the upper decile of 11.14. The upper decile consisted of 863 respondents. A total of 145 respondents from SIC category 73.1 were identified in IM1a in 2005 of which 56, or 39%, appeared in the upper decile. No SIC category had a higher proportion of its respondents in the upper decile for this measure of innovation in 2005 (illustrated in Table 4). So, in UKIS 2005 for innovation measure 1a (expenditure per employee), SIC Category 73.1 is deemed the most innovative because it has a greater proportion of its responding firms in the upper decile of that measure than any other SIC Code category.

Table 4: Determining highly innovative SIC Code categories (example from UKIS 2005)

	Innovation measure 1a	All respondents
Sample size	8,621	16,445
Upper decile of IM1a	863	n/a
SIC Code 73.1	145	207
SIC Code 73.1 in Upper Decile	56	n/a

Subsequently, these proportions were ranked for each innovation measure and for each of the three survey periods. Appendices 3 and 4show in detail the rankings and proportions for all those SIC categories ranked at least once in the top 5 and top 10 of any innovation measure in any survey period.

Tables 5 and 6provide a summary of these data, listing all those 3 digit SIC Code categories ranked at least once in the top 5 or top 10 of the ranking of proportions for each innovation measure in any year. The theoretical maximum number of times that a SIC category can occur in either of these lists is 21 (7 innovation measures x 3 survey periods). The greater the number of times a SIC Code category features in the top 5 or top 10, then the more highly innovative it might be considered.

Table 5: Highly innovative SIC Code categories 2005-2009 (number of appearances as top 5 ranked)

SIC category	2005	2007	2009	Total
73.1 - Research and experimental development on natural sciences and engineering	4	2	5	11
72.6 - Other computer related activities	5	3	0	8
24.4 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products	1	3	3	7
32.3 - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	1	3	3	7
74.5 - Labour recruitment and provision of personnel	3	1	2	6
30.0 - Manufacture of office machinery and computers	0	1	3	4
72.2 - Software consultancy & supply	1	3	0	4
32.2 - Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	2	0	1	3
33.1 - Manufacture of electric motors, generators and transformers	1	2	0	3
50.2 - Maintenance and repair of motor vehicles	0	1	2	3
55.4 - Bars	1	0	2	3
64.1 – Post and courier activities	1	1	1	3
70.1 - Real estate activities with own property	0	3	0	3
74.7 - Industrial cleaning	2	0	1	3
92.1 - Motion picture and video activities	0*	3	0	3
14.2 - Quarrying of sand and clay	0	0	2	2
15.9 - Manufacture of beverages	1	0	1	2
20.1 - Saw milling and planing of wood, impregnation of wood	0	0	2	2
29.7 - Manufacture of domestic appliances not elsewhere classified	0	1	1	2
34.2 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	2	0	0	2
67.1 - Activities auxiliary to financial intermediation, except insurance and pension funding	0	1	1	2
70.3 - Real estate activities on a fee or contract basis	0	2	0	2
73.2 - Research and experimental development on social sciences and humanities	2	0	0	2

14.1 - Quarrying of stone	1	0	0	1
15.1 - Production, processing and preserving of meat and meat products	0	0	1	1
15.2 - Processing and preserving of fish and fish products	0	0	1	1
22.2 - Printing and service activities related to printing	0	1	0	1
24.6 - Manufacture of other chemical products	1	0	0	1
26.2 - Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	0	0	1	1
28.1 - Manufacture of structural metal products	0	0	1	1
28.4 - Forging, pressing, stamping and roll forming of metal; powder metallurgy	1	0	0	1
31.1 - Manufacture of electric motors, generators and transformers	0	0	1	1
31.3 - Manufacture of insulated wire and cable	0	1	0	1
31.6 - Manufacture of electrical equipment not elsewhere classified	0	1	0	1
33.2 - Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	0	1	0	1
34.1 - Manufacture of motor vehicles	0	1	0	1
36.2 – Manufacture of jewellery and related articles	1	0	0	1
36.5 - Manufacture of games and toys	1	0	0	1
37.1 - Recycling of metal waste and scrap	1	0	0	1
37.2 - Recycling of non-metal waste and scrap	0	1	0	1
45.4 - Building completion	1	0	0	1
45.5 - Renting of construction or demolition equipment with operator	1	0	0	1
50.3 - Sale of motor vehicle parts and accessories	0	1	0	1
52.4 - Other retail sale of new goods in specialised stores	1	0	0	1
55.1 - Hotels	0	1	0	1
55.3 - Restaurants	1	0	0	1
60.2 - Other land transport	1	0	0	1
61.1 - Sea and coastal water transport	0	0	1	1
63.2 - Other supporting transport activities	0	0	1	1
74.4 - Advertising	0	0	1	1
74.6 - Investigation and security activities	0	1	0	1

Table 6: Highly innovative SIC Code categories 2005-2009 (number of appearances as top 10 ranked)

SIC category	2005	2007	2009	Total
73.1 - Research and experimental development on natural sciences and engineering	5	4	5	14
72.2 - Software consultancy & supply	4	6	3	13
72.6 - Other computer related activities	5	4	3	12
32.3 - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	3	4	4	11
24.4 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products	1	3	3	7

74.5 - Labour recruitment and provision of personnel	3	2	2	7
30.0 - Manufacture of office machinery and computers	1	1	4	6
32.2 - Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	2	2	2	6
92.1 - Motion picture and video activities	0	4	2	6
34.1 - Manufacture of motor vehicles	2	1	2	5
64.1 – Post and courier activities	2	2	1	5
33.1- Manufacture of medical and surgical equipment and orthopaedic appliances	1	2	1	4
33.2 - Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	1	1	2	4
35.3- Manufacture of aircraft and spacecraft	2	2	0	4
37.2- Recycling of non-metal waste and scrap	2	1	1	4
50.2- Maintenance and repair of motor vehicles	0	2	2	4
55.1- Hotels	0	2	2	4
55.4- Bars	1	1	2	4
70.3- Real estate activities on a fee or contract basis	0	4	0	4
74.7- Industrial cleaning	2	1	1	4
14.2- Quarrying of sand and clay	1	0	2	3
24.6- Manufacture of other chemical products	2	0	1	3
29.7- Manufacture of domestic appliances not elsewhere classified	1	1	1	3
34.2- Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	2	0	1	3
45.4- Building completion	3	0	0	3
52.4- Other retail sale of new goods in specialised stores	1	2	0	3
55.3- Restaurants	2	1	0	3
60.2- Other land transport	3	0	0	3
63.2- Other supporting transport activities	1	0	2	3
70.1- Real estate activities with own property	0	3	0	3
73.2- Research and experimental development on social sciences and humanities	2	0	1	3
74.8- Miscellaneous business activities not elsewhere classified	2	1	0	3
15.1- Production, processing and preserving of meat and meat products	0	0	2	2
15.9- Manufacture of beverages	1	0	1	2
20.1- Saw milling and planing of wood, impregnation of wood	0	0	2	2
26.2- Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	1	0	1	2
28.1- Manufacture of structural metal products	0	0	2	2
29.4- Manufacture of machine tools	0	2	0	2
31.6- Manufacture of electrical equipment not elsewhere classified	1	1	0	2
33.4- Manufacture of optical instruments and photographic equipment	1	0	1	2

37.1- Recycling of metal waste and scrap	1	1	0	2
64.2- Telecommunications	0	0	2	2
65.1- Monetary intermediation	1	1	0	2
65.2- Other financial intermediation	0	1	1	2
67.1- Activities auxiliary to financial intermediation, except insurance and pension funding	0	1	1	2
74.3- Technical testing and analysis	1	0	1	2
74.6- Investigation and security activities	1	1	0	2
11.1- Extraction of crude petroleum and natural gas	1	0	0	1
14.1- Quarrying of stone	1	0	0	1
15.2- Processing and preserving of fish and fish products	0	0	1	1
15.6- Manufacture of grain mill products, starches and starch products	0	1	0	1
15.7- Manufacture of prepared animal feeds	0	1	0	1
18.2- Manufacture of other wearing apparel and accessories	0	1	0	1
20.3- Manufacture of builders' carpentry and joinery	0	0	1	1
21.1- Manufacture of pulp, paper and paperboard	1	0	0	1
22.2- Printing and service activities related to printing	0	1	0	1
24.5- Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	1	0	0	1
26.6- Manufacture of articles of concrete, plaster and cement	0	1	0	1
27.5- Casting of metals	0	1	0	1
28.4- Forging, pressing, stamping and roll forming of metal; powder metallurgy	1	0	0	1
29.5- Manufacture of other special purpose machinery	0	0	1	1
31.1- Manufacture of electric motors, generators and transformers	0	0	1	1
31.3- Manufacture of insulated wire and cable	0	1	0	1
32.1 -Manufacture of electronic valves and tubes and other electronic components	0	1	0	1
35.1- Building and repairing of ships and boats	0	0	1	1
36.1- Manufacture of furniture	0	1	0	1
36.2- Manufacture of jewellery and related articles	1	0	0	1
36.5- Manufacture of games and toys	1	0	0	1
36.6- Miscellaneous manufacturing not elsewhere classified	0	1	0	1
40.1- Production and distribution of electricity	0	1	0	1
41.0- Collection, purification and distribution of water	0	1	0	1
45.5- Renting of construction or demolition equipment with operator	1	0	0	1
50.1- Sale of motor vehicles	0	0	1	1
50.3- Sale of motor vehicle parts and accessories	0	1	0	1
51.1- Wholesale on a fee or contract basis	0	0	1	1
51.3- Wholesale of food, beverages and tobacco	1	0	0	1
52.6- Retail sale not in stores	0	1	0	1
55.5- Canteens and catering	0	0	1	1

61.1- Sea and coastal water transport	0	0	1	1
70.2- Letting of own property	0	1	0	1
71.3- Renting of other machinery and equipment	1	0	0	1
72.1- Hardware consultancy	1	0	0	1
74.4 -Advertising	0	0	1	1
Note * SIC 92.1 not included in UKIS 2005				

Several observations can be made from these tables:

- A little over one quarter (51 out of 182) of SIC Codes rank in the top 5 of any innovation measure at least once over the three periods. Nearly half (83 out of 182) of all SIC Codes rank in the top 10 in any innovation measure at least once over the three periods.

  CONCLUSION – high innovation is sectorally widely distributed and happens in a wide range of industry types.

- Of all the ranking SIC Codes (top 5 and top 10), most appear only 3 or fewer times.

  CONCLUSION – achieving highest performance across the diversity of innovation measures is infrequent and appears difficult to sustain.

- A small number of SIC Code categories appear to have been able to sustain high performance. Six SIC code categories have ≥7 appearances(see Table 7).

  CONCLUSION – a small number of SIC Code categories appear able to sustain high performance relative to others and may be characterised as innovation hotspots.

- The two tables, comparing top 5 and top 10 performers, appear reasonably stable over time. That is, high performance is reasonably distributed over the three survey periods as opposed to being loaded in a single survey period. This stability, or persistent high performance, is more evident in top 10 than top 5.

  CONCLUSION – a small number of categories can be described as persistent high performers (PHPs).

This raises a question about the characteristics of these persistently high performing industry sectors

Persistence

In the previous section, a small number of 3 digit SIC Code categories were identified as persistent high performing innovators, these are detailed in Table7. The following section explores specific characteristics of these high performers in terms of the

innovation-related activities they engage in and, these SIC Code categories' relations with the science base and other sources of information for innovation.

Table 7: Persistent high performing SIC Code categories

24.4 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products[#]
32.3 - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods[#]
72.2 - Software consultancy & supply[*]
72.6 - Other computer related activities[#]
73.1 - Research and experimental development on natural sciences and engineering[#]
74.5 - Labour recruitment and provision of personnel[*]
* top 10 only # both top 5 and top 10

The innovation activities of persistent innovators

UKIS investigates a variety of innovation-related activities that respondents may or may not engage in. This area of investigation has undergone some modification between the different iterations of the questionnaire. In 2005, seven activities are investigated:

- Intramural (in-house) R&D
- Acquisition of R&D (extramural R&D)
- Acquisition of machinery, equipment and software
- Acquisition of external knowledge
- Training
- All forms of Design
- Market introduction of innovations

In UKIS 2007 and 2009the items Acquisition of machinery, equipment and software and, the Market introduction of innovations were expanded to include

- Acquisition of machinery, equipment and software:
    - Acquisition of advanced machinery
    - Acquisition of computer hardware
    - Acquisition of computer software
- Market introduction of innovations
    - Changes to product or service design
    - Market research
    - Changes to marketing methods
    - Launch advertising

For the purposes of this report, these expanded items have been aggregated to single items to enable, as far as possible, comparison of 'like-for-like' between the three survey periods.

Figures 1 to 7compare the innovation activities the persistent high performing innovators engage in against all other respondents to the 3 surveys that do not

appear in any upper decile. These *Non UDs* (not in upper deciles[9]) respondents, i.e. those who are not amongst the most innovative, provide a powerful contrast to those SIC Code categories earlier identified as persistent innovators – high performance innovation sustained over the period of the 3 surveys.

In every case, with the exception of SIC 74.5 (Labour recruitment and provision of personnel), and for every activity, a significantly larger proportion of the persistent high performing innovators report engaging in the activity than do Non UD respondents.

Whilst a higher proportion of each persistent high performing category engage in each of the activities than Non UD respondents (with the exception already noted), there is variance between the SIC Code categories in the apparent importance of the different activities.

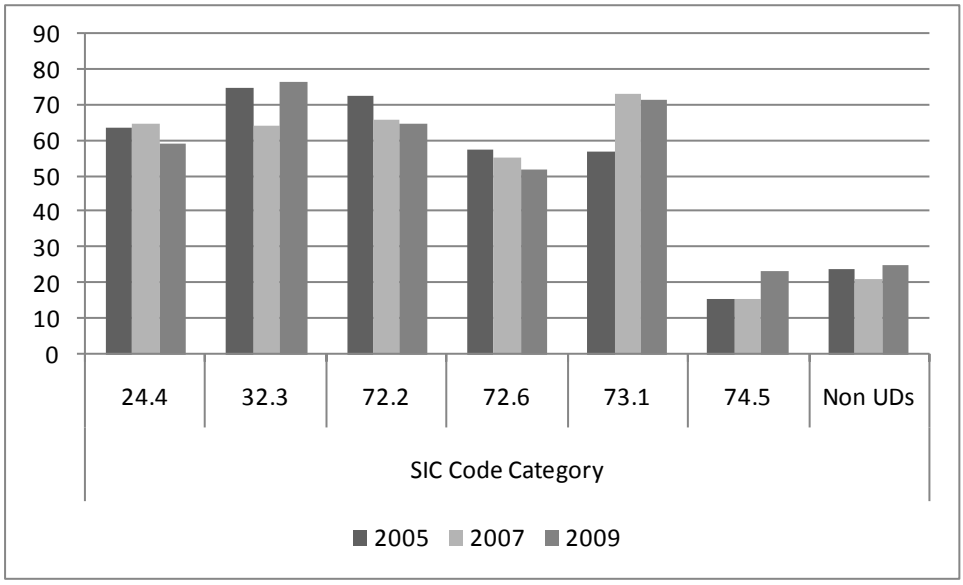


Figure 1: Percentage of persistent innovators engaging in internal R&D

- Internal R&D, commonly, is one of the activities in which greater proportions of innovating firms engage (Robson & Haigh, 2008; Robson & Kenchatt, 2010). It is an important activity for all PHP categories, with the exception of SIC 74.5 for whom a smaller proportion engage than do Non UD respondents. Marginally more 32.3, 72.2 and 73.1 respondents engage in internal R&D than other PHP categories.

[9] Non Upper Decile respondents include respondents that record some level of innovation (but do not appear in the upper decile of performers for any innovation measure) and also respondents reporting no innovation.

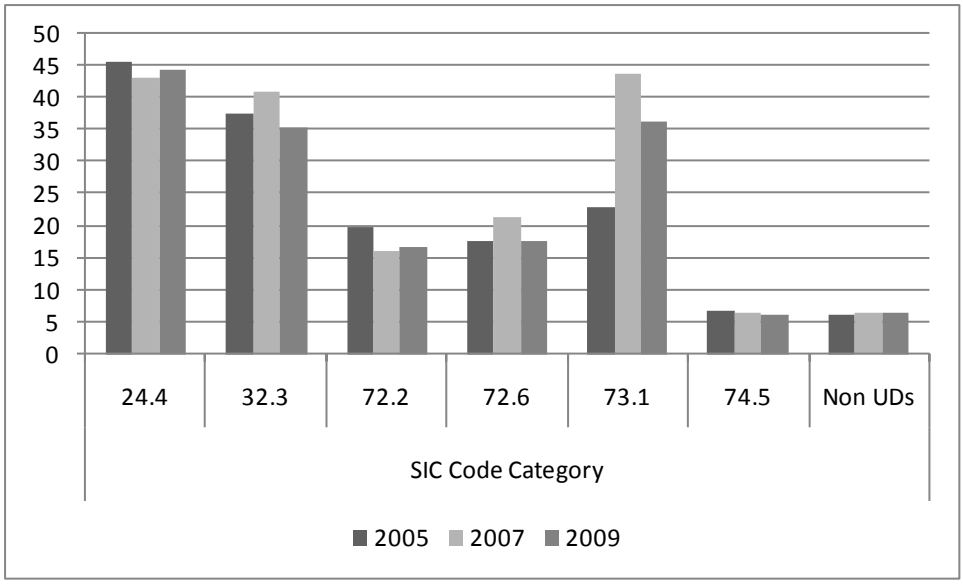


Figure 2: Percentage of persistent innovators acquiring external R&D

- Acquiring external R&D is engaged in by greater proportions of 24.4, 32.3 and 73.1 respondents than other PHPs, and 24.4 consistently greater than the others.

- With the exception of SIC 73.1, the acquisition of external R&D appears a less important activity for KIS-type firms than for the other PHP categories (Pharmaceuticals and, television and radio manufacture).

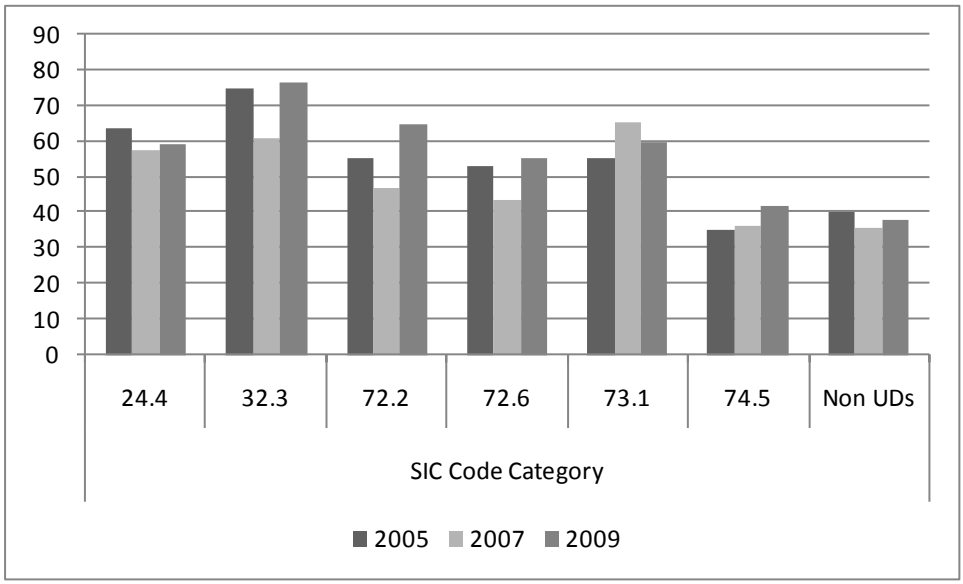


Figure 3: Percentage of persistent innovators acquiring machinery, equipment or software

- Previous studies have demonstrated that the acquisition of machinery, equipment and software tends to be the activity that the greatest proportions of innovation active respondents engage In (Robson & Haigh, 2008; Robson & Kenchatt, 2010). Similarly, higher proportions of PHPs report

engaging in this activity than any other activity, and a higher proportion of SIC 32.3 (Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods)respondents than any other SIC category (see Figure 3).

- The acquisition of machinery, equipment or software is the activity where the variance between PHPs and Non UDs is at its narrowest and so is, arguably, the least significant differentiating activity.

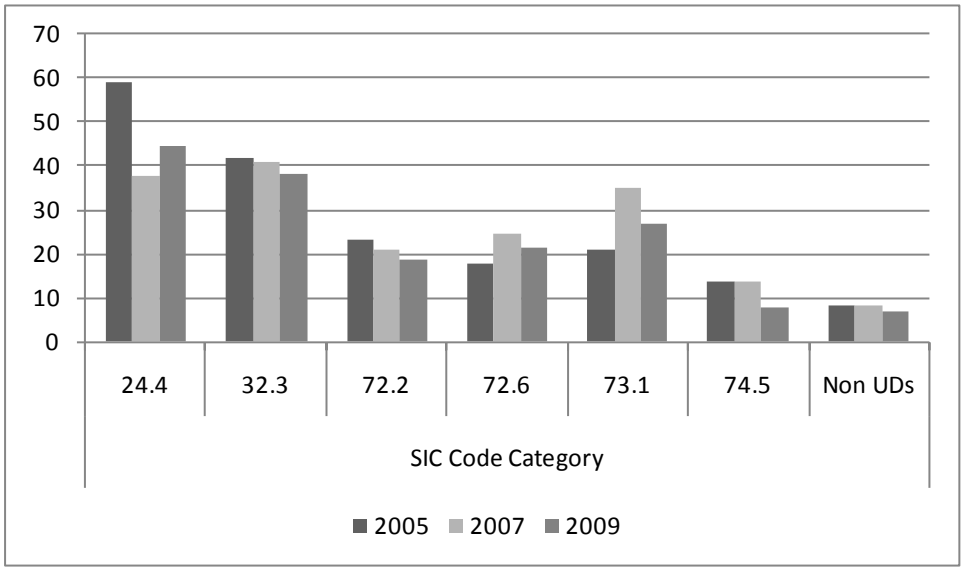


Figure 4: Percentage of persistent innovators acquiring external knowledge

- Consistent with the acquisition of external R&D, greater proportions of SIC 24.4 respondents engage in the acquisition of external knowledge than other PHPs, followed by SIC 32.3 respondents.
- Other than a peak in UKIS 2007 for SIC 73.1, there is little to distinguish the KIS-type respondents from one another in terms of their acquisition of external knowledge.

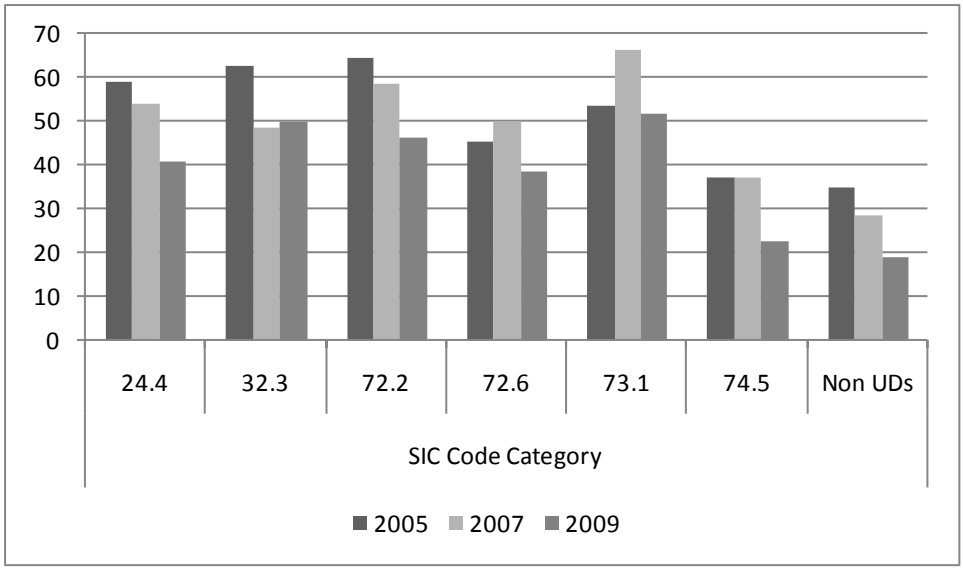


Figure 5: Percentage of persistent innovators engaging in training activities

- Significant proportions of each PHP category engage in training activities and, after the acquisition of machinery, equipment or software is the weakest discriminator between PHPs and Non UDs.

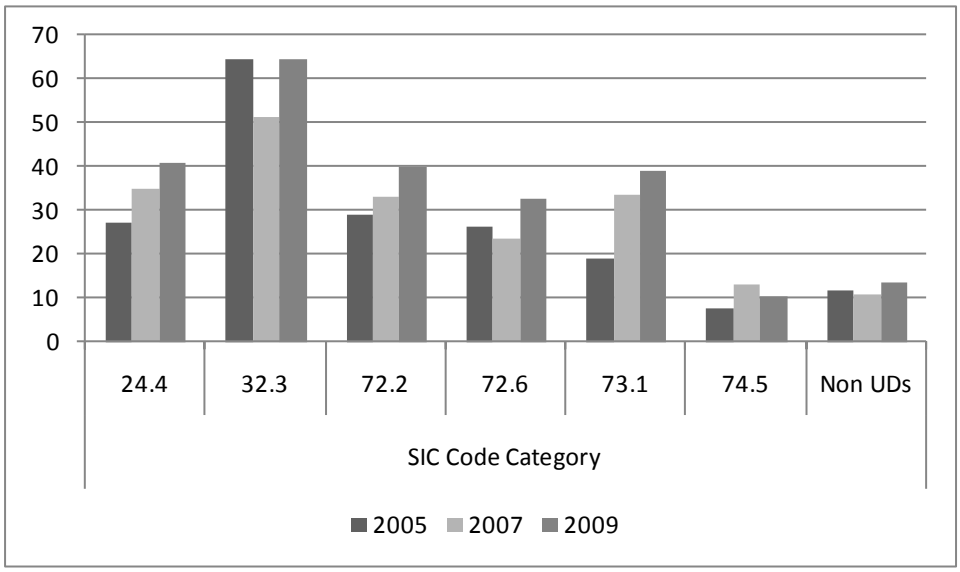


Figure 6: Percentage of persistent innovators engaging in all forms of design

- SIC 32.3 respondents are clearly differentiated from other PHP categories on the basis of proportions engaged in all forms of design.

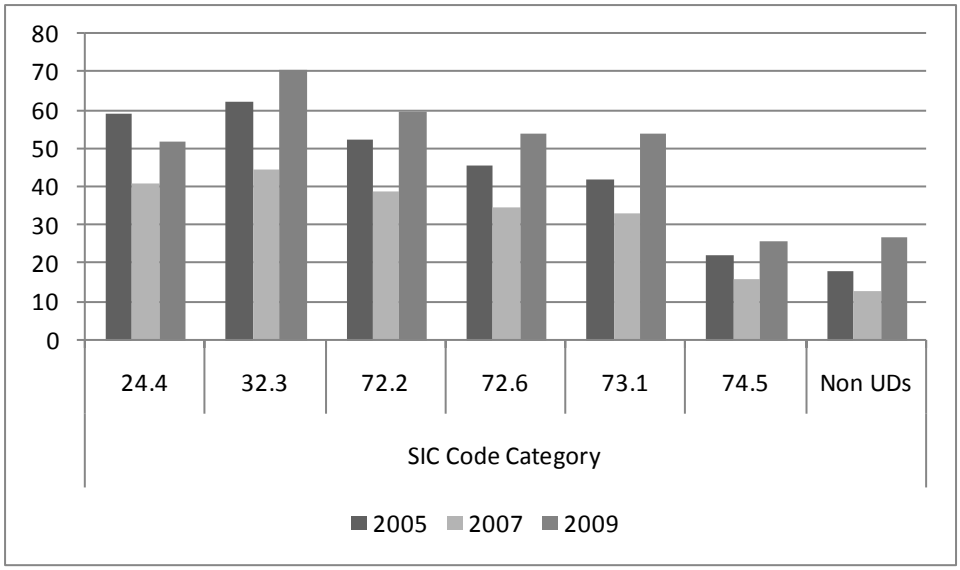


Figure 7: Percentage of innovators engaged in the market introduction of innovation

- Marginally greater proportions of the two manufacturing PHPs engage in market introduction activities than the KIS-type respondents.
- Amongst the KIS-type respondents, marginally greater proportions of SIC 72.2 respondents engaged in the market introduction of innovations than did others.

Persistent High Performers and sources of information for innovation

Respondents were asked to rank a number of public and private information sources that they might use in their innovation activities on a scale from 'not used' to 'high importance'.

Figures 8 to 29 show the importance PHPs attach to each of these information sources over the three survey periods, and compare these against responses from the Non UD group. The following general observations can be made:

- Although each PHP displays its own pattern and it is difficult to discern a clear, overarching pattern, in general greater proportions of respondents rated sources as highly important or of some importance in UKIS 2007 than in either UKIS 2005 or UKIS 2009.
- Significantly greater proportions of PHPs than Non UDs rate all sources highly important or of some importance (except SIC 74.5 – see below).
- SIC 32.3 and 73.1 share similar profiles.
- PHPs can be distinguished from each other in terms of sources of high importance, but there is greater parity in terms of sources of some importance.
- Greater proportions of Non UD enterprises than SIC 74.5 enterprises rate sources as highly important, with the exception of the following sources
    - clients or customers
    - competitors or other businesses in the same industry
    - government or public research institutes and,
    - professional and industry associations

  which a greater proportion of SIC 74.5 respondents rate as highly important sources of information for innovation than Non UD respondents.
- Greater proportions of all PHP categories rated internal and market sources (particularly sources within their own business and clients and customers) as highly important for information for innovation than other sources

Sources within their own business

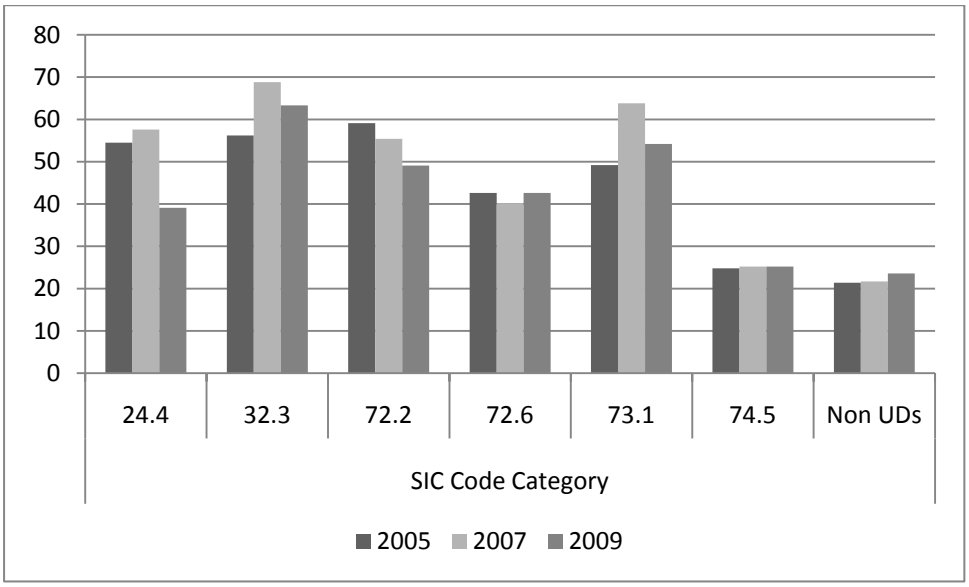


Figure 8: Percentage of PHPs rating sources of information within their own business as highly important for innovation

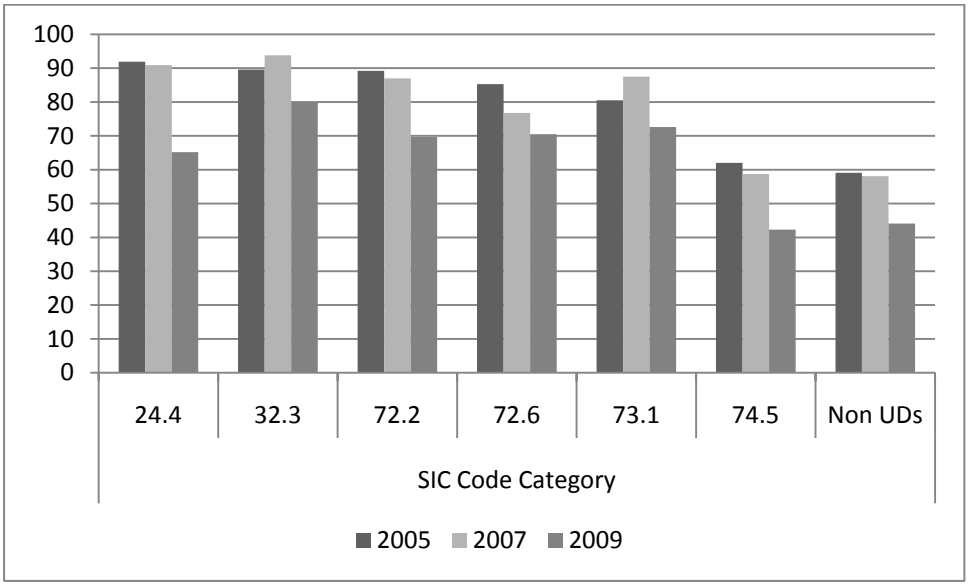


Figure 9: Percentage of PHPs rating sources of information within their own business of some importance for innovation

- Sources within their own business appear highly important to greater proportions of SIC 32.3, 72.2 and 73.1 enterprises than other PHP respondents
- There is approximate parity between SIC 74.5 and Non UD respondents
- At the level of 'some importance', very little discriminates between PHPs

Suppliers of equipment, materials, services or software

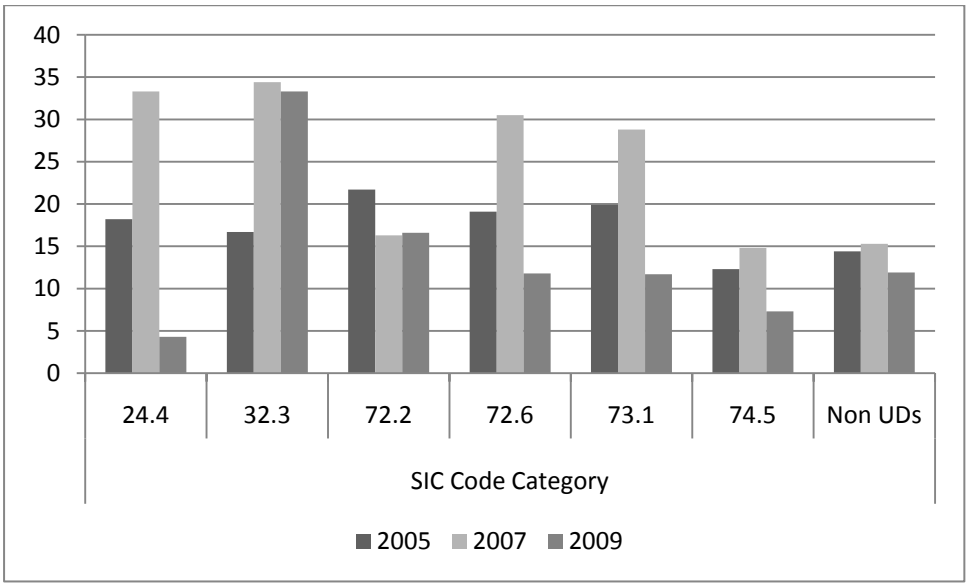


Figure 10: Percentage of PHPs rating suppliers of equipment, materials, services or software as sources of information for innovation of high importance

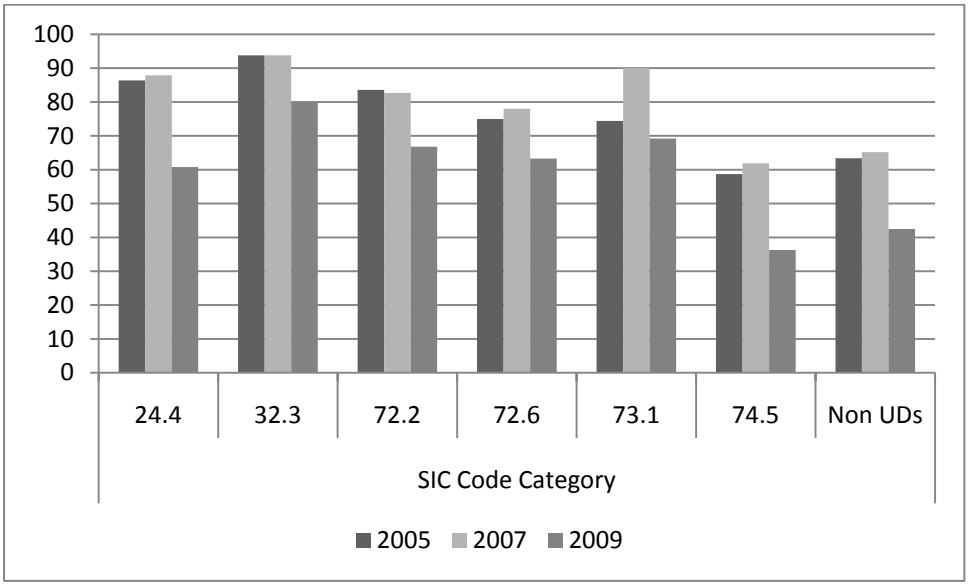


Figure 11: Percentage of PHPs rating suppliers of equipment, materials, services or software as sources of information for innovation of some importance

- In UKIS 2007, ratings are higher than for other years
- In UKIS 2009, greater proportions of Non UDs rate suppliers of equipment, materials, services and software as a source of high importance than 4 out of 6 PHPs
- At the level of 'some importance', very little discriminates between PHPs

Clients or customers

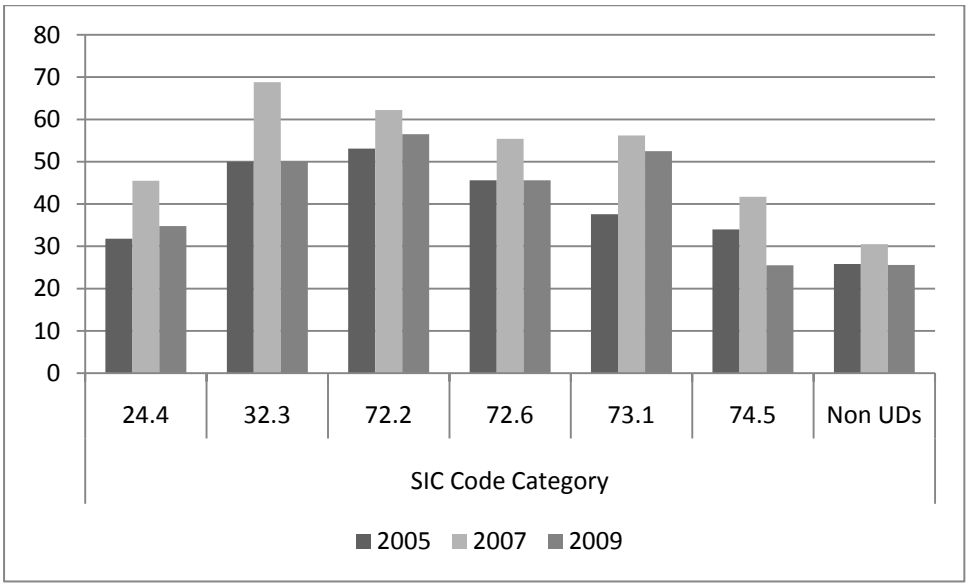


Figure 12: Percentage of PHPs rating clients or customers as sources of information for innovation of high importance

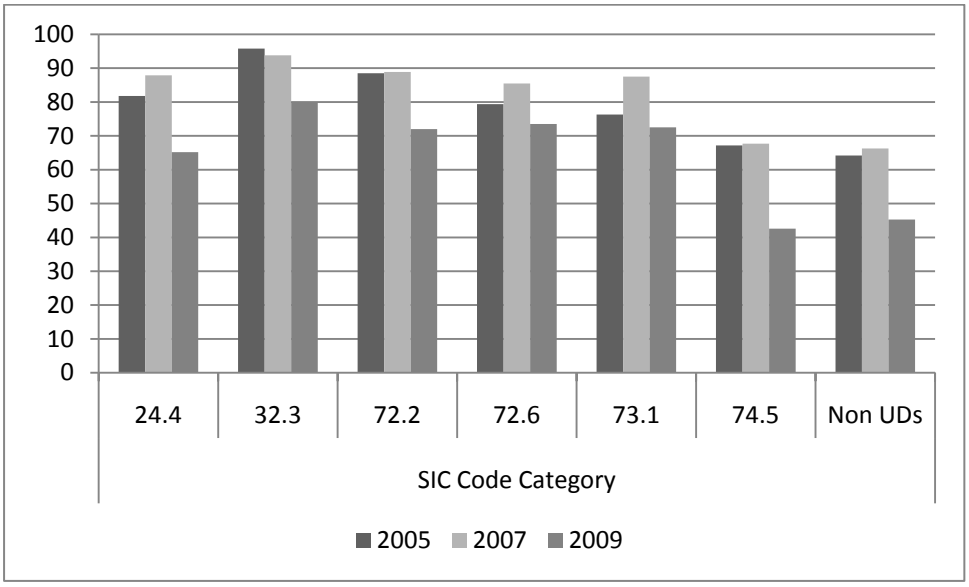


Figure 13: Percentage of PHPs rating clients or customers as sources of information for innovation of some importance

- In UKIS 2007, ratings are higher than for other years
- Highly important to a greater proportion of SIC 32.3 enterprises than other PHPs
- At the level of 'some importance', very little discriminates between PHPs

Competitors or other businesses in the same industry

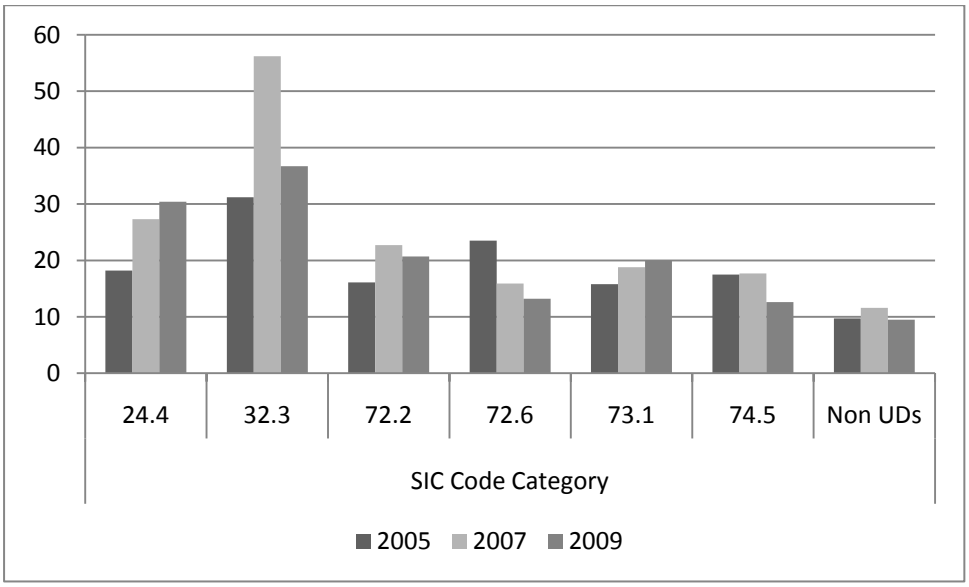


Figure 14: Percentage of PHPs rating competitors or other businesses in the same industry as sources of information for innovation of high importance

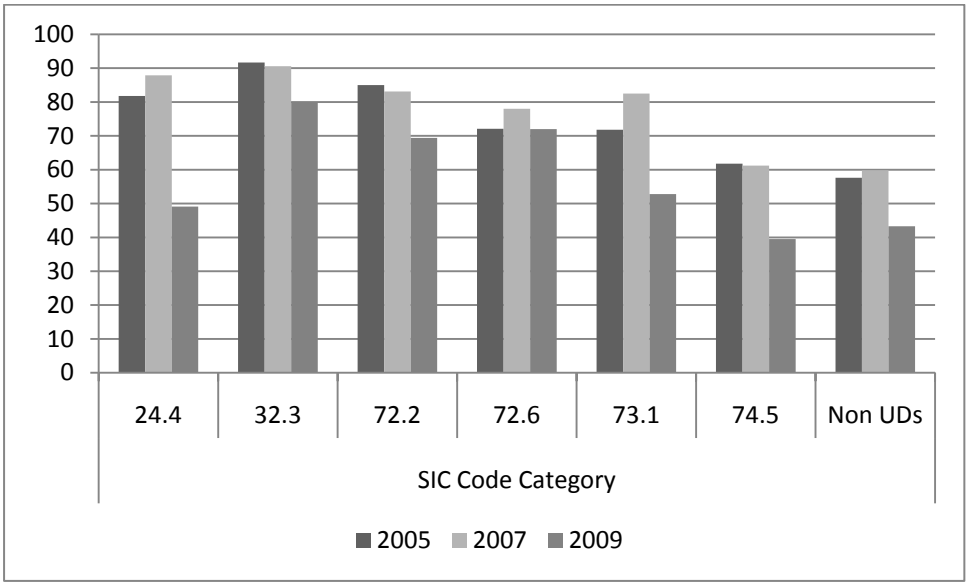


Figure 15: Percentage of PHPs rating competitors or other businesses in the same industry as a source of information for innovation of some importance

- Highly important to a greater proportion of SIC 32.3 enterprises than other PHPs
- Rare occasion on which SIC 74.5 rates exceed those of Non UDs
- At the level of 'some importance', very little discriminates between PHPs

Consultants, commercial labs, or private R&D institutes

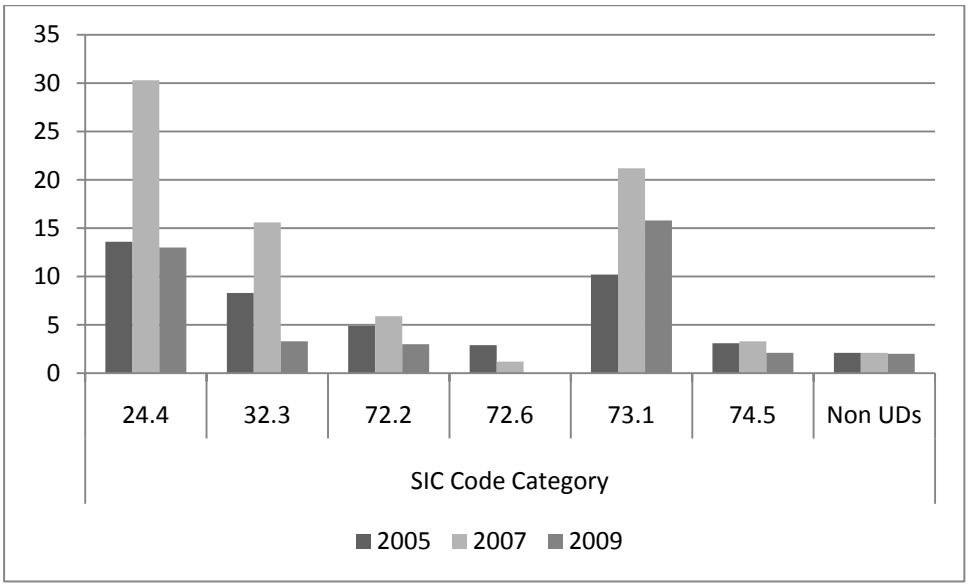


Figure 16: Percentage of PHPs rating consultants, commercial labs, or private R&D institutes as sources of information for innovation of high importance

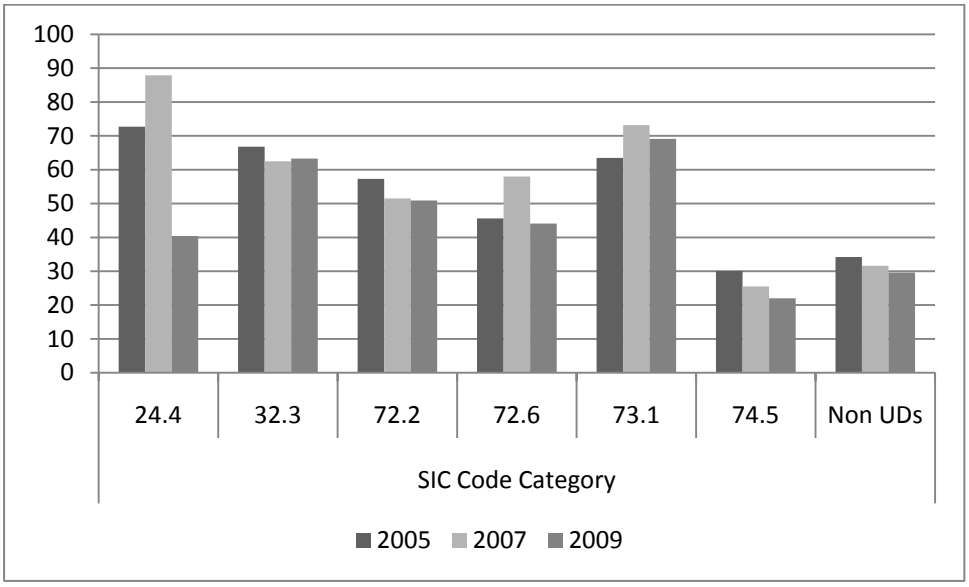


Figure 17: Percentage of PHPs rating consultants, commercial labs, or private R&D institutes as sources of information for innovation of some importance

- Highly important to a greater proportion of SIC 24.4 and 73.1 enterprises than other PHPs, which is also echoed at the level of some importance

Universities and other higher education institutes

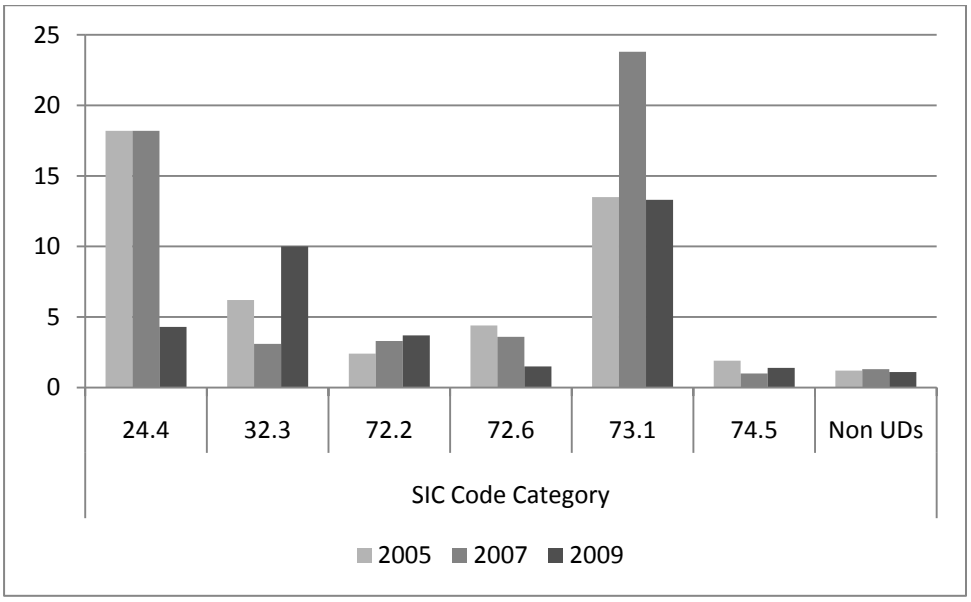


Figure 18: Percentage of persistent innovators rating universities or other higher education institutes as a source of information for innovation of high importance

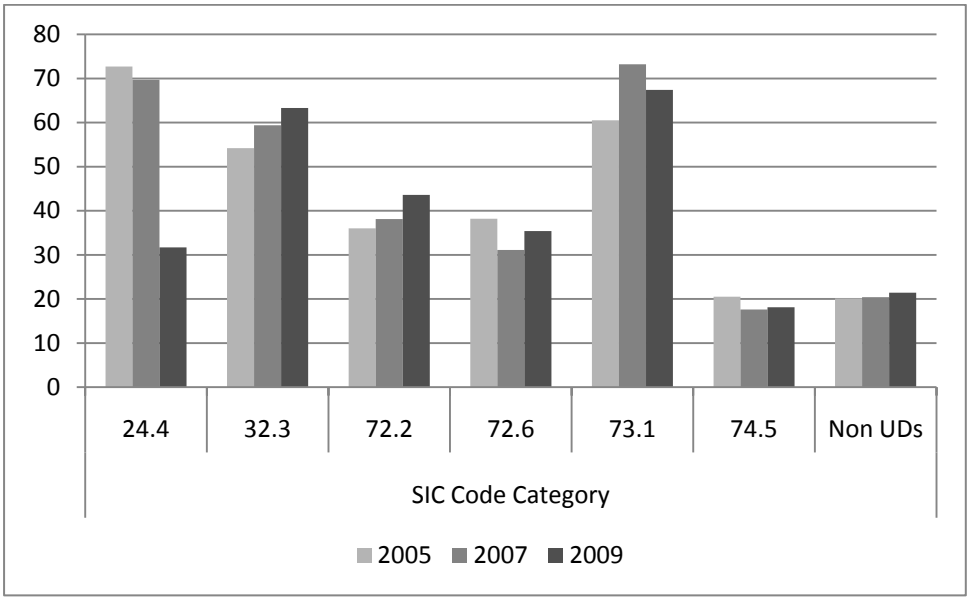


Figure 19: Percentage of persistent innovators rating universities or other higher education institutes as a source of information for innovation of some importance

- Highly important to a greater proportion of SIC 24.4 and 73.1 enterprises than other PHPs, which is also echoed at the level of some importance
- SIC 32.3 respondents also attach high importance to university and HEI knowledge. But, none of the remaining PHPs appear to stress the importance of university and HEI knowledge to a very much greater extent than Non UD respondents

- Noticeably greater proportions of PHPs, with the exception of 74.5, attach some importance to universities and other HEIs as a source of information for innovation than Non UD respondents
- Amongst Non UD respondents, the proportions rating universities and other HEIs as an important source of information for innovation remains fairly constant, between 1.1% and 1.3%, over the 3 survey periods. This stability is not reflected amongst the PHPs for whom there is wide variation over the period. Nor do PHPs share a common pattern: for example, whilst the proportion of SIC Code 72.2 respondents increases over the period, it reduces for respondents from SIC 72.6

Government or public research institutes

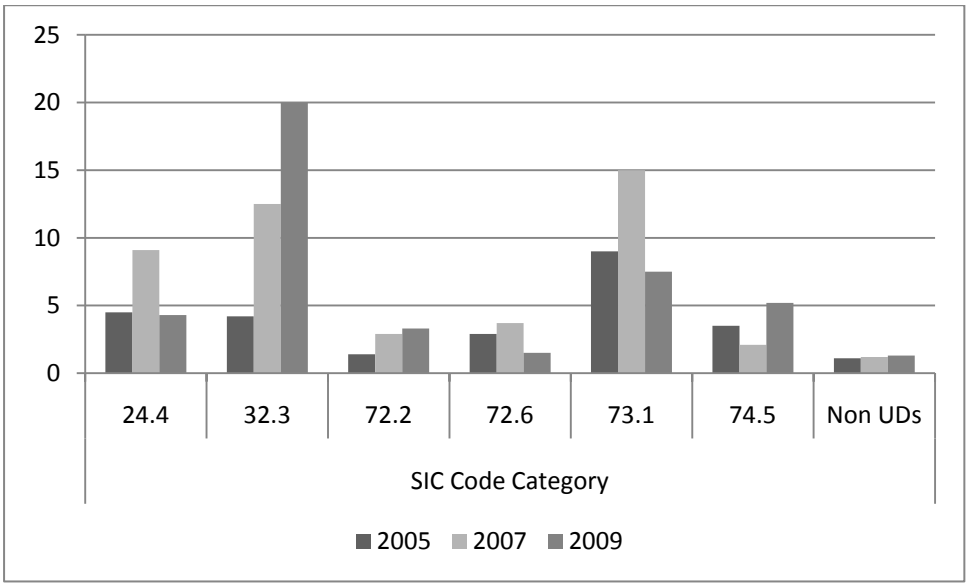


Figure 20: Percentage of PHPs rating government or public research institutes as sources of information for innovation of high importance

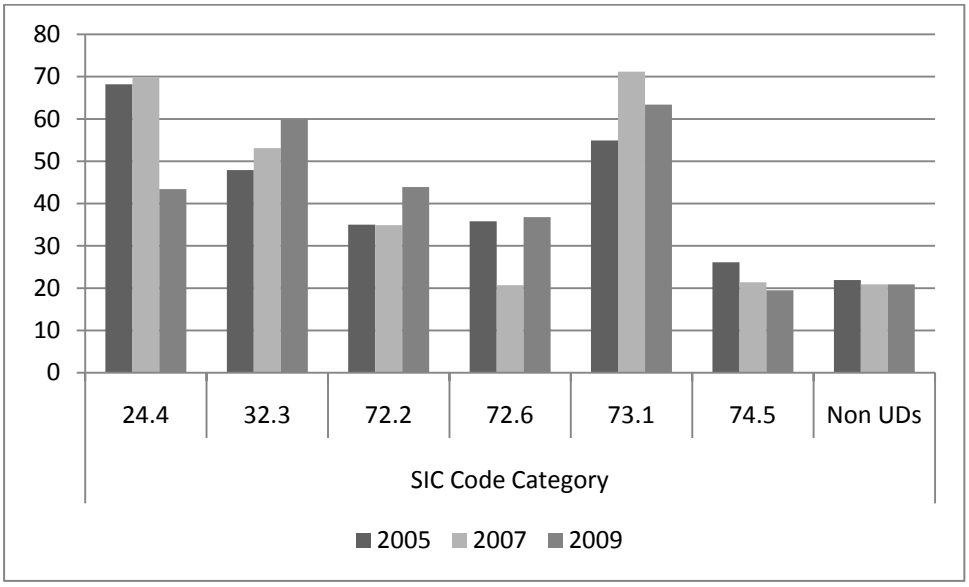


Figure 21: Percentage of PHPs rating government or public research institutes as sources of information for innovation of some importance

- Highly important to a greater proportion of SIC 32.3 and 73.1 enterprises than other PHPs
- Rare occasion on which SIC 74.5 rates exceed those of Non UDs
- Whilst comparatively not highly important for a large proportion of SIC 24.4 enterprises, government or public research institutes are of some importance for a much greater proportion
- At the level of 'some importance', very little discriminates between PHPs

Conferences, trade fairs and exhibitions

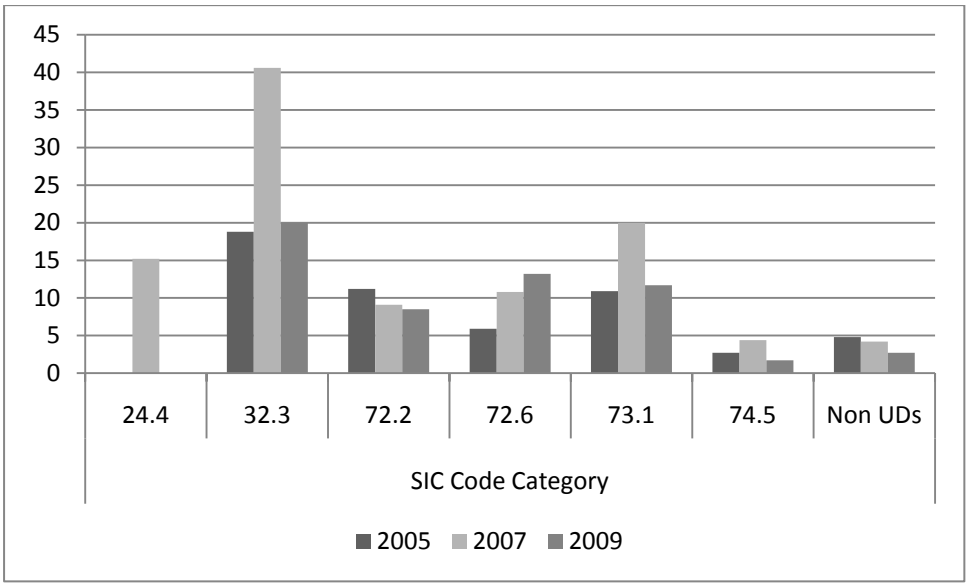


Figure 22: Percentage of PHPs rating conferences, trade fairs and exhibitions as sources of information for innovation of high importance

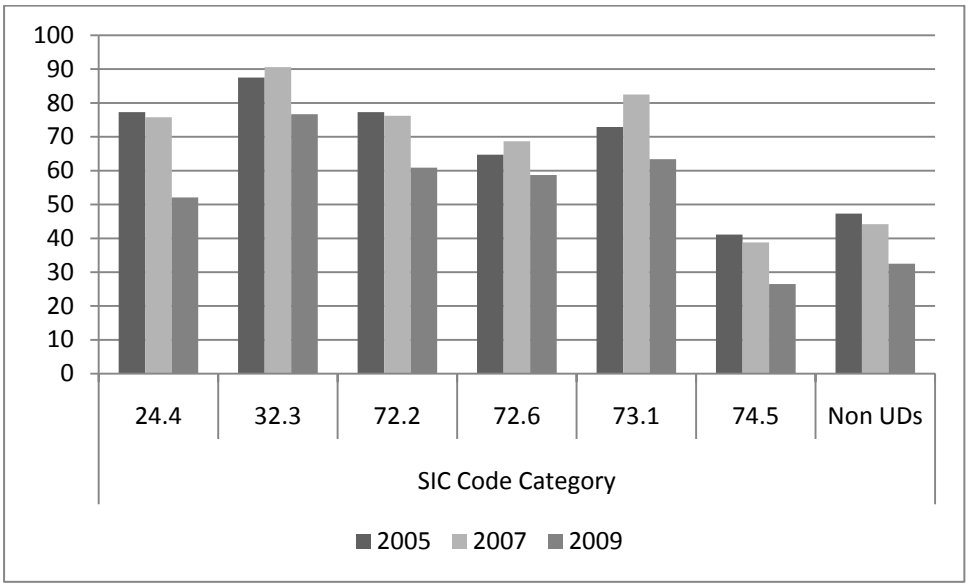


Figure 23: Percentage of PHPs rating conferences, trade fairs and exhibitions as sources of information for innovation of some importance

- Highly important to a greater proportion of SIC 32.3 and, to a lesser extent, 73.1 enterprises than other PHPs
- At the level of 'some importance', very little discriminates between PHPs

Scientific journals and trade/technical publications

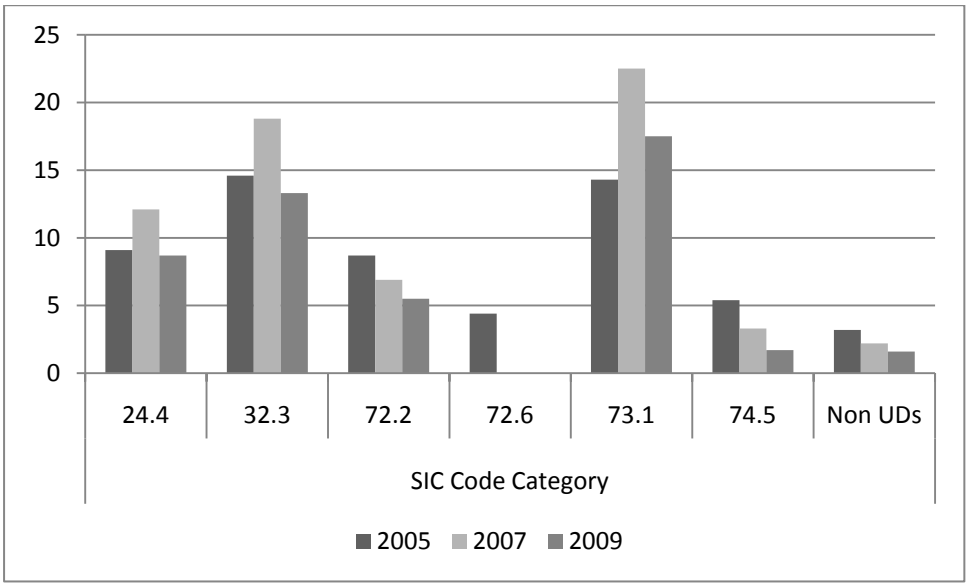


Figure 24: Percentage of PHPs rating scientific journals and trade/technical publications as sources of information for innovation of high importance

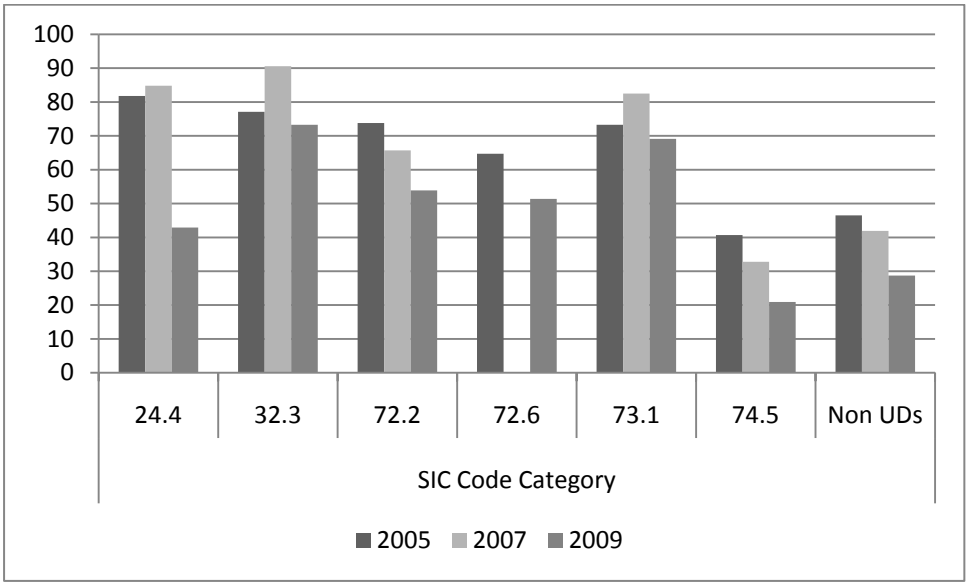


Figure 25: Percentage of PHPs rating scientific journals and trade/technical publications as sources of information for innovation of some importance

- Highly important to a greater proportion of SIC 73.1 and 32.3 enterprises than other PHPs
- At the level of 'some importance', very little discriminates between PHPs

Professional and industry associations

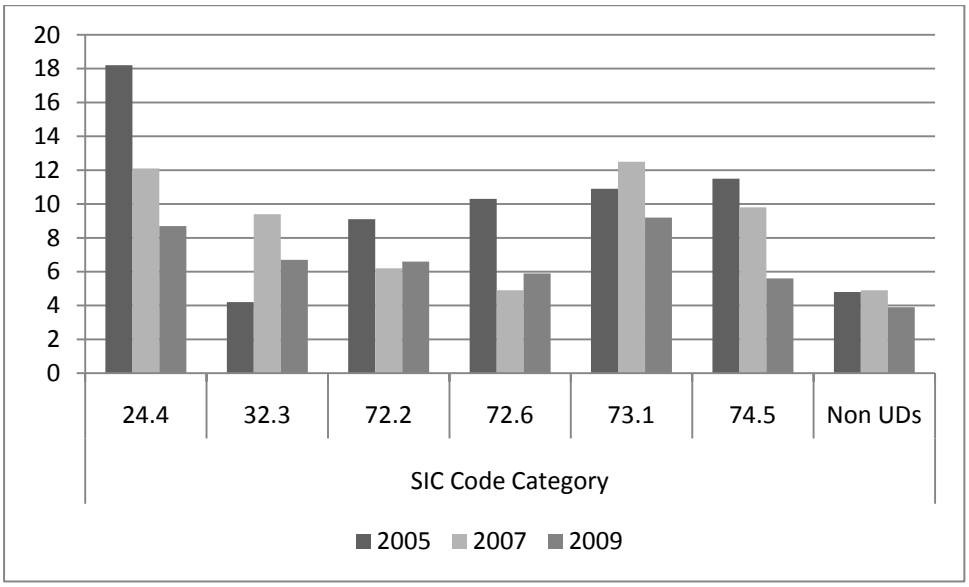


Figure 26: Percentage of PHPs rating professional and industry associations as sources of information for innovation of high importance

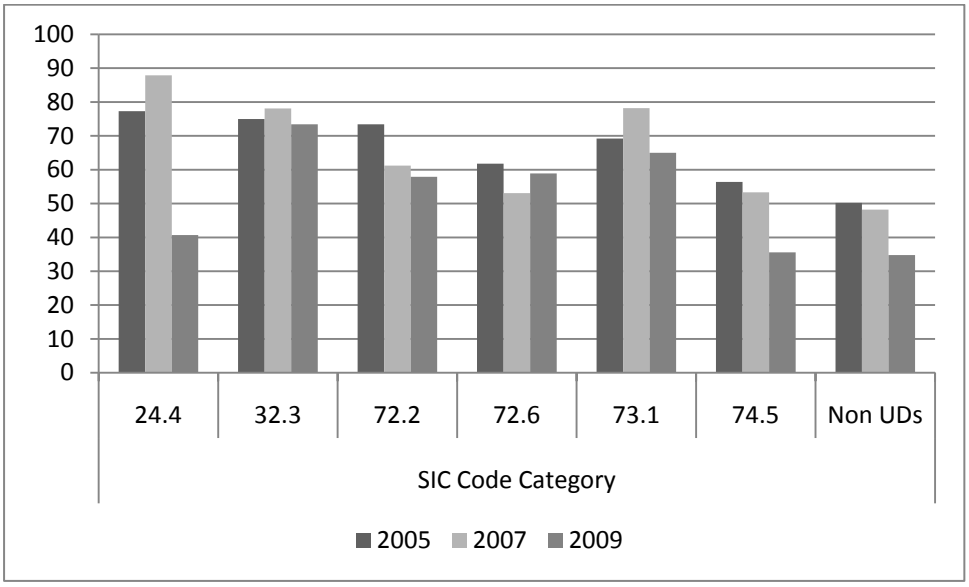


Figure 27: Percentage of PHPs rating professional and industry associations as sources of information for innovation of some importance

- Highly important to a greater proportion of SIC 24.4 enterprises than other PHPs
- Rare occasion on which SIC 74.5 rates exceed those of Non UDs
- At the level of 'some importance', very little discriminates between PHPs

Technical, industry or service standards

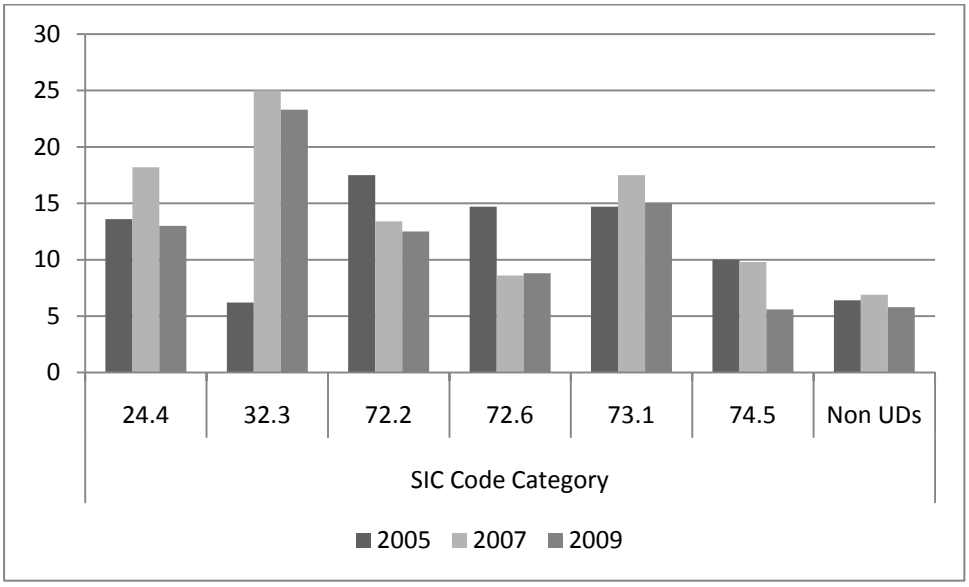


Figure 28: Percentage of PHPs rating technical, industry or service standards as sources of information for innovation of high importance

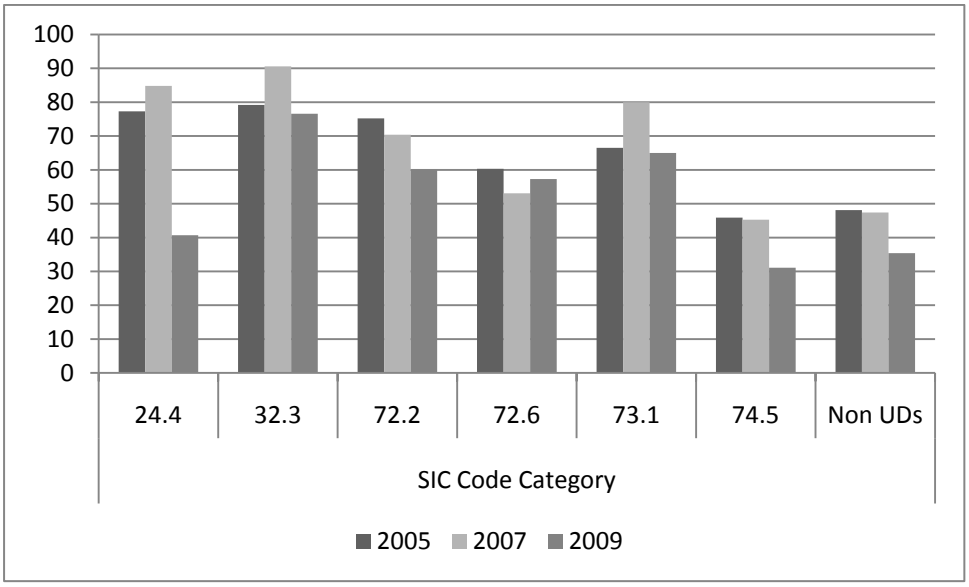


Figure 29: Percentage of PHPs rating technical, industry or service standards as sources of information for innovation of some importance

- Highly important to a greater proportion of 32.3 enterprises than other PHPs, except in UKIS 2005 when it had the smallest proportion of all PHPs
- At the level of 'some importance', very little discriminates between PHPs

Summary

- PHPs have been found across a small but diverse set of 3 digit SIC Code classifications and include manufacturing and service firms
- PHPs have been found to be highly differentiated on important dimensions of engagement in innovation activities and sources of information for innovation) from other respondents, notably Non UDs
- There are no clearly discernible unifying patterns in the analysis of PHPs, no obvious rising or falling trends
- Within the general PHP category, there is considerable variance suggesting different approaches to innovation and re-affirming that there is unlikely a 'one-size-fits-all' solution to the challenge of innovation
- PHP SIC Code 74.5 is a curiosity. Whilst clearly a high performer, in terms of innovation activities it is difficult to distinguish the category from Non UD respondents. A similar picture pertains regarding sources of information for innovation: little distinguishes SIC 74.5 enterprises from Non UD enterprises.

THE GEOGRAPHICAL DISTRIBUTION OF HIGH INNOVATION PERFORMANCE

One simple, but discounted, method of identifying highly innovative post code areas is illustrated below in appendix 6. This method relies on determining what proportion of each Post Code area is accounted for by respondents registering any level of activity in any of the innovation measures.

Of course, even with the application of the general rule of including only those Post Code areas with ≥10 respondents, this approach is subject to several limitations. The most notable of these is that this method fails adequately to capture and reflect the highest levels of innovation. As Table 2 indicates, for each innovation measure there exists a long tail of lower performers and it may be the case that a Post Code area comprising of a high proportion of qualifying enterprises consists principally of respondents from the long tail of lower performers – an example of such an analysis is presented, for illustrative purposes, at appendix 6. Due to these limitations, an alternative approach to identifying high performing Post Code areas that focuses on respondents constituting the upper deciles of innovation measures is preferred. For these reasons, the same approach used to identify high performing SIC Code categories is adopted here:

$$\frac{N_{judk}}{N_{jimk}}$$

Where, for each Post Code area

> N_{jud} is the number of respondents from Post Code area *j* in the upper decile of innovation measure *k*, and
>
> N_{jimk} is the number of respondents from Post Code area *j* in the innovation measure *k*

For example, in UKIS 2009, 6,503 respondents were identified as achieving a level of expenditure on innovation per employee ≥0.01 (innovation measure 1a). The range for IM 1a in 2009 was 0.01 – 13,158.95, with a lower limit for the upper decile of 9.83. The upper decile consisted of 651 respondents. A total of 53 respondents from Post Code area CB (Cambridge) were identified in IM1a in 2009 of which 23, or 43%, appeared in the upper decile. No Post Code area had a higher proportion of its respondents in the upper decile for this measure of innovation in 2009 (illustrated in Table 8, see also Map 1).

Table 8: Determining highly innovative Post Code areas

	UKIS 2009	
	Innovation measure 1a	**All respondents**
Sample size	6,503	14,281
Upper decile of IM1a	651	n/a
Post Code area CB enterprises	53	111
Post Code area CB enterprises in Upper Decile	23	n/a

Highly innovative Post Code areas were determined to be those found consistently to have a greater proportion of respondents in the upper decile of performers across the seven measures of innovation and over time, than others.

UKIS data offer a range of opportunities for exploring the spatial distribution of innovation, including 13 Government Office Regions (including Scotland, Wales and Northern Ireland, though not strictly GORs) and 124 Post Code areas. Analysis at the level of Government Office Region does not provide a particularly nuanced picture of innovation activity; indeed, it presents a rather indistinct picture in terms distinguishing between levels of performance.

Figure 30, reproduced from (Adams, 2011), shows the distribution of innovation active enterprises across the Government Office Regions of the UK. At the level of Government Office Region, three things strike about the distribution of innovation active enterprises across the country:

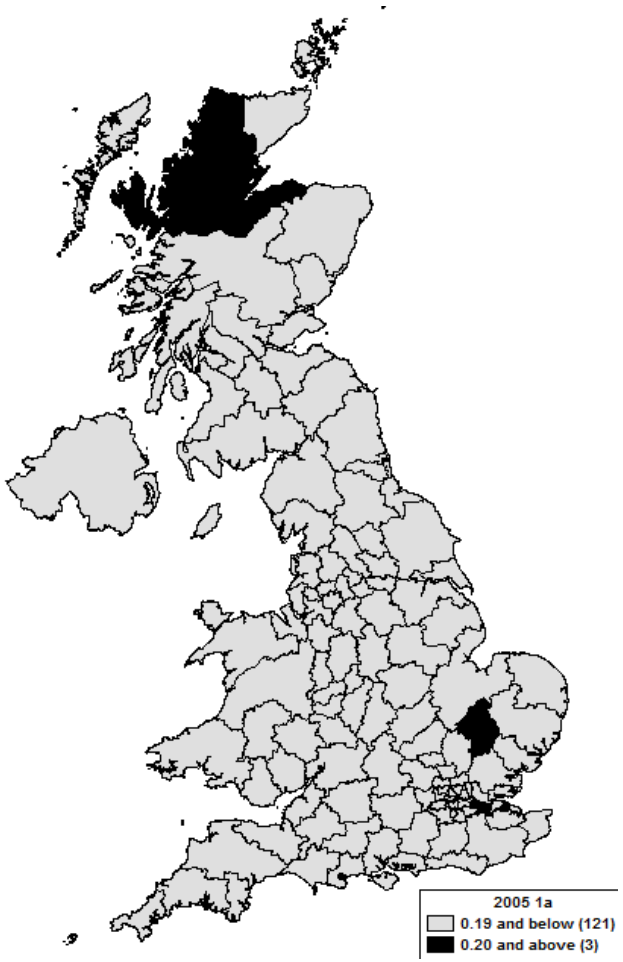
- There appears to be a high level of consistency between GORs and between periods. The majority fall between 60% and 70% with a small number of outliers above and below this range.
- Across the country and each GOR, there are proportionately more enterprises reporting themselves innovation active in UKIS 2007 than in either of the other two periods.
- Although several GORs outperformed the UK average for innovation active enterprises in one or two of the periods, only one, Yorkshire and the Humber, outperformed the national average for each of the three periods.

In summary, analysis of the distribution of innovation active enterprises at the level of Government Office Region does not provide any very clear indication of where more or less innovation, more or less investment in innovation, more or less return from innovation or, where more or less new-to-the-market or new-to-the enterprise innovation occurs. This raises important questions about precisely where across the UK this variety is distributed and analysis at the level of Post Code area allows for this.

Figure 30: Government Office Regions' shares of innovation active enterprises

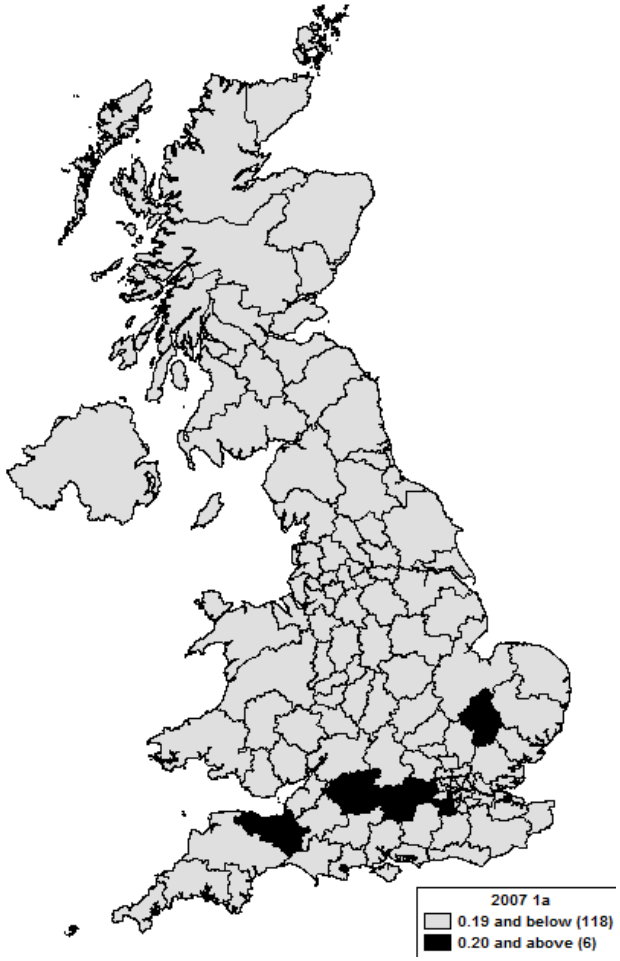
For each innovation measure, 3 maps have been produced (Maps 1-7), each displaying High Performing Post Code areas (i.e. those in which ≥20% respondents are in the upper decile) for each of the three periods of the survey.

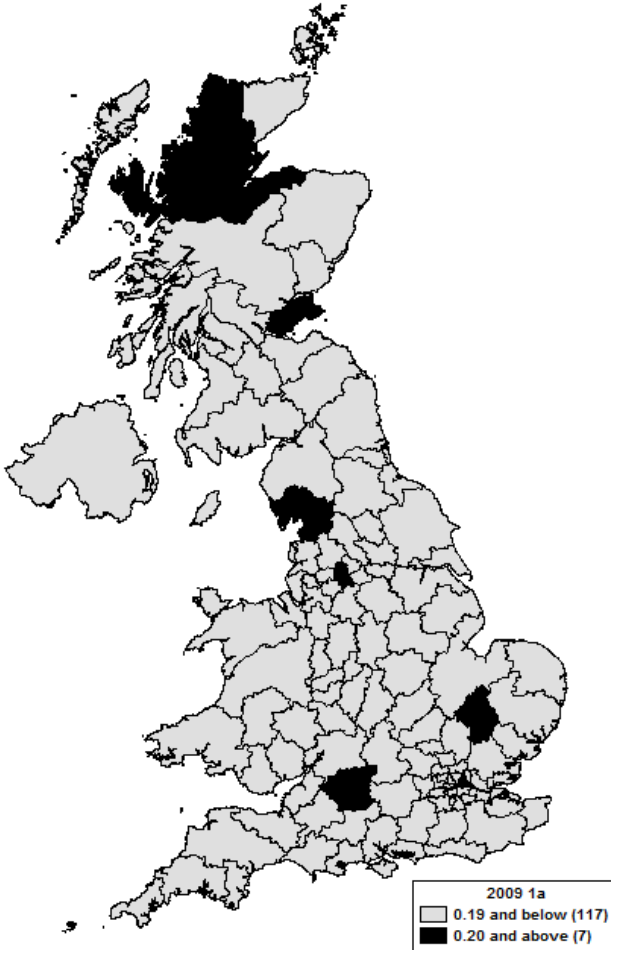
Most immediately apparent is just how diverse the distribution of high performers from period to period is: seemingly, high performance in one period is not an indicator of high performance in the next. As was seen in the analysis at 3 digit SIC Codes, and so, perhaps, unsurprisingly, high performance is widely distributed and apparently difficult to sustain across the different measures of innovation and over time.



Cambridge	0.29
Inverness	0.23
Dartford	0.22

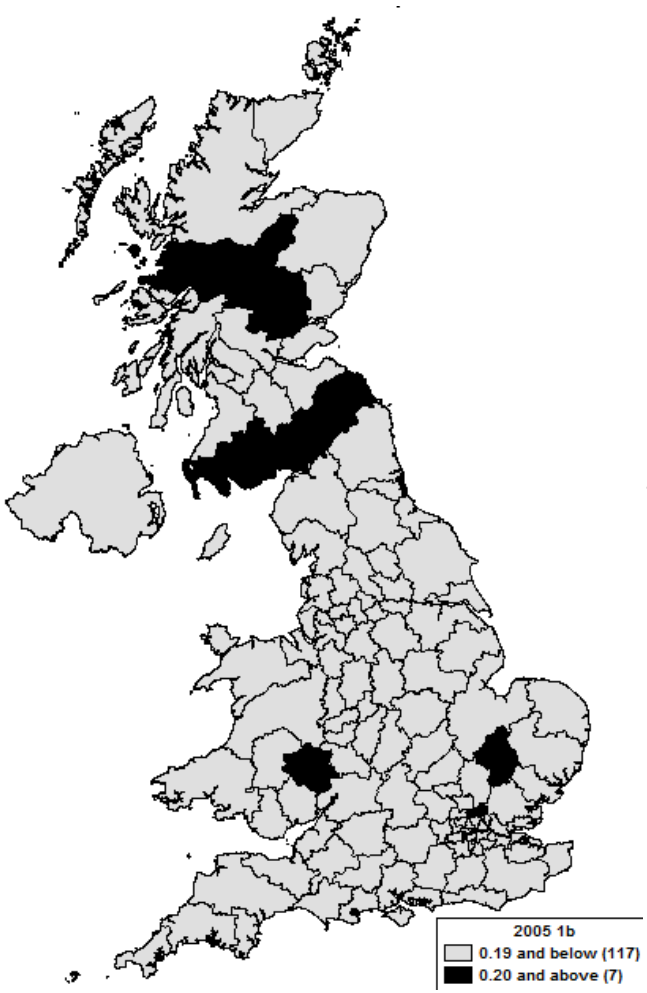
Kingston upon Thames	0.25
Taunton	0.24
Slough	0.23
Swindon	0.22
Cambridge	0.21
Reading	0.21



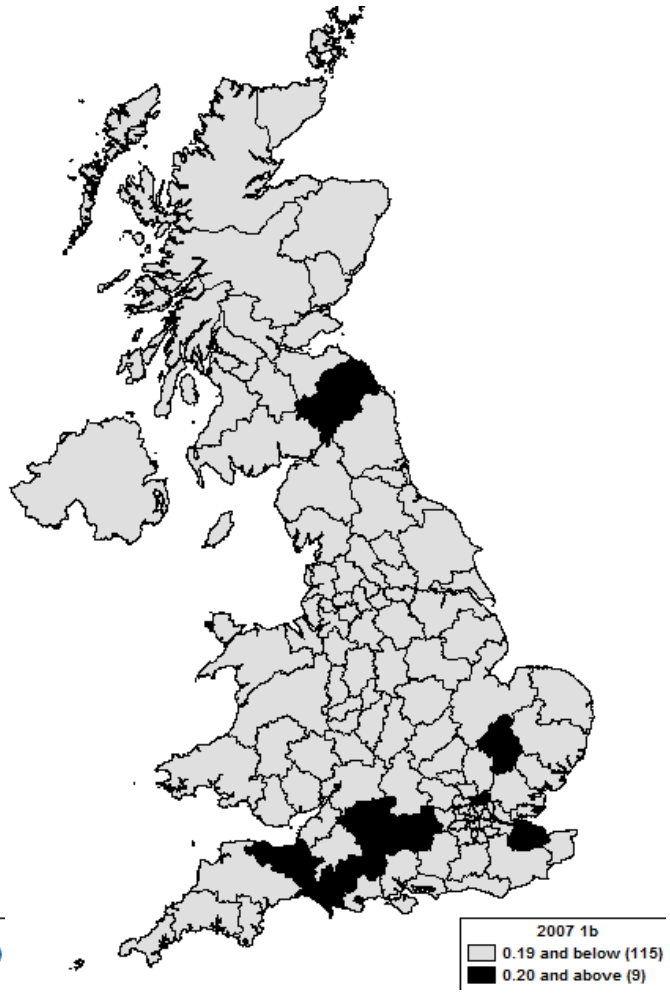


Cambridge	0.43
Inverness	0.26
Swindon	0.21
Kirkcaldy	0.21
London E	0.20
Lancaster	0.20
Oldham	0.20

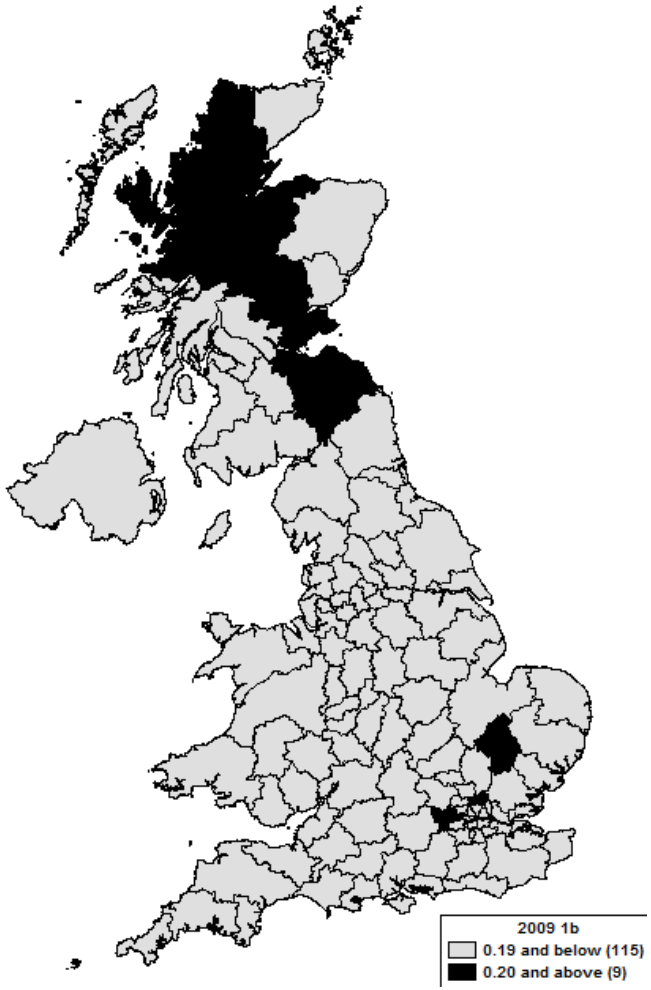
Map 1: High performing Post Code areas (expenditure on innovation per employee) 2005-2009



Cambridge	0.27
Hereford	0.25
Enfield	0.21
Dumfries	0.20
Perth	0.20
Sunderland	0.20
Berwick upon Tweed	0.20

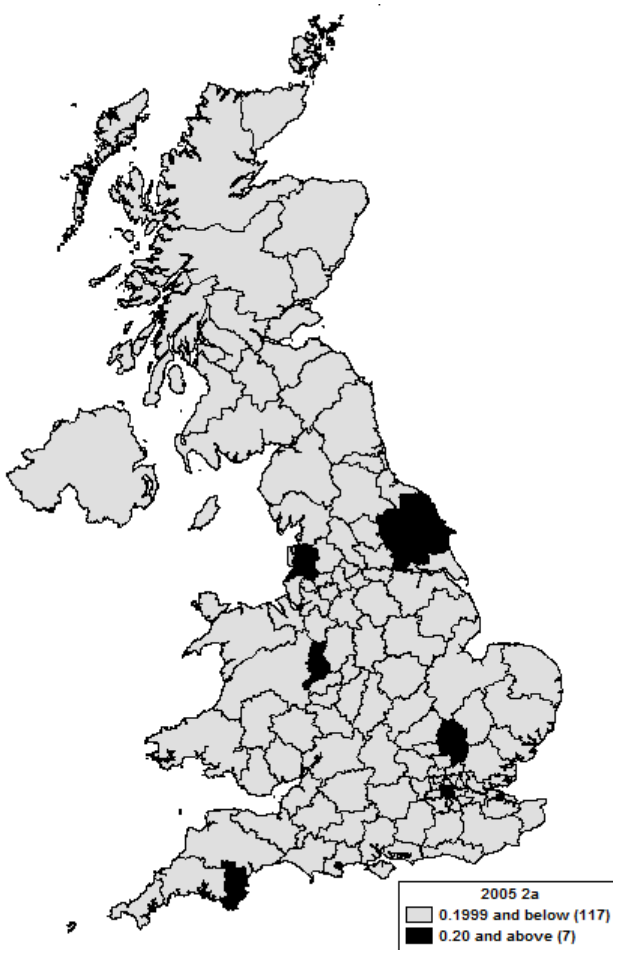


Taunton	0.27
Berwick upon Tweed	0.25
Enfield	0.24
Swindon	0.24
Reading	0.23
Cambridge	0.23
Maidstone	0.23
Salisbury	0.21
Dorchester	0.20



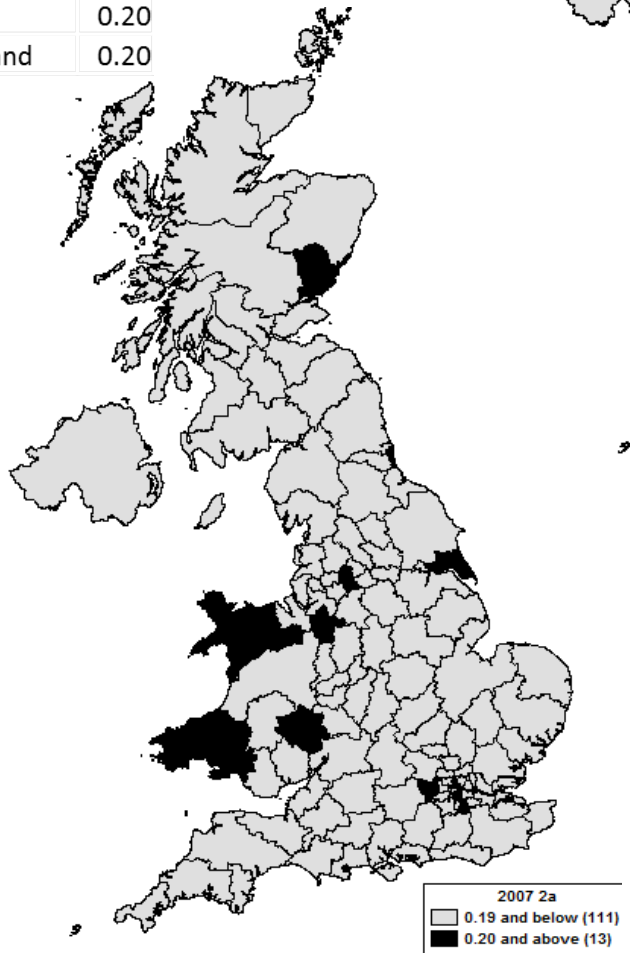
Cambridge	0.42
Perth	0.27
Berwick upon Tweed	0.27
Uxbridge	0.27
Inverness	0.24
Edinburgh	0.23
Kirkcaldy	0.23
Enfield	0.20
Slough	0.20

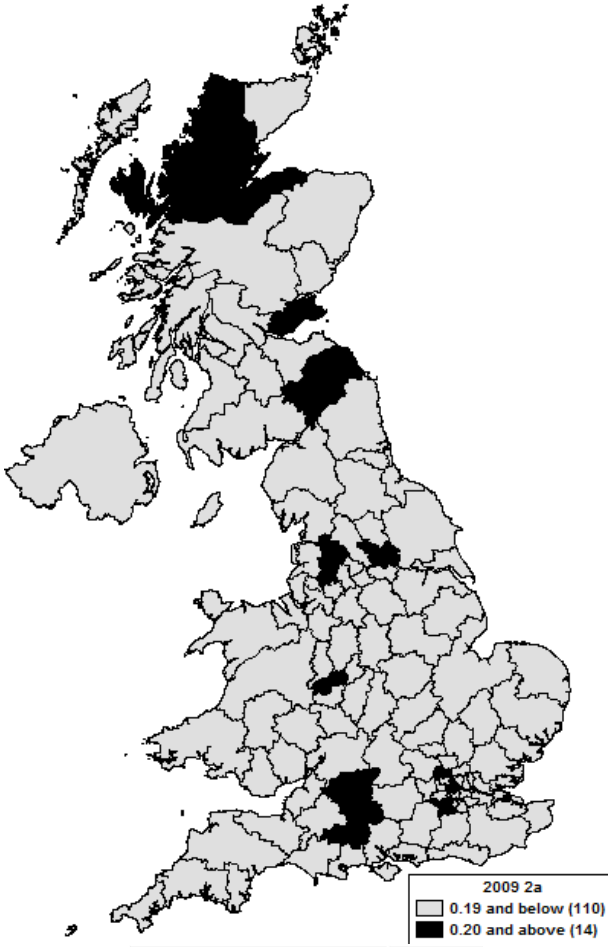
Map 2: High performing Post Code areas (expenditure on innovation as a percentage of turnover) 2005-2009



Telford	0.29
London SW	0.24
Torquay	0.24
Preston	0.23
Stevenage	0.22
York	0.22
London W	0.21

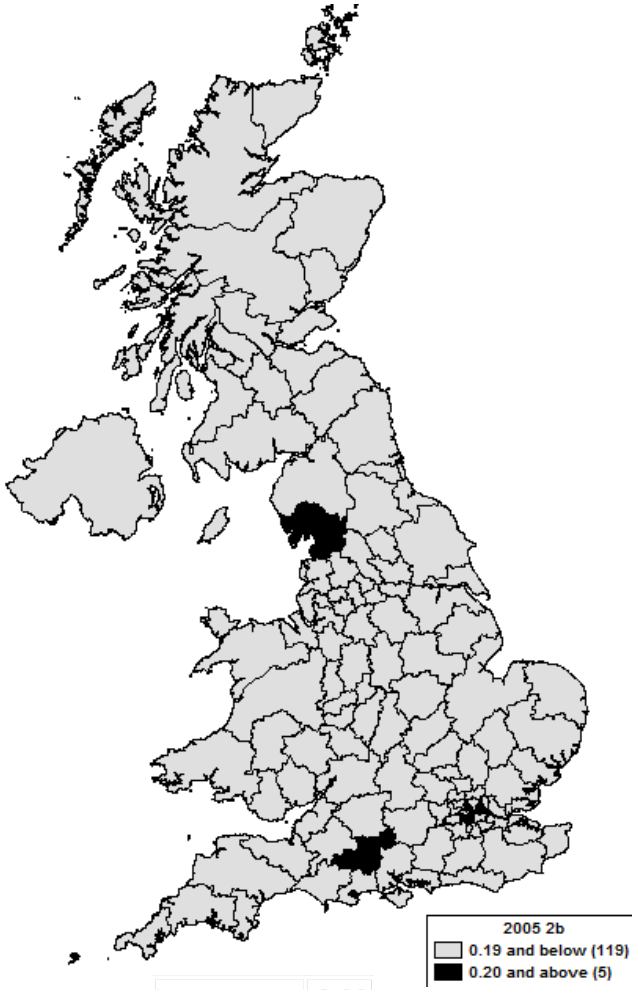
Hereford	0.27
Crewe	0.25
Hull	0.25
Dundee	0.24
London NW	0.23
London SW	0.23
Swansea	0.22
Llandudno	0.21
Croydon	0.20
London EC	0.20
Oldham	0.20
Slough	0.20
Sunderland	0.20



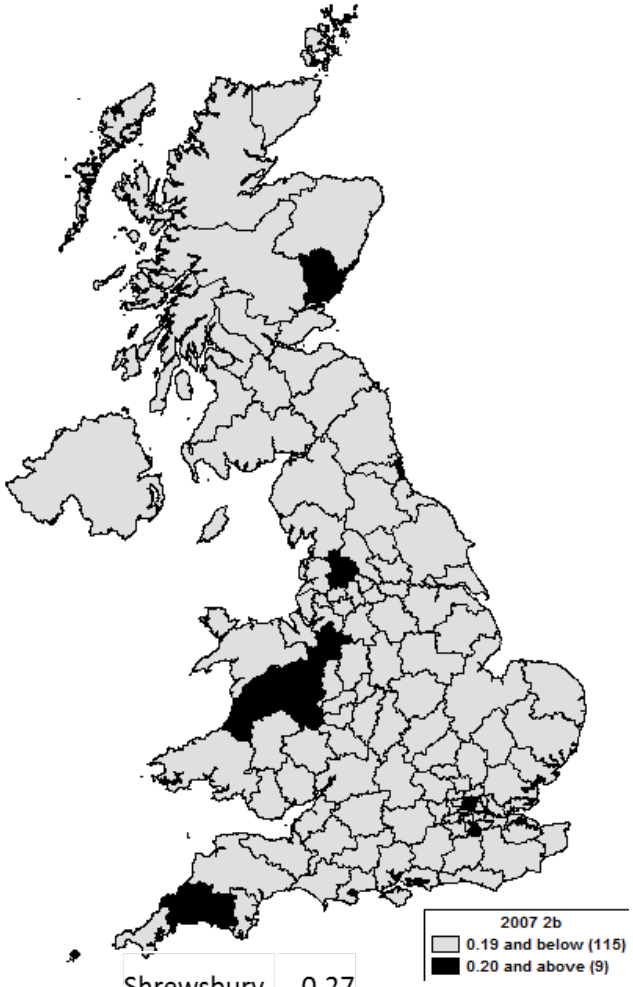


Salisbury	0.30
Bolton	0.29
Berwick upon Tweed	0.27
Wolverhampton	0.27
Swindon	0.25
London W	0.25
Watford	0.25
London NW	0.24
Blackburn	0.23
Inverness	0.23
London WC	0.21
Leeds	0.20
Kingston upon Thames	0.20
Kirkcaldy	0.20

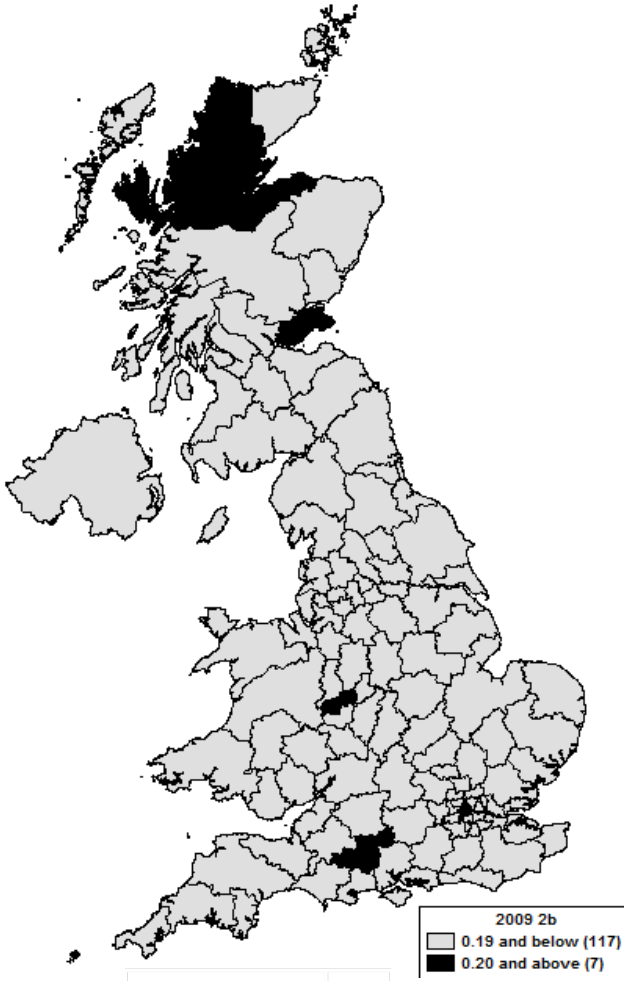
Map 3: High performing Post Code areas (percentage of turnover from innovation) 2005-2009



Lancaster	0.33
Salisbury	0.33
London SW	0.23
London E	0.21
London NW	0.20

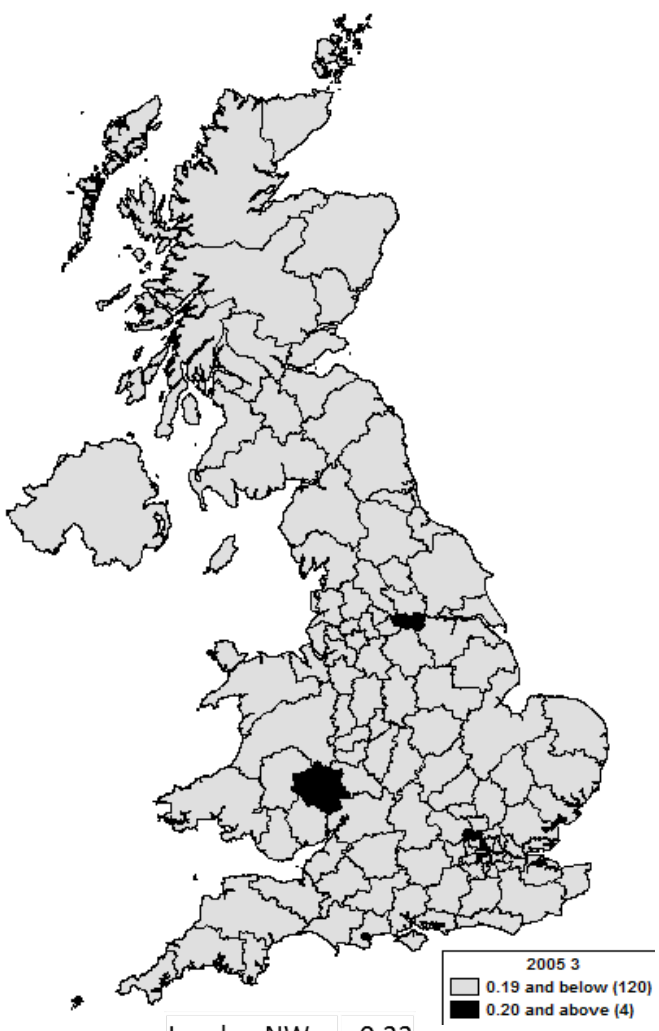


Shrewsbury	0.27
Crewe	0.25
London NW	0.25
Dundee	0.24
Plymouth	0.22
Blackburn	0.21
Croydon	0.20
London N	0.20
Sunderland	0.20

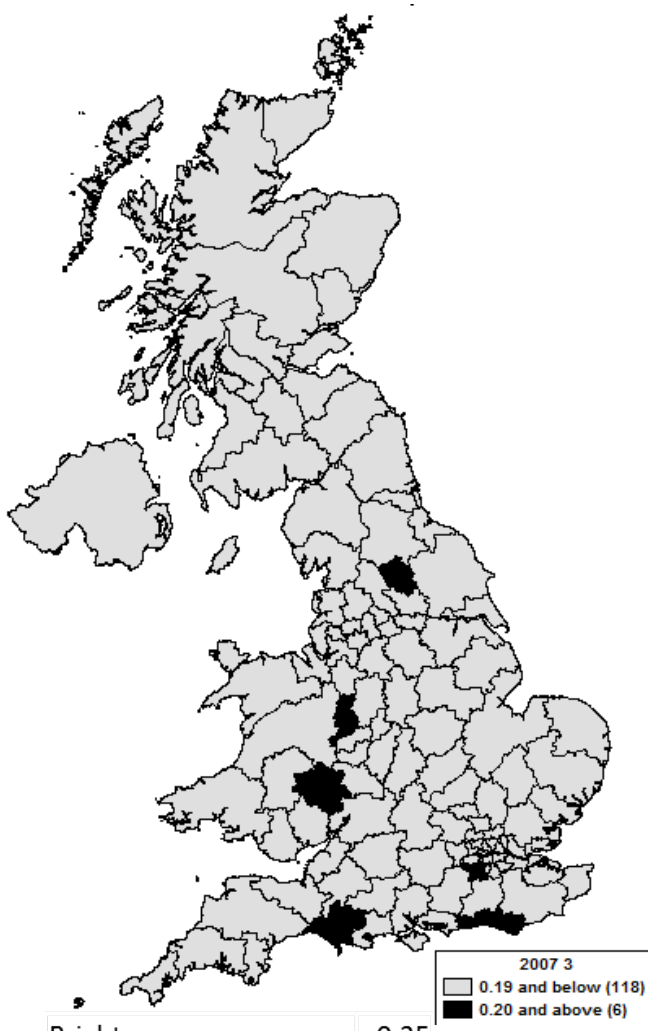


Inverness	0.38
Salisbury	0.30
London NW	0.29
London WC	0.21
London W	0.20
Kirkcaldy	0.20
Wolverhampton	0.20

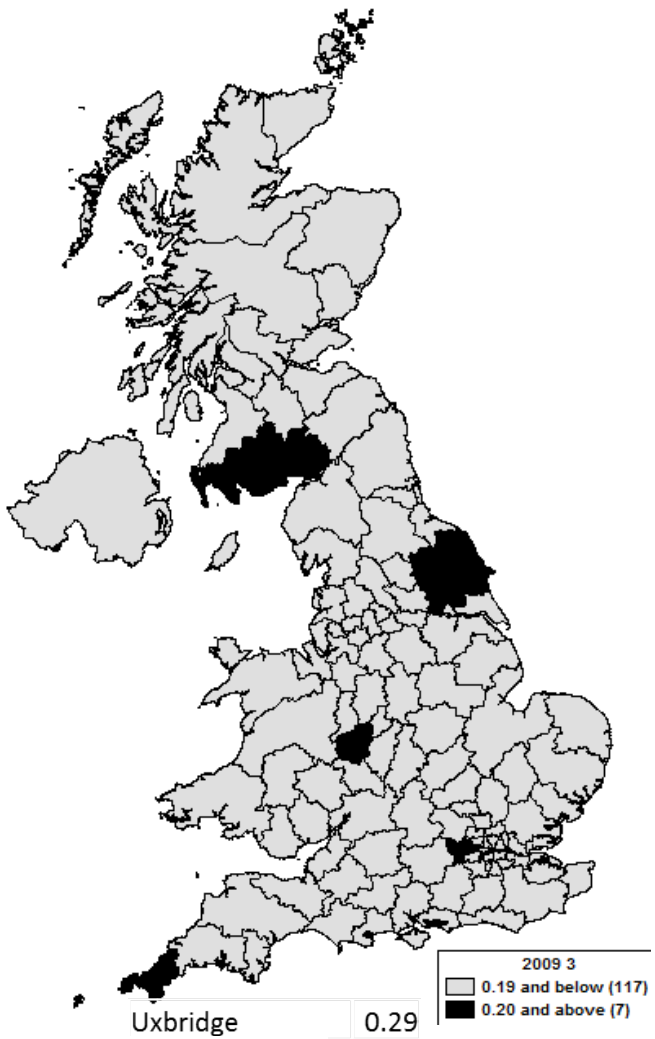
Map 4: High performing Post Code areas (percentage of turnover from innovation per employee) 2005-2009



London NW	0.22
Watford	0.22
Hereford	0.21
Wakefield	0.20

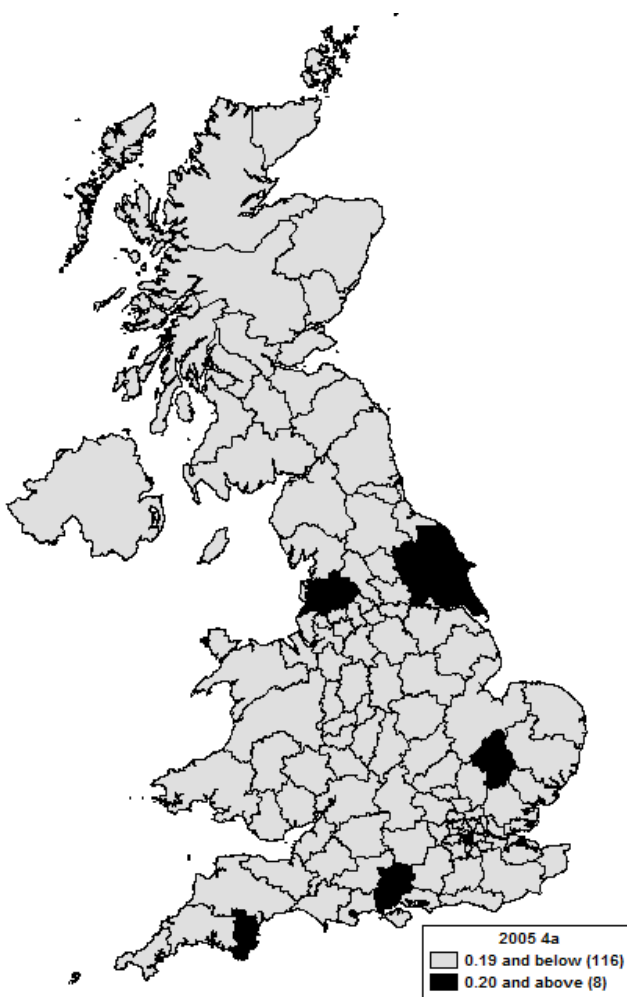


Brighton	0.25
Kingston upon Thames	0.22
Dorchester	0.21
Hereford	0.21
Harrogate	0.21
Telford	0.20

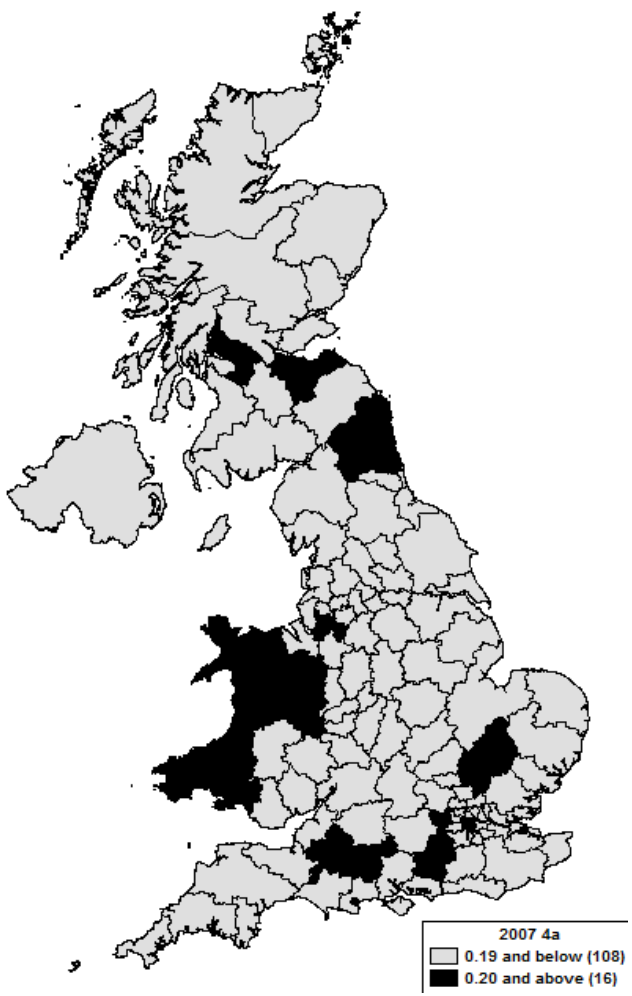


Uxbridge	0.29
	0.26
Dudley	0.24
Slough	0.22
Truro	0.21
Wolverhampton	0.20
York	0.20

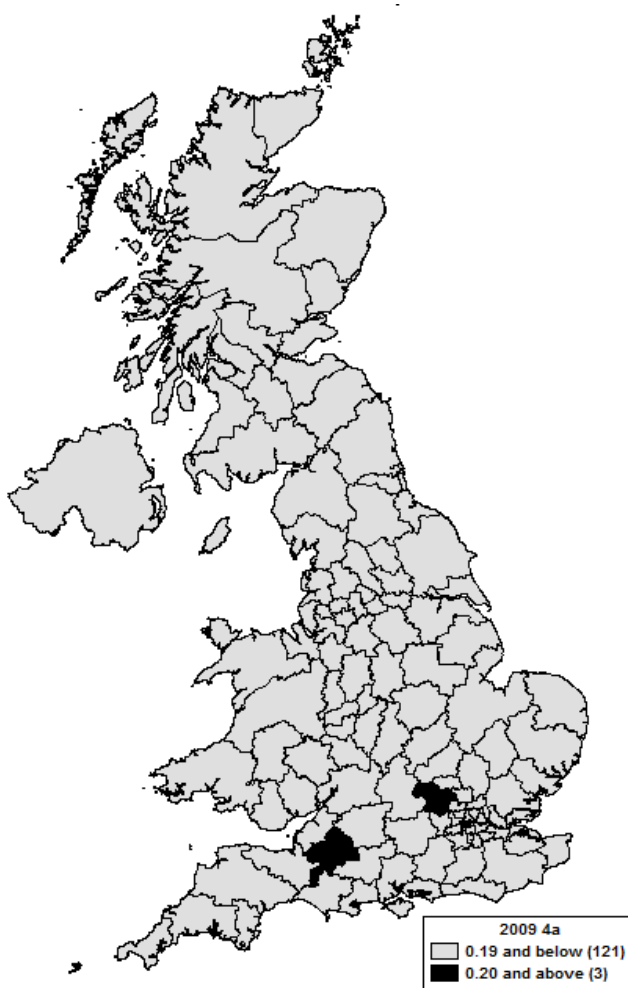
Map 5: High performing Post Code areas (innovation activities) 2005-2009



London SW	0.28
Torquay	0.27
York	0.26
Hull	0.25
Preston	0.23
Cambridge	0.21
Blackburn	0.20
Southampton	0.20

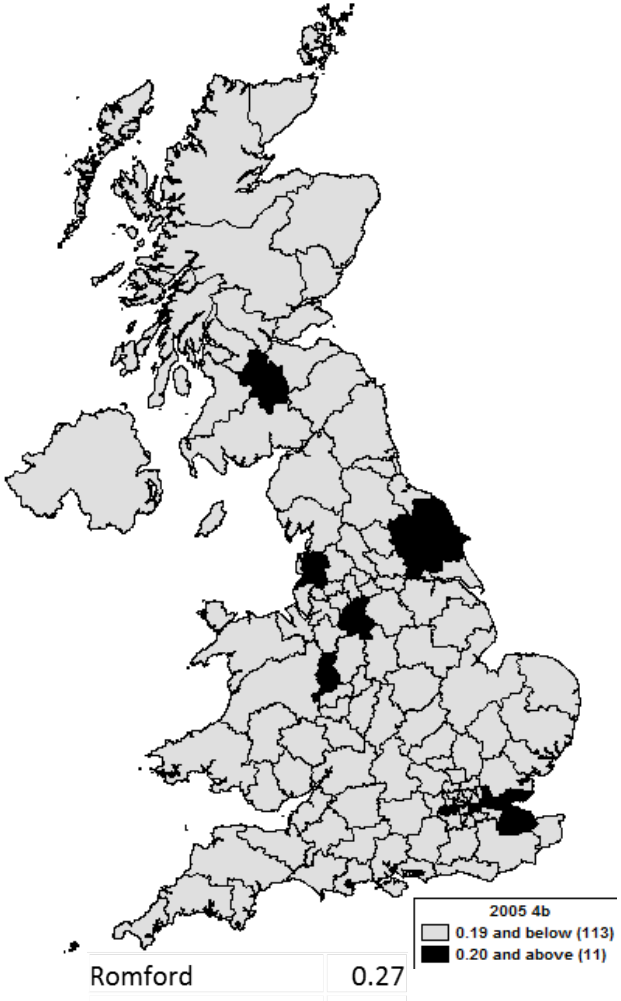


Bath	0.40	Cambridge	0.21
Slough	0.38	Swansea	0.21
Llandudno	0.31	London SW	0.21
Shrewsbury	0.27	Edinburgh	0.21
Warrington	0.26	Glasgow	0.20
Guildford	0.26	Newcastle upon Tyne	0.20
London EC	0.25	Stevenage	0.20
London W	0.23	Salisbury	0.20

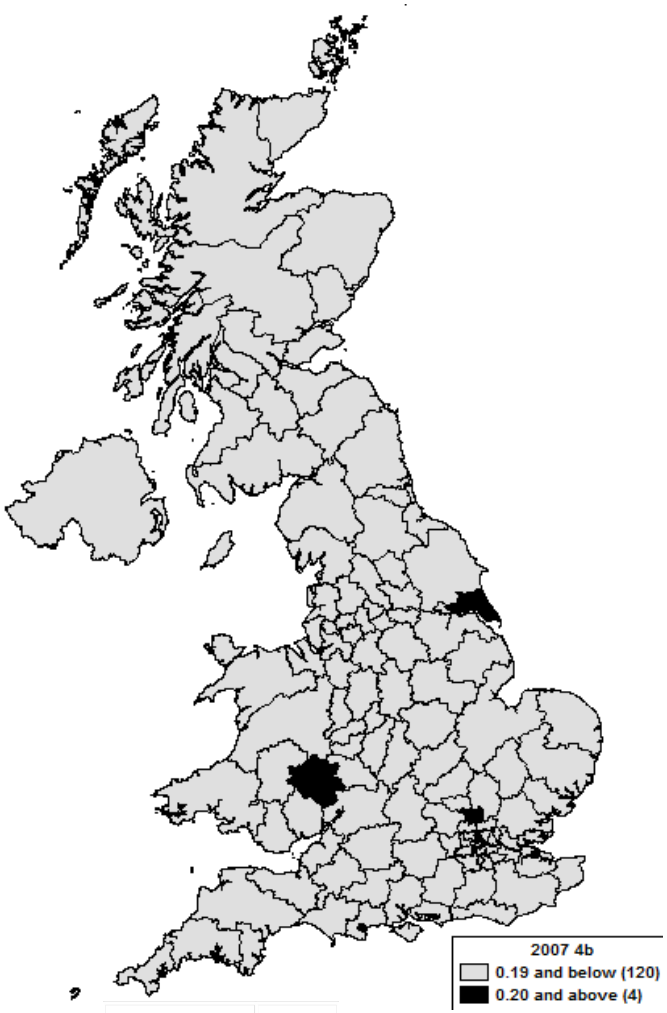


Bath	0.36
London W	0.25
Hemel Hempstead	0.23

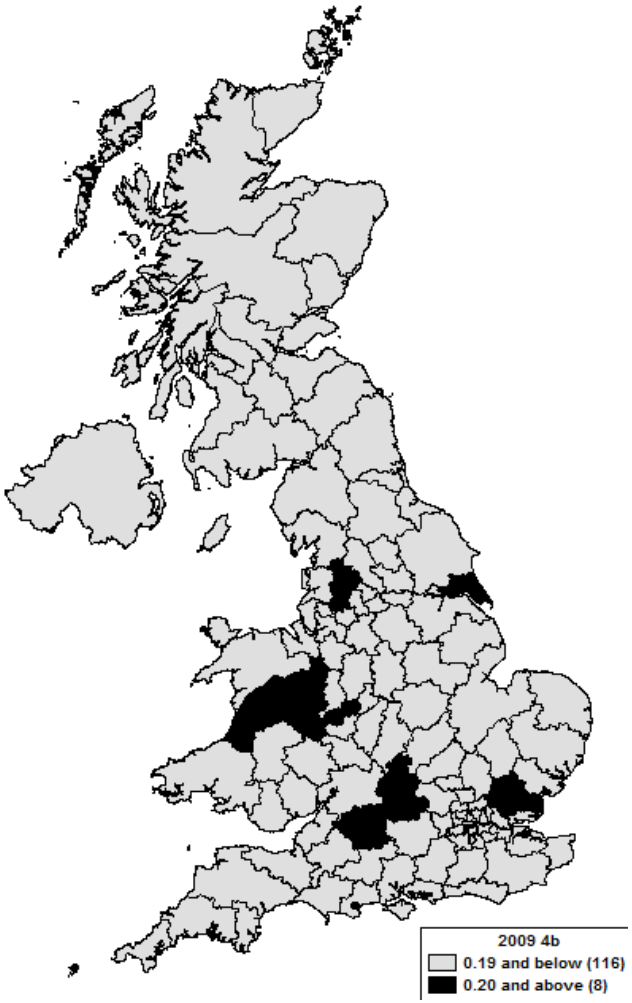
Map 6: High performing Post Code areas (new-to-the-market innovation) 2005-2009



Romford	0.27
York	0.26
Motherwell	0.23
Preston	0.22
London SE	0.22
Maidstone	0.21
Telford	0.21
Twickenham	0.21
Stockport	0.20
Southend on Sea	0.20
London WC	0.20



London NW	0.27
Hereford	0.23
St Albans	0.22
Hull	0.21



Chelmsford	0.25
Bolton	0.23
Wolverhampton	0.21
Blackburn	0.20
Hull	0.20
Oxford	0.20
Swindon	0.20
Shrewsbury	0.20

Map 7: High performing Post Code areas (new-to-firm and significantly improved products) 2005-2009

Table 9presents data reporting the frequency with which the different Post Code areas appear as high performers in Maps 1-7. In some respects, this is quite a remarkable table as it shows that no fewer than 68 different Post Code areas (greater than 50% of the total Post Code areas in the UK) feature as highly innovative in at least one measure of innovation at some point over the three periods of the survey.

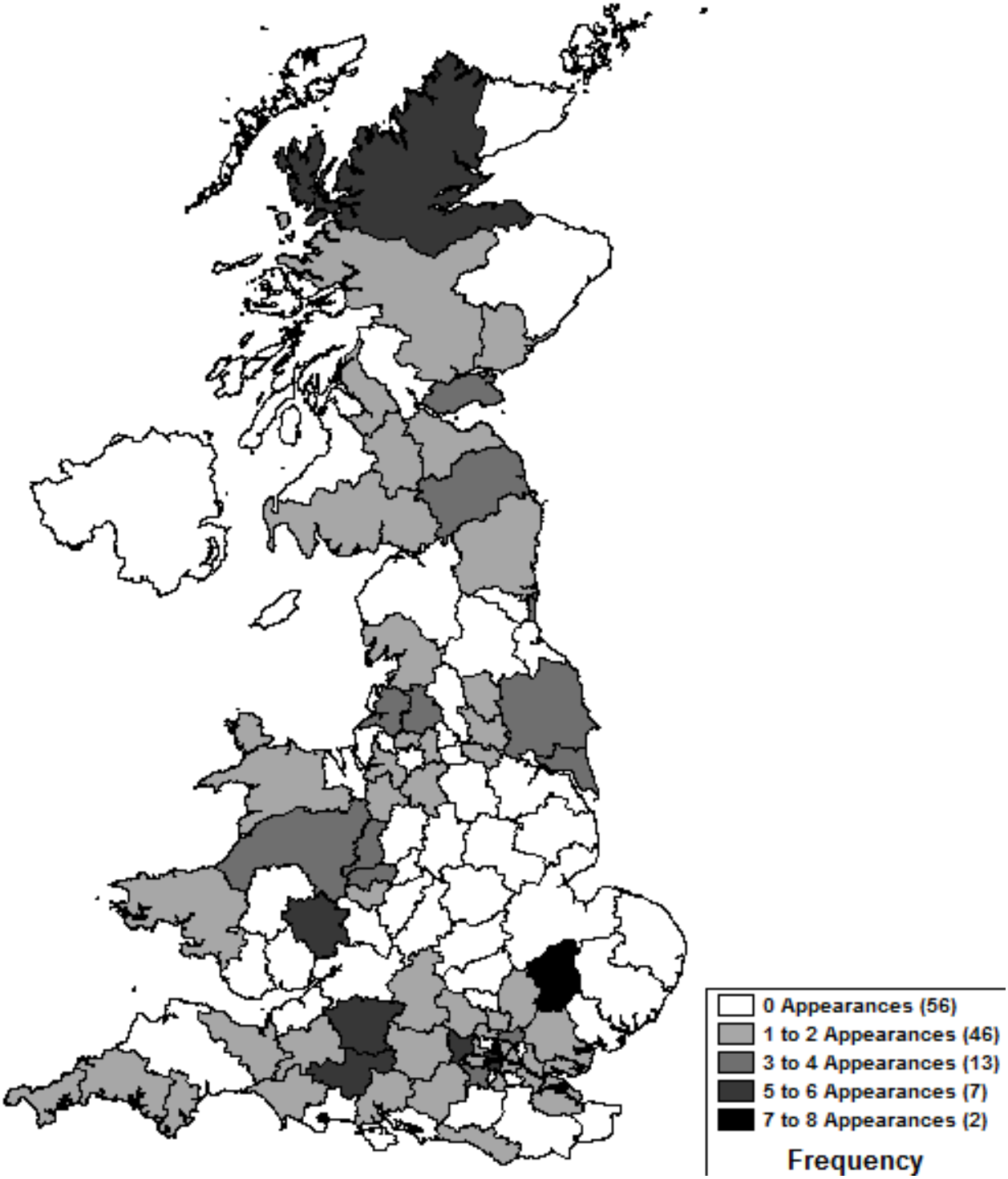
Table 9: Sustained highly innovative Post Code areas: frequency of appearance as high performers (≥0.20) across survey periods and innovation measures

Cambridge	8	Bolton	2	Dartford	1
London NW	7	Crewe	2	Dudley	1
Hereford	5	Croydon	2	Glasgow	1
Inverness	5	Dorchester	2	Guildford	1
London SW	5	Dumfries	2	Harrogate	1
London W	5	Dundee	2	Hemel Hempstead	1
Salisbury	5	Edinburgh	2	Leeds	1
Slough	5	Lancaster	2	London N	1
Swindon	5	Llandudno	2	London SE	1
Berwick upon Tweed	4	London E	2	Motherwell	1
Blackburn	4	London EC	2	Newcastle upon Tyne	1
Hull	4	Maidstone	2	Oxford	1
Kirkcaldy	4	Oldham	2	Plymouth	1
Wolverhampton	4	Perth	2	Romford	1
York	4	Reading	2	Southampton	1
Enfield	3	Stevenage	2	Southend on Sea	1
Kingston upon Thames	3	Swansea	2	St Albans	1
London WC	3	Taunton	2	Stockport	1
Preston	3	Torquay	2	Truro	1
Shrewsbury	3	Uxbridge	2	Twickenham	1
Sunderland	3	Watford	2	Wakefield	1
Telford	3	Brighton	1	Warrington	1
Bath	2	Chelmsford	1		

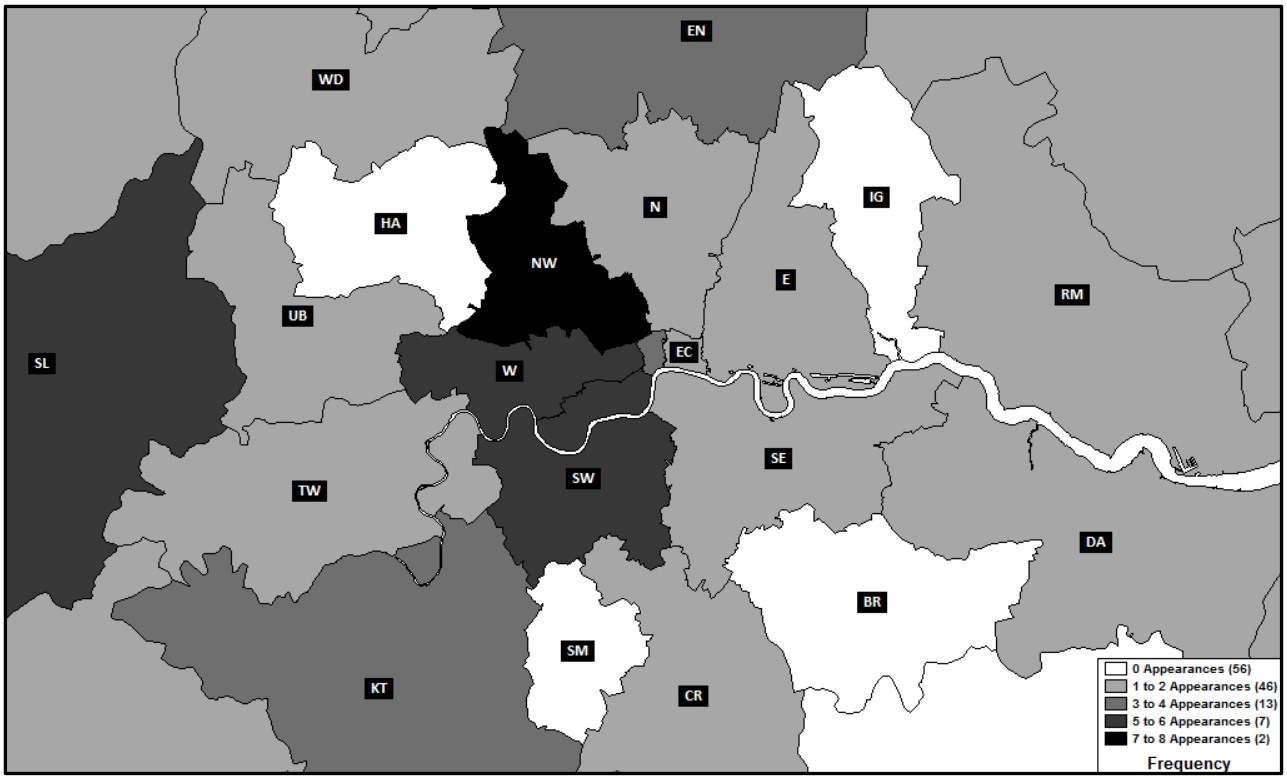
Data from Table 9are presented in Maps 8 and 9. These data, presented cartographically, allow for some interesting observations. The major point is that, although some of the popularly perceived distribution of innovation is reflected in the map – M4 Corridor/Thames Valley, Silicon Glen and the Cambridge Phenomenon – there are some surprising gaps and inclusions:

- The two most persistent high performers are Cambridge and London NW, appearing as high performers 8 and 7 times respectively.
- With two exceptions, the Post Code areas with five appearances (London SW, London W, Salisbury, Slough and Swindon), map onto the M4 corridor.
- The two exceptions (Inverness and Hereford) stand rather isolated, ringed by Post Code areas of lesser high performance frequency.

- A large swathe of central England, extending to the east coast where no Post Code area is a high performer.
- Whilst the inclusion of several Post Code areas in the west of Wales may be unexpected, the absence of high performance registering in any of Gloucester, Bristol, Newport and Cardiff is, perhaps surprising
- Other interesting observations include:
    - The local concentration of high performance in Post Code areas Torquay, Plymouth and Truro
    - Given the congestion of highly innovative areas in the South East of England, the absence of high performance in the contiguous areas of Harrow, Ilford, Sutton, Bromley, Redhill, Tonbridge and Canterbury is notable.
    - Contrary to expectations, perhaps, Oxford appears only once



Map 8: Post Code areas: frequency of appearance as highly innovative



Map 9: Post Code areas: frequency of appearance as highly innovative - Greater London detail

To discover whether or not highly innovative Post Code areas enjoy different relationships with different sources of information for innovation, all respondents from those Post Code areas with a frequency of appearance count ≥5, which are assumed to be persistently highly innovative (see Table 11) were compared against all other Post Code areas.

The expectation might be that the most highly innovative Post Code areas would be characterised by a generally greater emphasis on the importance of knowledge sources of all types than other Post Code areas. By and large, this is the case, but not always by a large degree of magnitude. In some cases, there are unremarkable differences between these highly innovative Post Code areas (HPs) and Non HPs that value some information sources as highly important to their innovation activities. It is not that these sources are rated unimportant, but that approximately equal proportions of HPs and Non-HPs rate them as highly important.

Also, there is a small number of cases where a greater proportion of Non HPs rate a source highly important than do HPs. These include:

- 2007 – Universities or other higher education institutes (Figure 37)
- 2009 – Professional and industry associations (Figure 41)
- 2005 – Technical, industry or service standards (Figure 42)

A stronger effect may have been achieved if other highly innovative post code areas (i.e. those with a frequency count of ≤4, see Table 7) across survey periods and innovation measures had been stripped out of the analysis – looking only at those post code areas that did not feature at least one as a high performer in any measure in any year. However, these were in the minority 56 out of 124 Post Code areas, some of which would be excluded from analysis on the basis of low cell counts.

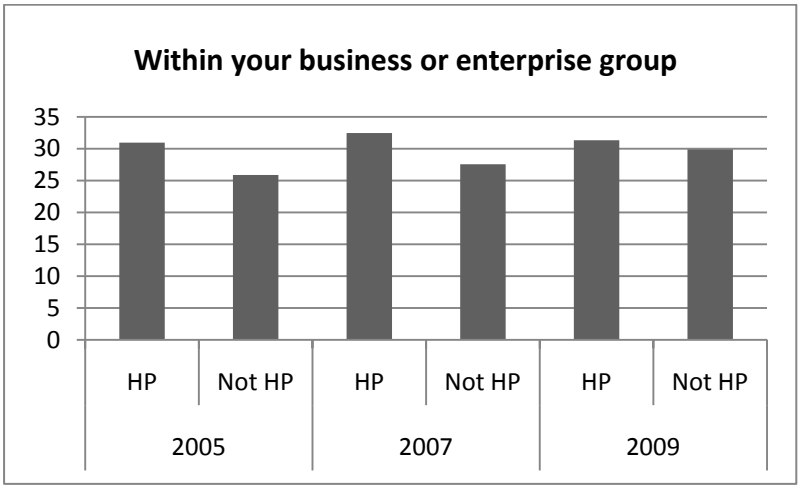


Figure 32: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

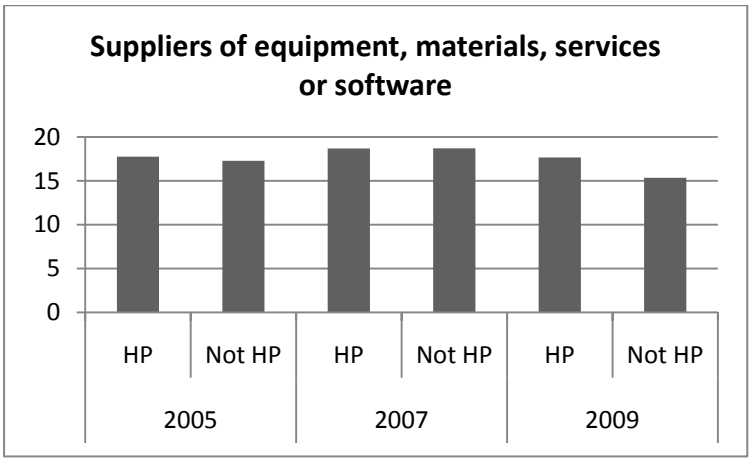


Figure 33: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

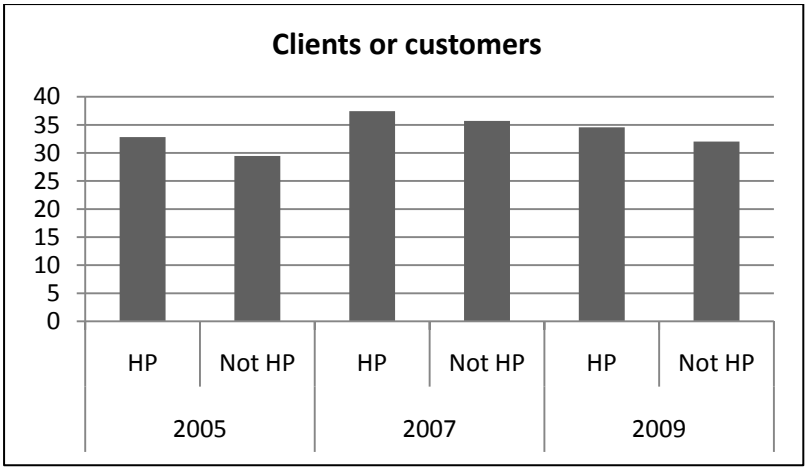


Figure 34: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

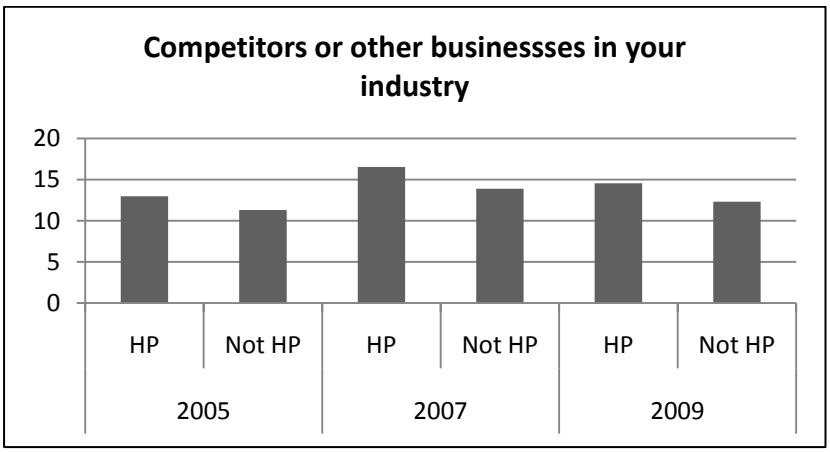


Figure 35: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

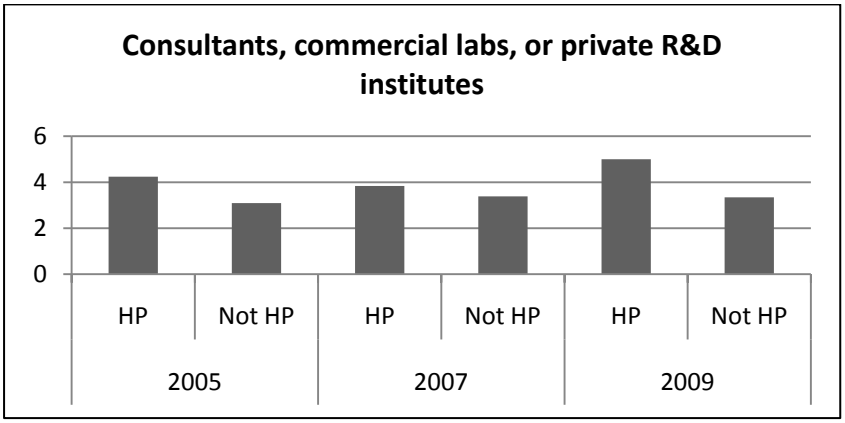


Figure 36: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

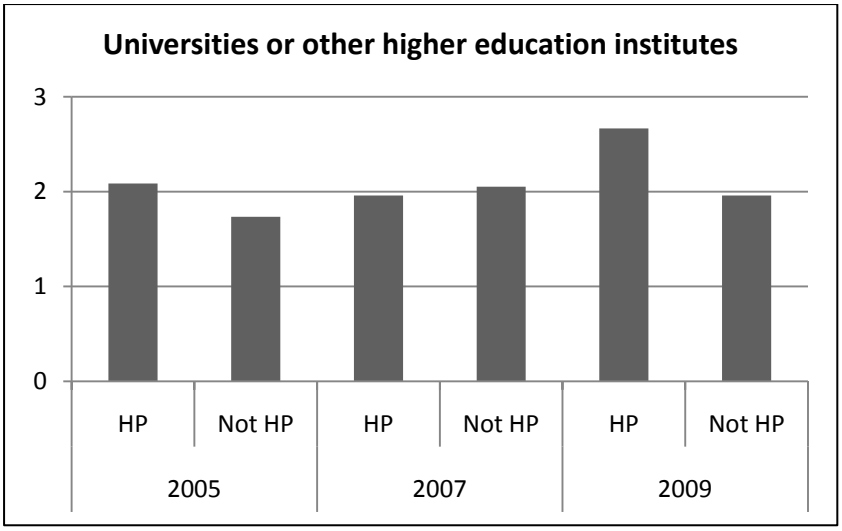


Figure 37: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

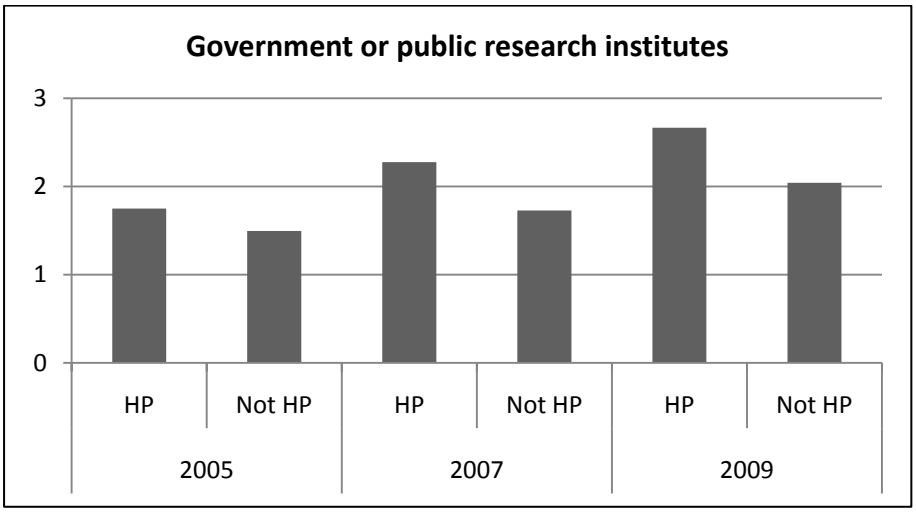


Figure 38: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

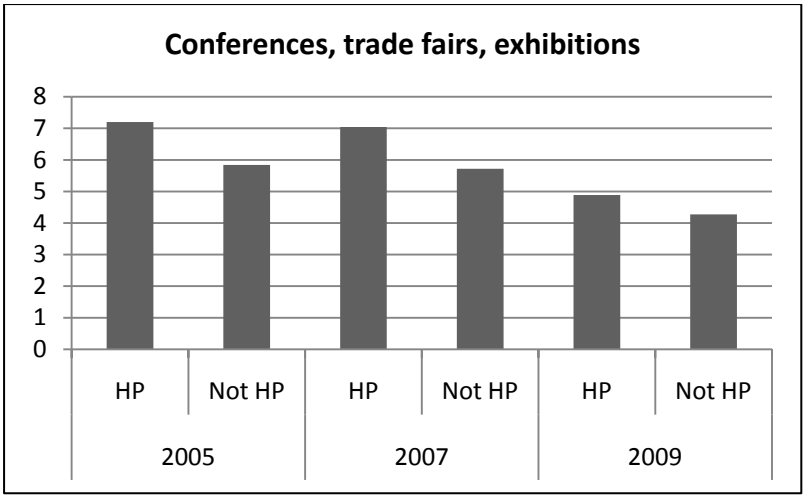


Figure 39: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

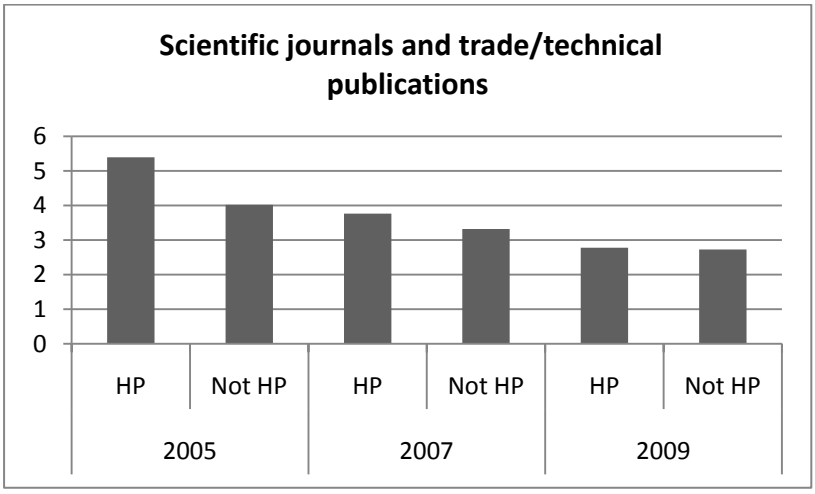


Figure 40: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

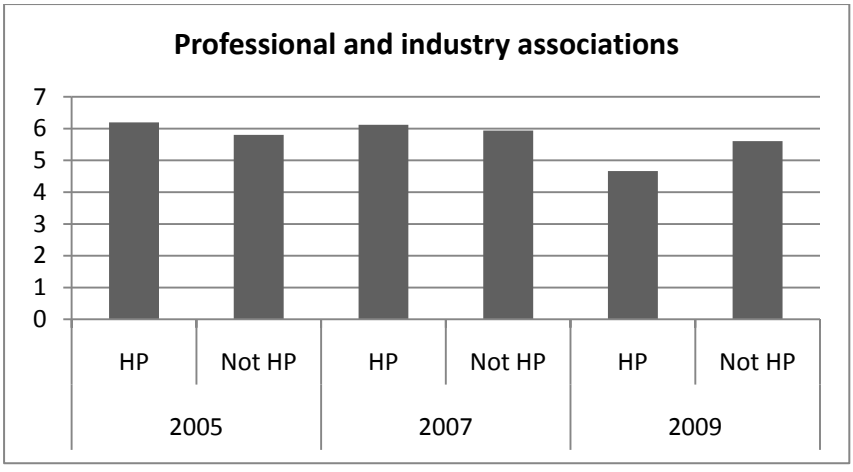


Figure 41: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

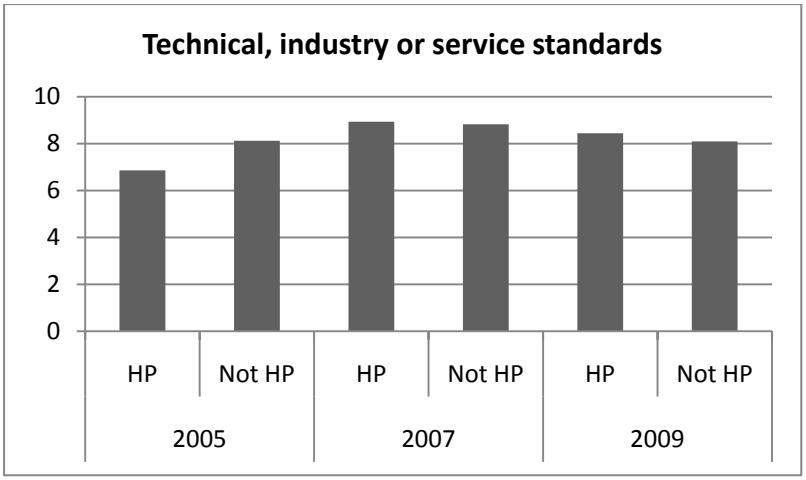


Figure 42: High performing Post Code areas rating source of knowledge highly important (vs. non high performers) %

INNOVATION AND INTERNAL R&D

The UK innovation surveys ask respondents to indicate whether or not they have engaged in any of 12 different activities (seven in UKIS 2005) that are fundamentally important to innovation. As this (see Figure 1), and previous studies have shown, internal R&D is amongst the most commonly engaged-in innovation activity by innovators across all sectors (Robson & Haigh, 2008; Robson & Kenchatt, 2010). R&D activity has also frequently been used as a proxy for innovation in research projects and has been a focus of government policy, and so it is interesting to investigate how R&D activity is distributed through the UK.

Tables 12-16address the question *how is R&D activity distributed?* and focus particularly on where most and least internal R&D occurs.

In Table 13,for example, of those enterprises that reported some innovation expenditure per employee in UKIS 2009 (n=6,503), 56% reported having engaged in R&D. At the level of Post Code, the greatest R&D intensity was in CB (Cambridge), with 76% of responding enterprises reporting R&D activity, and the least active PH (Perth) with only 30% of enterprises reporting R&D activity.

Ten Post Code areas account for the highest observed intensity of R&D (Table 10).

Table 10: Post Code areas with the least proportion of innovative firms engaged in internal R&D

• Cambridge	• Dudley
• Dorchester	• Kirkcaldy
• Sutton	• Llandudno
• Lancaster	• Enfield
• Stoke on Trent	• York

These are widely distributed about the country, from DT (Dorchester) in the south to LL (Llandudno) in the west and KY (Kirkcaldy) in the north.

CB (Cambridge) is the highest user of innovation activity in two of the innovation measures: amongst those firms that are innovation active and those firms with greatest innovation input. Also, according to this analysis, the Cambridge Post Code area is the most persistently engaged in innovation activities. Over the three periods and 5 measures, Cambridge accounts for 4 of the 15 observations:

- Innovation active enterprises 2005 (68% engaged in internal R&D)
- Innovation active enterprises 2007 (63% engaged in internal R&D)
- Enterprises with innovation input 2007(68% engaged in internal R&D)
- Enterprises with innovation input 2009 (76% engaged in internal R&D)

This means that, of all enterprises reporting they were innovation active, in UKIS 2005 and 2007 the Post Code area that had the greatest proportion engaged in internal R&D was Cambridge. Likewise, of all enterprises reporting input in terms of expenditure on innovation per employee, in UKIS 2007 and 2009 the Post Code area that had the greatest proportion engaged in internal R&D was Cambridge. The Stoke on Trent area accounted for 3 of the 15 observations.

In terms of lowest levels of reported internal R&D activity, these are distributed across eight Post Code areas (Table 11).

Table 11: Post Code areas with least proportion of innovative firms engaged in internal R&D

• Swindon	• Taunton
• Sunderland	• Perth
• London E	• Dartford
• London SE	• Harrow

The SR (Sunderland) Post Code area consistently reports amongst the lowest levels of R&D activity across the country, across the periods of the survey and across innovation categories (7 out of 15).

Furthermore, those Post Code areas that engage least in internal R&D activity seem to do so consistently. Typically, the levels of engagement in internal R&D remain close to the UK minimum across the 3 periods of the survey and only once does any of the low engaging Post Code areas have a level of engagement that exceeds the national average (Table 12Distribution of R&D activity amongst innovation active enterprises, (SR 2009, 64% engaged in internal R&D).

Table 12: Distribution of R&D activity amongst innovation active enterprises

	Innovation active		
	2009	**2007**	**2005**
Max	74	63	68
Min	29	22	28
UK	54	43	49
Most R&D active			
CB	64	***63***	***68***
DT	***74***	43	55
Least R&D active			
HA	***29***	***22***	34
SR	64	27	***28***

In UKIS 2009, 54% of innovation active respondents engaged in internal R&D. In Dorchester (DT), 74% of innovation active respondents engaged in internal R&D, whereas it was only 29% of innovation active respondents from Harrow (HA).

Table 13: Distribution of R&D activity amongst enterprises reporting innovation input (expenditure per employee)

	Input - expenditure per employee		
	2009	**2007**	**2005**
Max	76	68	73
Min	30	25	26
UK	56	46	51
Most R&D active			
CB	***76***	***68***	72
SM	-	36	***73***
Least R&D active			
PH	***30***	29	29
SR	32	***25***	***26***

- denotes low cell count

In UKIS 2009, 56% of all respondents reporting some expenditure on innovation per employee engaged in internal R&D. In Cambridge (CB), 76% of 'expenditure per employee' respondents engaged in internal R&D, whereas it was only 30% of those from Perth (PH).

Table 14: Distribution of R&D activity amongst enterprises reporting innovation output (≥1% turnover derived from innovation)

	Output - contribution to turnover		
	2009	**2007**	**2005**
Max	97	100	93
Min	40	45	33
UK	69	69	67
Most R&D active			
LA	-	***100***	46
ST	***97***	76	***93***
Least R&D active			
DA	50	***45***	35
SR	***40***	50	***33***

- denotes low cell count

In UKIS 2009, 69% of those respondents reporting ≥1% turnover derived from innovation engaged in internal R&D. In Stoke on Trent (ST), 97% of respondents reporting ≥1% turnover derived from innovation engaged in internal R&D, whereas it was only 40% of those from Sunderland (SR).

Table 15: Distribution of R&D activity amongst enterprises reporting new-to-market innovation(percent)

	Novelty (new-to-market)		
	2009	**2007**	**2005**
Max	100	100	100
Min	50	38	45
UK	73	76	74
Most R&D active			
DY	***100***	92	93
KY	-	50	***100***
LL	60	***100***	61
Least R&D active			
E	-	67	***45***
SE	***50***	-	53
TA	-	***38***	-

- denotes low cell count

In UKIS 2009 73% of respondents reporting new-to-the-market innovation engaged in internal R&D. In Dudley (DY), all respondents reporting new-to-the-market innovation engaged in internal R&D, whereas it was only 50% of respondents in London SE.

Table 16: Distribution of R&D activity amongst enterprises reporting new-to-firm innovation (percent)

	Novelty (new-to-firm)		
	2009	**2007**	**2005**
Max	97	100	93
Min	30	42	27
UK	68	69	67
Most R&D active			
EN	92	80	***93***
ST	***97***	57	93
YO	58	***100***	63
Least R&D active			
SN	67	***42***	67
SR	***30***	-	***27***

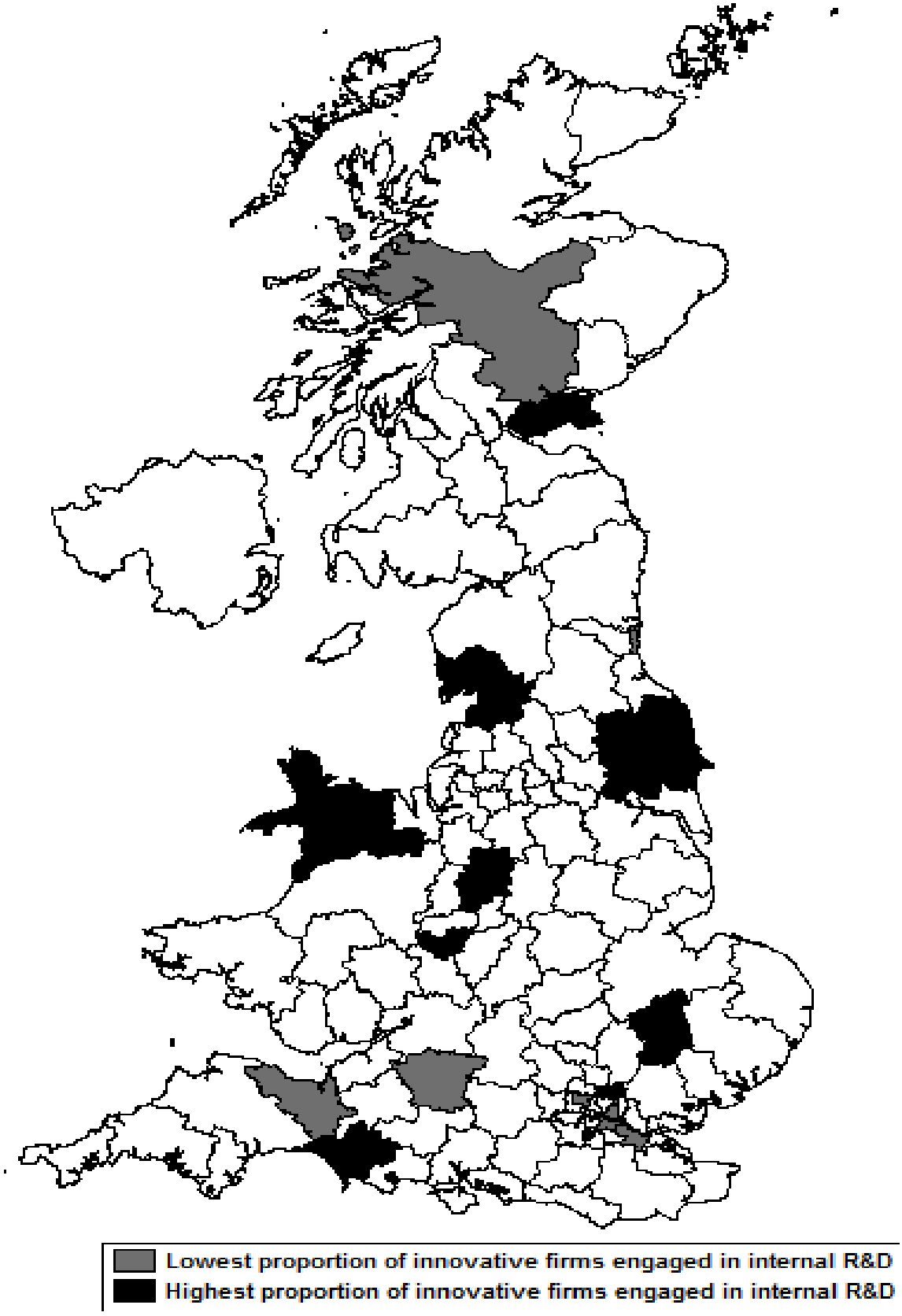
- denotes low cell count

In UKIS 2009 68% of respondents reporting new-to-the-firm innovation engaged in internal R&D. In Stoke on Trent (ST), 97% of respondents reporting new-to-the-firm innovation engaged in internal R&D, whereas it was only 30% of respondents in Sunderland (SR).

It is important to remember that the firms in these Post Code areas at the bottom of the ranking of engagement in internal R&D are, nevertheless, innovative firms (in terms of at least one of the activity, input, output or novelty measures). Indeed, 6 of the 8 Post Code areas in Table 11feature in the Map 8as areas of high innovative performance.

These Post Code areas are characterised, in this instance, only by their relatively low engagement in internal R&D. The ranking makes no inferences about innovativeness or performance, it merely states that these Post Code areas (Sunderland etc.) are differentiated from those at the top of the ranking (Cambridge etc.) only on the basis of the extent to which their populations of firms engage in internal R&D. That is, proportionately more innovators in some Post Code areas use internal R&D than do

innovators in other Post Code areas. The distribution of engagement in internal R&D is illustrated in Map 10.



Map 10: Post Code areas engagement in internal R&D

But, of course, internal R&D is only one of a range of possible activities that an innovative enterprise might engage in, and to infer that any of the Post Code areas in which engagement in R&D is low are not innovative would be mistakenly to equate innovation only with R&D. It does raise the question, however about whether or not it is possible to be highly innovative without internal R&D.

In Table 17,all the enterprises that feature in the upper decile of at least one of the measures are aggregated for each of the survey periods. So, 2,439 of the 16,445 respondents to UKIS feature in at least one upper decile. Similar data are shown for UKIS 2007 and UKIS 2009. Respectively, 28%, 25% and 18% of these upper decile enterprises did not engage in internal R&D.

Table 17: Upper decile enterprises not engaged in internal R&D

	2005	2007	2009
Total upper decile respondents	2439	2364	1853
Total upper decile respondents not doing internal R&D	653	590	291
% upper decile respondents not doing internal R&D	28	25	18

However, as Table 18shows, these enterprises not engaged in internal R&D nevertheless still produced a variety of innovation outputs. These data suggest that policies oriented toward the promotion of firm-level R&D may, in fact, be missing up to a quarter of the highest performing innovating firms.

Table 18: Innovation activity of upper decile firms not engaged in internal R&D

	2005	2007	2009
Total enterprises from upper deciles not engaged in internal R&D, of which	653	590	291
Product innovator (%)	63	54	64
Process innovator (%)	36	27	30
Wider innovator (%)	50	51	51
Services innovator (%)	46	44	49

INNOVATION IN THE LOW INNOVATING SECTORS

Battista and Stoneman (2010) used data from CIS4 to explore the pattern of innovation use across the UK at an aggregated level. On the basis of intensity of use of two sets of innovations, organisational and technological, they discovered three clusters of firms representing below average, intermediate and above average adoption. As in other studies (e.g. Heidenreich, 2009), firms in the lower performing cluster were characterised by an absence of R&D, lack of regular training, no public support, few graduate employees and being small. Notably, the highest percentage of low intensity users were found in retail trade and, hotels and restaurants: other poor performing sectors included electricity, gas and water supply and, construction.

Table 19 shows, for each of the three periods of the survey, the percentage of **all** respondents from each of these four industry sectors that appear in any upper decile. As a comparator, the percentage for SIC Category 73 (Research and Development), shown in this study to be one of the higher performing industrial sectors, is also shown.

The data show that up to 10% of respondents from generally thought to be low performing industrial sectors feature in the upper deciles of the innovation measures used in this study. Amongst these data, 2007 and 2009 appear to be exceptional periods for innovation in Electricity, gas and water supply during which time 19% and 15% respectively of responding enterprises appeared in the upper deciles.

Table 19: Poorer performing SIC Code categories: percentage of sample in upper decile

	2005	2007	2009
40 Electricity, gas and water supply (%)	7	19	15
45 Construction (%)	8	6	7
52 Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods (%)	7	10	8
55 Hotels and restaurants(%)	9	9	8
73 Research and development(%)	39	38	47

DISCUSSION

This final section reflects on the exploration of the distribution of highly innovative SIC Code categories and Post Code areas.

The research question underpinning this research was, with a particular concern in identifying highly innovative areas and sectors and uncovering innovation in unexpected places, how is innovation distributed in the UK. The adopted method interrogated this question from industrial and spatial perspectives and wondered whether or not the popular perception that innovation was a largely cluster-based or science-park-located and techno-centric phenomenon actually held.

Innovation is not just a technological phenomenon, though this is an aspect that policy has prioritised. Clearly, innovation in the UK is not restricted to a limited number of high-tech and bio-pharmaceutical industries that coalesce in eponymous innovation clusters (M4 Corridor, Thames Valley, Silicon Glen, Motor Sport Valley),nor is it only associated with the new knowledge generation efforts of some of the country's leading universities – notably Oxford and Cambridge. The contribution of the current research is to shine new light and identify those less obvious geographic and industrial areas where high performance innovation can also be found.

The analysis of this study shows a wide distribution of innovation. On the basis of this analysis, it would be hard to argue that any particular industrial sector or Post Code area absolutely dominates. However, several 'hotspots' do emerge.

The notion of *hotspots* can be traced back in the innovation literature to at least the work of Pouder and St John (1996) who described regional clusters of firms which:

- compete in the same industry,
- begin as one or several start-up firms that, as a group, grow more rapidly than other industry participants (sales and employment levels),
- have the same or very similar immobile physical resource requirements in the long run, and
- are geographically concentrated.

and are characterised by the emergence, development, sharing and improvement of new ideas which are then applied resulting in rapid growth, economic expansion and job creation.

For policy makers in pursuit of growth, clusters and hotspots are seductive phenomena: there is great potential for firms locating in close geographic proximity to benefit from positive feedback, or externalities (McCann and Folta, 2009). And, these agglomerations matter, it seems, because they have the potential to increase innovation in and between firms, raise productivity and competitiveness and hence contribute to regional and national economic growth (Andriani et al., 2005). Questions have been raised, however, about whether or not the promise they offer is as alluring as might first be thought.

Cluster-based regional planning policies are predicated on the observed successes from the late 20th Century of a few significant regional performers, characterised by their emphasis on high-technology development or technological upgrading of craft products (Gordon and McCann, 2005). Gordon and McCann (2005) argue that policy that seeks to replicate these as an 'ideal' model of industry-geography organisation is misguided and that quite different forms of spatial and institutional arrangements may be appropriate for innovation in different kinds of business. Their analysis of innovating firms in the London area shows no particular links to the perceived advantages of clustering and no evident effects from having more local regional markets, suppliers, or partners. The implication is clear. It means that we do not necessarily have to look to established clusters to find innovation (though they are one important source), nor establish clusters to promote innovation: innovation may be found in locales not characterised by clusters of homogeneous economic activity.

Another limitation of the literature addressing the geographical perspective, though not necessarily reflected at a policy level (c.f. DTI, 2002), is that it has tended to overlook innovation in the services sectors. Although a wide range of industries has been studied from a regional perspective, e.g. opto-electronics (Hendry & Brown, 2006), motorsports (Mariotti, Delbridge, & Munday, n.d.), biotechnology (Prevezer, 1997), manufacturing firms (Baptista & Swann, 1998), hotels (Canina, Enz, & Harrison, 2005) and, notwithstanding the latter, clusters of firms in the services sector appear to have been marginalised: and this despite their evident proliferation (e.g. in retailing, financial services, film-making [Hollywood, Bollywood,

Nollywood…], restaurants etc). Partly due to a relative paucity of previous research focusing on a wider range of sectors and on non-technological innovations across a wider set of economic and industrial activity, a priori expectations about the distribution of innovation performance are more muted for service industries.

Furthermore, firm performance is not always improved as a result of cluster membership and challenges to the idea of agglomeration economies and innovation benefits deriving from local clustering have emerged. In their study of the UK opto-electronics industry Hendry and Brown (2006) showed that firms in the non-cluster group performed as well or better on several measures. Pouder and St. John's (1996) study showed that dense proximal connections can, over time, lead to a decline in performance. With findings such as these in mind, and the increasing acknowledgement that agglomerations are not a single phenomenon, for example they can differ on the basis of technology, industry (St. John & Pouder, 2006) relations and transactions (Iammarino and McCann, 2006), some scholars have argued for a more nuanced approach, increased precision and even disaggregation (e.g. McCann and Folta, 2009).

This research explores some of these issues. By increasing the level of resolution to Post Code area and SIC Code category to 3 digits, this research manages to produce a richly detailed map of the distribution of innovation in the UK.

Analysis of survey returns for each of the periods in isolation presents a highly heterogeneous, dynamic and distributed picture of innovation. However, by looking at the pattern over the 3 periods of the survey (UKIS 2005, UKIS 2007 and UKIS 2009), a slightly more stable picture emerges. In terms of innovation at the industry level, six persistently high performing 3 digit SIC Code categories are identified. These are a mix of knowledge intensive services firms, manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods and, manufacture of pharmaceuticals, medicinal chemicals and botanical products.

At the spatial level, and as is clear from Maps 1-9, innovation is widely distributed across the country. Highly innovative Post Code areas were defined as those that comprised at least 20% of its population of respondents amongst the upper decile of performers of any of seven different innovation measures. Even with this qualification criterion, more than half the Post Code areas in the UK achieve high performance status at least once over the three periods of the survey. Of the 68 highly innovative Post Code areas, 24 appear only once, 23 twice, 7 three times, 6 four times, 7 five times and London NW and Cambridge seven and eight times respectively. London Post Code areas (NW, SW, W WC, E, EC N and SE) appear a total of 26 times.

So, whilst it is clear that no single industry or Post Code area has a monopoly on innovation, that innovation is not limited to a restricted number of geographic areas or industrial sectors, a small number of Post Code areas and SIC Code categories might reasonably be thought to be hotspots (Table 20)

Table 20: The UK's innovation hotspots

Sectoral	Geographic
24.4 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products	Cambridge
32.3 - Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	London NW
72.2 - Software consultancy & supply	
72.6 - Other computer related activities	
73.1 - Research and experimental development on natural sciences and engineering	
74.5 - Labour recruitment and provision of personnel	

Highly innovative sectors and Post Code areas were also compared against other respondents in respect of the innovation activities in which they engage and also their ratings of the importance of different sources of knowledge for innovation.

Relative to each other, highly innovative industrial sectors displayed their own patterns of activity and ratings of importance of information sources. Their distinctiveness would seem to support other studies' conclusions that there is not a single one-size-fits-all pattern of innovation (Lambert and Frenz, u.d.), and that even the highest performing innovators adopt different modes.

Relative to other respondents, high performers have been found to be highly differentiated on important dimensions of engagement in innovation activities and sources of information for innovation.

Finally, up to one quarter of innovative firms from the upper deciles were found not to engage in internal R&D, but still generate an important range of innovative outcomes, Much remains unknown about these firms. Whilst the absence of internal R&D may suggest a non-product or non-technical orientation to innovation, these innovators that do not engage in internal R&D generate a variety of outputs (Table 18) and up to 64% of them appear to be product innovators. Also, they are widely distributed about the country, including London, Taunton, Perth and Sunderland. Similarly, up to 10% of firms in sectors traditionally not thought to be particularly innovative were found in the upper deciles of several of the innovation measures.

These firms are an important component of the UK innovation system and include, possibly, some of the less familiar, certainly less tangible, but no less important, organisational, service, business model and practice innovations that have delivered things such as budget airlines and internet banking as well as supply chain improvements and process efficiencies across every business sector. These, as well as product and process innovations are found in all sectors. However, they have been neglected in academic study and retain a low profile in policy debates.

The OECD utilises an industrial classification system of high-, medium- and low technology industries (HT and LMT industries). Heidenreich (2009) is sceptical of LMT industries' potential for contributing to economic and employment growth arguing that regions where these industries predominate tend to have below average growth rates. However, Heidenreich's, and others', arguments as a validation of a high-technology-oriented growth policy are limited in several ways. First, they are predominantly based on an analysis manufacturing firms only and cannot be generalised to the services sector. Second, LMT industries exhibit their own specific innovation pattern and have a different set of innovation objectives and outputs: they tend to orient around process efficiencies and cost reductions. Third, whilst HT industrial clusters may be every policy-makers' ultimate desire, previous studies have shown that it is not feasible to establish them anywhere. Further research is required in order that the nature and contribution of innovation in these 'non-R&D' and 'low-performing' contexts can be better understood. It is particularly important that their contribution to growth rates is better understood.

These findings raise some interesting questions for policy. For a recovery strategy predicated on the idea that innovation leads to growth and that innovative businesses are growing businesses and in order that support may be appropriately directed, it is important that policy makers fully understand which are the country's innovative firms and where they are located.

A glance at some of the more recent policy pronouncements in the UK relating to innovation gives the impression of a technological past and a technological future. Rightly or wrongly, recent and current policy has been strongly oriented toward new technologies – consider James Dyson's (2010) recent report for the Conservative party. Furthermore, in papers relating to the New Industry, New Jobs initiative (BERR, 2009;DBIS, 2010), HM Government highlights key sectors, targets spending and advocates a new activism which "… must improve the skills of our people and adapt them to the specialist demands of a modern economy; strengthen our capabilities in research and development; innovate further in science and technology, and industrialise this innovation in commercially successful ways" (BERR, 2009: 4). This contrasts with a much wider vision expressed in Innovation Nation (DBIS, 2008) which, recognising diversity, argues, simply, that the UK must excel at all types of innovation, "[it means]…harnessing ideas from the public and private sectors, users and professionals to create more effective products, services, processes and methods of public service delivery" (pp3).

The previous analysis has identified wide spatial and geographic distribution of innovation in the UK, capped with a small number of hotspots. On this basis, where should policy focus in order to address the challenges of economic growth and job creation. Where do the greatest prospects lie? How should 'prospects' be determined and what, if any, should be the trade-off between short term fixes to current problems versus a longer-term orientation that looks to build on all the country's identified innovation potential. If the economy is to be re-balanced, in favour of which sectors and which geographical areas should it be rebalanced?

Of course, simply because innovation happens in the areas identified in this study, does not necessarily mean they are where the growth in jobs and tax revenues will come – further research is needed to understand which of these innovative industries and geographical areas offer the best prospects. Hirsch-Heroines (2008) has argued that the high-tech and the non-high-tech sectors are heavily interdependent, the latter being users of the output of the former and, as a result, a policy focus on the users could promote benefits for the high-tech sector: policies need to ensure that they encourage both the generation of knowledge and its diffusion. Future research should consider the relations between the highly innovative sectors and areas identified in this research and their relations with the rest of the UK's innovation system. More specifically, as the geographic distribution of innovation reflects firms' locational decisions and the factors that affect sectors, further research examining the innovation activities and outputs of the sectors and locations identified in this study would greatly enhance understanding of this dynamic.

Interesting though they are, and as noted in the methods section, these results need to be interpreted with some caution and further research is required to test their validity. Whilst the findings for each individual UKIS period point toward great heterogeneity of high performance from both spatial and industrial perspectives, these may just be random artefacts of the data. However, that this heterogeneity is observable year-on-year suggests it may be a real and dynamic phenomenon.

Another limitation is the rather arbitrary assignment of firms to 'high performance' status. At the industry level, SIC Code categories were determined to be high performing if, when respondent firms ranked by proportions, appeared in the top 5 or 10 featured in the upper decile of any innovation measure. In terms of the spatial perspective, Post Code areas were deemed to be high performing if ≥20% responding firms appeared in the upper decile of any of the performance measures.

ACKNOWLEDGEMENTS

This research has been supported by an ESRC Research Placement Fellowship number RES-173-27-0178 hosted by Science and Innovation Analysis (SIA) in the Department for Business, Innovation and Skills. This support is gratefully acknowledged. I would also like to thank the contributions, thoughtful comments and suggestions of all SIA colleagues, but in particular Keith Smith, Ray Lambert, Martin Kenchatt and Daniel Hodges as well as the input of delegates who attended two UKIS Users Workshops during the Fellowship. Errors and omissions remain my own.

APPENDIX 1: SIC CODE CATEGORIES

SECTION A		**AGRICULTURE, HUNTING AND FORESTRY**
1		AGRICULTURE, HUNTING AND RELATED SERVICE ACTIVITIES
	1.1	Growing of crops; market gardening; horticulture
	1.2	Farming of animals
	1.3	Growing of crops combined with farming of animals (mixed farming)
	1.4	Agricultural and animal husbandry service activities, except veterinary activities
	1.5	Hunting, trapping and game propagation including related service activities
2		FORESTRY, LOGGING AND RELATED SERVICE ACTIVITIES
SECTION B		**FISHING**
	5	FISHING, OPERATION OF FISH HATCHERIES AND FISH FARMS; SERVICE ACTIVITIES INCIDENTAL TO FISHING
SECTION C		**MINING AND QUARRYING**
Subsection CA		MINING AND QUARRYING OF ENERGY PRODUCING MATERIALS
10		MINING OF COAL AND LIGNITE; EXTRACTION OF PEAT
	10.1	Mining and agglomeration of hard coal
	10.2	Mining and agglomeration of lignite
	10.3	Extraction and agglomeration of peat
11		EXTRACTION OF CRUDE PETROLEUM AND NATURAL GAS; SERVICE ACTIVITIES INCIDENTAL TO OIL AND GAS EXTRACTION EXCLUDING SURVEYING
	11.1	Extraction of crude petroleum and natural gas
	11.2	Service activities incidental to oil and gas extraction excluding surveying
12		MINING OF URANIUM AND THORIUM ORES
Subsection CB		MINING AND QUARRYING EXCEPT ENERGY PRODUCING MATERIALS
13		MINING OF METAL ORES
	13.1	Mining of iron ores
	13.2	Mining of non-ferrous metal ores, except uranium and thorium ores
14		OTHER MINING AND QUARRYING
	14.1	Quarrying of stone
	14.2	Quarrying of sand and clay
	14.3	Mining of chemicals and fertilizer minerals

	14.4	Production of salt
	14.5	Other mining and quarrying not elsewhere classified

SECTION D		**MANUFACTURING**
Subsection DA		MANUFACTURE OF FOOD PRODUCTS, BEVERAGES AND TOBACCO
15		MANUFACTURE OF FOOD PRODUCTS, BEVERAGES
	15.1	Production, processing and preserving of meat and meat products
	15.2	Processing and preserving of fish and fish products
	15.3	Processing and preserving of fruit and vegetables
	15.4	Manufacture of vegetable and animal oils and fats
	15.5	Manufacture of dairy products
	15.6	Manufacture of grain mill products, starches and starch products
	15.7	Manufacture of prepared animal feeds
	15.8	Manufacture of other food products
	15.9	Manufacture of beverages
16		MANUFACTURE OF TOBACCO PRODUCTS

SECTION D		**MANUFACTURING**
Subsection DB		MANUFACTURE OF TEXTILES AND TEXTILE PRODUCTS
17		MANUFACTURE OF TEXTILES
	17.1	Preparation and spinning of textile fibres
	17.2	Textile weaving
	17.3	Finishing of textiles
	17.4	Manufacture of made-up textile articles, except apparel
	17.5	Manufacture of other textiles
	17.6	Manufacture of knitted and crocheted fabrics
	17.7	Manufacture of knitted and crocheted articles
18		MANUFACTURE OF WEARING APPAREL; DRESSING AND DYEING OF FUR
	18.1	Manufacture of leather clothes
	18.2	Manufacture of other wearing apparel and accessories
	18.3	Dressing and dyeing of fur; manufacture of articles of fur

SECTION D		**MANUFACTURING**
Subsection DC		MANUFACTURE OF LEATHER AND LEATHER PRODUCTS
19		TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE, HANDBAGS, SADDLERY, HARNESS AND FOOTWEAR
	19.1	Tanning and dressing of leather
	19.2	Manufacture of luggage, handbags and the like, saddlery

		and harness
	19.3	Manufacture of footwear
Subsection DD		MANUFACTURE OF WOOD AND WOOD PRODUCTS
20		MANUFACTURE OF WOOD AND PRODUCTS OF WOOD AND CORK, EXCEPT FURNITURE; MANUFACTURE OF ARTICLES OF STRAW AND PLAITING MATERIALS
	20.1	Saw milling and planing of wood, impregnation of wood
	20.2	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards
	20.3	Manufacture of builders' carpentry and joinery
	20.4	Manufacture of wooden containers
	20.5	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
Subsection DE		MANUFACTURE OF PULP, PAPER AND PAPER PRODUCTS PUBLISHING AND PRINTING
21		MANUFACTURE OF PULP, PAPER AND PAPER PRODUCTS
	21.1	Manufacture of pulp, paper and paperboard
	21.2	Manufacture of articles of paper and paperboard
22		PUBLISHING, PRINTING AND REPRODUCTION OF RECORDED MEDIA
	22.1	Publishing
	22.2	Printing and service activities related to printing
	22.3	Reproduction of recorded media
SECTION D		**MANUFACTURING**
Subsection DF		MANUFACTURE OF COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL
23		MANUFACTURE OF COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL
	23.1	Manufacture of coke oven products
	23.2	Manufacture of refined petroleum products
	23.3	Processing of nuclear fuel
Subsection DG		MANUFACTURE OF CHEMICALS, CHEMICAL PRODUCTS AND MAN-MADE FIBRES
24		MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS
	24.1	Manufacture of basic chemicals
	24.2	Manufacture of pesticides and other agro-chemical products
	24.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
	24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products

	24.5	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
	24.6	Manufacture of other chemical products
	24.7	Manufacture of man-made fibres
Subsection DH		MANUFACTURE OF RUBBER AND PLASTIC PRODUCTS
25		MANUFACTURE OF RUBBER AND PLASTIC PRODUCTS
	25.1	Manufacture of rubber products
	25.2	Manufacture of plastic products
SECTION D		**MANUFACTURING**
Subsection DI		MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS
26		MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS
	26.1	Manufacture of glass and glass products
	26.2	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products
	26.3	Manufacture of ceramic tiles and flags
	26.4	Manufacture of bricks, tiles and construction products, in baked clay
	26.5	Manufacture of cement, lime and plaster
	26.6	Manufacture of articles of concrete, plaster and cement
	26.7	Cutting, shaping and finishing of stone
	26.8	Manufacture of other non-metallic mineral products
SECTION D		**MANUFACTURING**
Subsection DJ		MANUFACTURE OF BASIC METALS AND FABRICATED METAL PRODUCTS
27		MANUFACTURE OF BASIC METALS
	27.1	Manufacture of basic iron and steel and of ferro-alloys (ECSC) **2**
	27.2	Manufacture of tubes
	27.3	Other first processing of iron and steel and production of non-ECSC ferro-alloys
	27.4	Manufacture of basic precious and other non-ferrous metals
	27.5	Casting of metals
28		MANUFACTURE OF FABRICATED METAL PRODUCTS, EXCEPT MACHINERY AND EQUIPMENT
	28.1	Manufacture of structural metal products
	28.2	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
	28.3	Manufacture of steam generators, except central heating hot water boilers
	28.4	Forging, pressing, stamping and roll forming of metal; powder metallurgy

	28.5	Treatment and coating of metals; general mechanical engineering
	28.6	Manufacture of cutlery, tools and general hardware
	28.7	Manufacture of other fabricated metal products
SECTION D		**MANUFACTURING**
Subsection DK		MANUFACTURE OF MACHINERY AND EQUIPMENT NOT ELSEWHERE CLASSIFIED
29		MANUFACTURE OF MACHINERY AND EQUIPMENT NOT ELSEWHERE CLASSIFIED
	29.1	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
	29.2	Manufacture of other general purpose machinery
	29.3	Manufacture of agricultural and forestry machinery
	29.4	Manufacture of machine tools
	29.5	Manufacture of other special purpose machinery
	29.6	Manufacture of weapons and ammunition
	29.7	Manufacture of domestic appliances not elsewhere classified
SECTION D		**MANUFACTURING**
Subsection DL		MANUFACTURE OF ELECTRICAL AND OPTICAL EQUIPMENT
30		MANUFACTURE OF OFFICE MACHINERY AND COMPUTERS
31		MANUFACTURE OF ELECTRICAL MACHINERY AND APPARATUS NOT ELSEWHERE CLASSIFIED
	31.1	Manufacture of electric motors, generators and transformers
	31.2	Manufacture of electricity distribution and control apparatus
	31.3	Manufacture of insulated wire and cable
	31.4	Manufacture of accumulators, primary cells and primary batteries
	31.5	Manufacture of lighting equipment and electric lamps
	31.6	Manufacture of electrical equipment not elsewhere classified
32		MANUFACTURE OF RADIO, TELEVISION AND COMMUNICATION EQUIPMENT AND APPARATUS
	32.1	Manufacture of electronic valves and tubes and other electronic components
	32.2	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
	32.3	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
33		MANUFACTURE OF MEDICAL, PRECISION AND OPTICAL INSTRUMENTS, WATCHES AND CLOCKS

	33.1	Manufacture of medical and surgical equipment and orthopaedic appliances
	33.2	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
	33.3	Manufacture of industrial process control equipment
	33.4	Manufacture of optical instruments and photographic equipment
	33.5	Manufacture of watches and clocks
SECTION D		**MANUFACTURING**
Subsection DM		MANUFACTURE OF TRANSPORT EQUIPMENT
34		MANUFACTURE OF MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS
	34.1	Manufacture of motor vehicles
	34.2	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
	34.3	Manufacture of parts and accessories for motor vehicles and their engines
35		MANUFACTURE OF OTHER TRANSPORT EQUIPMENT
	35.1	Building and repairing of ships and boats
	35.2	Manufacture of railway and tramway locomotives and rolling stock
	35.3	Manufacture of aircraft and spacecraft
	35.4	Manufacture of motorcycles and bicycles
	35.5	Manufacture of other transport equipment not elsewhere classified
Subsection DN		MANUFACTURING NOT ELSEWHERE CLASSIFIED
36		MANUFACTURE OF FURNITURE; MANUFACTURING NOT ELSEWHERE CLASSIFIED
	36.1	Manufacture of furniture
	36.2	Manufacture of jewellery and related articles
	36.3	Manufacture of musical instruments
	36.4	Manufacture of sports goods
	36.5	Manufacture of games and toys
	36.6	Miscellaneous manufacturing not elsewhere classified
37		RECYCLING
	37.1	Recycling of metal waste and scrap
	37.2	Recycling of non-metal waste and scrap
SECTION E		**ELECTRICITY, GAS AND WATER SUPPLY**
40		ELECTRICITY, GAS, STEAM AND HOT WATER SUPPLY

40.1 Production and distribution of electricity
40.2 Manufacture of gas; distribution of gaseous fuels through mains
40.3 Steam and hot water supply

41 COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER
41.0 Collection, purification and distribution of water

SECTION F CONSTRUCTION

45 CONSTRUCTION
45.1 Site preparation
45.2 Building of complete constructions or parts thereof; civil engineering
45.3 Building installation
45.4 Building completion
45.5 Renting of construction or demolition equipment with operator

SECTION G WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES, MOTORCYCLES AND PERSONAL AND HOUSEHOLD GOODS

50 SALE, MAINTENANCE AND REPAIR OF MOTOR VEHICLES AND MOTORCYCLES; RETAIL SALE OF AUTOMOTIVE FUEL
50.1 Sale of motor vehicles
50.2 Maintenance and repair of motor vehicles
50.3 Sale of motor vehicle parts and accessories
50.4 Sale, maintenance and repair of motorcycles and related parts and accessories
50.5 Retail sale of automotive fuel

51 WHOLESALE TRADE AND COMMISSION TRADE, EXCEPT OF MOTOR VEHICLES AND MOTORCYCLES
51.1 Wholesale on a fee or contract basis
51.2 Wholesale of agricultural raw materials and live animals
51.3 Wholesale of food, beverages and tobacco
51.4 Wholesale of household goods
51.5 Wholesale of non-agricultural intermediate products, waste and scrap
51.6 Wholesale of machinery, equipment and supplies
51.7 Other wholesale
51.8 Wholesale of machinery, equipment and supplies

51.9 Other wholesale

52 RETAIL TRADE, EXCEPT OF MOTOR VEHICLES AND MOTORCYCLES; REPAIR OF PERSONAL AND HOUSEHOLD GOODS
52.1 Retail sale in non-specialised stores

	52.2	Retail sale of food, beverages and tobacco in specialised stores
	52.3	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles
	52.4	Other retail sale of new goods in specialised stores
	52.5	Retail sale of second-hand goods in stores
	52.6	Retail sale not in stores
	52.7	52.7 Repair of personal and household goods
SECTION H		**HOTELS AND RESTAURANTS**
55		HOTELS AND RESTAURANTS
	55.1	Hotels
	55.2	Camping sites and other provision of short-stay accommodation
	55.3	Restaurants
	55.4	Bars
	55.5	Canteens and catering
SECTION I		**TRANSPORT, STORAGE AND COMMUNICATION**
60		LAND TRANSPORT; TRANSPORT VIA PIPELINES
	60.1	Transport via railways
	60.2	Other land transport
	60.3	Transport via pipelines
61		WATER TRANSPORT
	61.1	Sea and coastal water transport
	61.2	Inland water transport
62		AIR TRANSPORT
	62.1	Scheduled air transport
	62.2	Non-scheduled air transport
	62.3	Space transport
63		SUPPORTING AND AUXILIARY TRANSPORT ACTIVITIES; ACTIVITIES OF TRAVEL AGENCIES
	63.1	Cargo handling and storage
	63.2	Other supporting transport activities
	63.3	Activities of travel agencies and tour operators; tourist assistance activities not elsewhere classified
	63.4	Activities of other transport agencies
64		POST AND TELECOMMUNICATIONS
	64.1	Post and courier activities
	64.2	Telecommunications
SECTION J		**FINANCIAL INTERMEDIATION**
65		FINANCIAL INTERMEDIATION, EXCEPT INSURANCE AND PENSION FUNDING
	65.1	Monetary intermediation
	65.2	Other financial intermediation

66 INSURANCE AND PENSION FUNDING, EXCEPT COMPULSORY SOCIAL SECURITY

66.0 Insurance and pension funding, except compulsory social security

67 ACTIVITIES AUXILIARY TO FINANCIAL INTERMEDIATION

67.1 Activities auxiliary to financial intermediation, except insurance and pension funding

67.2 Activities auxiliary to insurance and pension funding

SECTION K REAL ESTATE, RENTING AND BUSINESS ACTIVITIES

70 REAL ESTATE ACTIVITIES

70.1 Real estate activities with own property

70.2 Letting of own property

70.3 Real estate activities on a fee or contract basis

71 RENTING OF MACHINERY AND EQUIPMENT WITHOUT OPERATOR AND OF PERSONAL AND HOUSEHOLD GOODS

71.1 Renting of automobiles

71.2 Renting of other transport equipment

71.3 Renting of other machinery and equipment

71.4 Renting of personal and household goods not elsewhere classified

72 COMPUTER AND RELATED ACTIVITIES

72.1 Hardware consultancy

72.2 Software consultancy and supply

72.3 Data processing

72.4 Data base activities

72.5 Maintenance and repair of office, accounting and computing machinery

72.6 Other computer related activities

73 RESEARCH AND DEVELOPMENT

73.1 Research and experimental development on natural sciences and engineering

73.2 Research and experimental development on social sciences and humanities

74 OTHER BUSINESS ACTIVITIES

74.1 Legal, accounting, book-keeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consultancy; holdings

74.2 Architectural and engineering activities and related technical consultancy

74.3 Technical testing and analysis

74.4 Advertising

74.5 Labour recruitment and provision of personnel

74.6 Investigation and security activities

74.7 Industrial cleaning

74.8 Miscellaneous business activities not elsewhere classified

SECTION L **PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY**

75 PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY

75.1 Administration of the State and the economic and social policy of the community

75.2 Provision of services to the community as a whole

75.3 Compulsory social security activities

SECTION M **EDUCATION**

80 EDUCATION

80.1 Primary education

80.2 Secondary education

80.3 Higher education

80.4 Adult and other education

SECTION N **HEALTH AND SOCIAL WORK**

85 HEALTH AND SOCIAL WORK

85.1 Human health activities

85.2 Veterinary activities

85.3 Social work activities

SECTION O **OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES**

92 RECREATIONAL, CULTURAL AND SPORTING ACTIVITIES

92.1 Motion picture and video activities

APPENDIX 2: POST CODE AREAS

PostTowns by UK Postcode Area: 2007 information
Source: http://www.evoxfacilities.co.uk/evoxptn.html

Post code	Coverage
AB	Aberdeen, Aberlour, Aboyne, Alford, Ballater, Ballindalloch, Banchory, Banff, Buckie, Ellon, Fraserburgh, Huntly, Insch, Inverurie, Keith, Laurencekirk, Macduff, Milltimber, Peterculter, Peterhead, Stonehaven, Strathdon, Turriff, Westhill
AL	Harpenden, Hatfield, St Albans, Welwyn, Welwyn Garden City
B	Alcester, Birmingham, Bromsgrove, Cradley Heath, Halesowen, Henley-In-Arden, Oldbury, Redditch, Rowley Regis, Smethwick, Solihull, Studley, Sutton Coldfield, Tamworth, West Bromwich
BA	Bath, Bradford-On-Avon, Bruton, Castle Cary, Frome, Glastonbury, Radstock, Shepton Mallet, Street, Templecombe, Trowbridge, Warminster, Wells, Westbury, Wincanton, Yeovil
BB	Accrington, Barnoldswick, Blackburn, Burnley, Clitheroe, Colne, Darwen, Nelson, Rossendale
BD	Bingley, Bradford, Cleckheaton, Keighley, Settle, Shipley, Skipton
BH	Bournemouth, Broadstone, Christchurch, Ferndown, New Milton, Poole, Ringwood, Swanage, Verwood, Wareham, Wimborne
BL	Bolton, Bury
BN	Arundel, Brighton, Eastbourne, Hailsham, Hassocks, Henfield, Hove, Lancing, Lewes, Littlehampton, Newhaven, Peacehaven, Pevensey, Polegate, Seaford, Shoreham-By-Sea, Steyning, Worthing
BR	Beckenham, Bromley, Chislehurst, Keston, Orpington, Swanley, West Wickham
BS	Axbridge, Banwell, Bristol, Cheddar, Clevedon, Wedmore, Weston-Super-Mare, Winscombe

BT	Antrim, Armagh, Augher, Aughnacloy, Ballycastle, Ballyclare, Ballymena, Ballymoney, Ballynahinch, Banbridge, Bangor, Belfast, Bushmills, Caledon, Carrickfergus, Castlederg, Castlewellan, Clogher, Coleraine, Cookstown, Craigavon, Crumlin, Donaghadee, Downpatrick, Dromore, Dungannon, Enniskillen, Fivemiletown, Hillsborough, Holywood, Larne, Limavady, Lisburn, Londonderry, Maghera, Magherafelt, Newcastle, Newry, Newtownabbey, Newtownards, Omagh, Portrush, Portstewart, Strabane
CA	Alston, Appleby-In-Westmorland, Beckermet, Brampton, Carlisle, Cleator, Cleator Moor, Cockermouth, Egremont, Frizington, Holmrook, Keswick, Kirkby Stephen, Maryport, Moor Row, Penrith, Ravenglass, Seascale, St Bees, Whitehaven, Wigton, Workington
CB	Cambridge, Ely, Haverhill, Newmarket, Saffron Walden
CF	Aberdare, Bargoed, Barry, Bridgend, Caerphilly, Cardiff, Cowbridge, Dinas Powys, Ferndale, Hengoed, Llantwit Major, Maesteg, Merthyr Tydfil, Mountain Ash, Penarth, Pentre, Pontyclun, Pontypridd, Porth, Porthcawl, Tonypandy, Treharris, Treorchy
CH	Bagillt, Birkenhead, Buckley, Chester, Deeside, Ellesmere Port, Flint, Holywell, Mold, Neston, Prenton, Wallasey, Wirral
CM	Billericay, Bishops Stortford, Braintree, Brentwood, Burnham-On-Crouch, Chelmsford, Dunmow, Epping, Harlow, Ingatestone, Maldon, Ongar, Sawbridgeworth, Southminster, Stansted, Witham
CO	Bures, Clacton-On-Sea, Colchester, Frinton-On-Sea, Halstead, Harwich, Manningtree, Sudbury, Walton On The Naze
CR	Caterham, Coulsdon, Croydon, Kenley, Mitcham, Purley, South Croydon, Thornton Heath, Warlingham, Whyteleafe
CT	Birchington, Broadstairs, Canterbury, Deal, Dover, Folkestone, Herne Bay, Hythe, Margate, Ramsgate, Sandwich, Westgate-On-Sea, Whitstable
CV	Atherstone, Bedworth, Coventry, Kenilworth, Leamington Spa, Nuneaton, Rugby, Shipston-On-Stour, Southam, Stratford-Upon-Avon, Warwick
CW	Congleton, Crewe, Middlewich, Nantwich, Northwich, Sandbach, Tarporley, Winsford
DA	Belvedere, Bexley, Bexleyheath, Dartford, Erith, Gravesend, Greenhithe, Longfield, Sidcup, Swanscombe, Welling
DD	Arbroath, Brechin, Carnoustie, Dundee, Forfar, Kirriemuir, Montrose, Newport-On-Tay, Tayport

DE	Alfreton, Ashbourne, Bakewell, Belper, Burton-On-Trent, Derby, Heanor, Ilkeston, Matlock, Ripley, Swadlincote
DG	Annan, Canonbie, Castle Douglas, Dalbeattie, Dumfries, Gretna, Kirkcudbright, Langholm, Lockerbie, Moffat, Newton Stewart, Sanquhar, Stranraer, Thornhill
DH	Chester Le Street, Consett, Durham, Houghton Le Spring, Stanley
DL	Barnard Castle, Bedale, Bishop Auckland, Catterick Garrison, Crook, Darlington, Ferryhill, Hawes, Leyburn, Newton Aycliffe, Northallerton, Richmond, Shildon, Spennymoor
DN	Barnetby, Barrow-Upon-Humber, Barton-Upon-Humber, Brigg, Cleethorpes, Doncaster, Gainsborough, Goole, Grimsby, Immingham, Retford, Scunthorpe, Ulceby
DT	Beaminster, Blandford Forum, Bridport, Dorchester, Lyme Regis, Portland, Sherborne, Sturminster Newton, Weymouth
DY	Bewdley, Brierley Hill, Dudley, Kidderminster, Kingswinford, Stourbridge, Stourport-On-Severn, Tipton
E	London
EC	London
EH	Balerno, Bathgate, Bo'Ness, Bonnyrigg, Broxburn, Currie, Dalkeith, Dunbar, East Linton, Edinburgh, Gorebridge, Gullane, Haddington, Heriot, Humbie, Innerleithen, Juniper Green, Kirkliston, Kirknewton, Lasswade, Linlithgow, Livingston, Loanhead, Longniddry, Musselburgh, Newbridge, North Berwick, Pathhead, Peebles, Penicuik, Prestonpans, Rosewell, Roslin, South Queensferry, Tranent, Walkerburn, West Calder, West Linton
EN	Barnet, Broxbourne, Enfield, Hoddesdon, Potters Bar, Waltham Abbey, Waltham Cross
EX	Axminster, Barnstaple, Beaworthy, Bideford, Braunton, Bude, Budleigh Salterton, Chulmleigh, Colyton, Crediton, Cullompton, Dawlish, Exeter, Exmouth, Holsworthy, Honiton, Ilfracombe, Lynmouth, Lynton, North Tawton, Okehampton, Ottery St Mary, Seaton, Sidmouth, South Molton, Tiverton, Torrington, Umberleigh, Winkleigh, Woolacombe
FK	Alloa, Alva, Bonnybridge, Callander, Clackmannan, Crianlarich, Denny, Dollar, Doune, Dunblane, Falkirk, Grangemouth, Killin, Larbert, Lochearnhead, Menstrie, Stirling, Tillicoultry

FY	Blackpool, Fleetwood, Lytham St Annes, Poulton-Le-Fylde, Thornton-Cleveleys
G	Alexandria, Arrochar, Clydebank, Dumbarton, Glasgow, Helensburgh
GL	Badminton, Berkeley, Blakeney, Cheltenham, Chipping Campden, Cinderford, Cirencester, Coleford, Drybrook, Dursley, Dymock, Fairford, Gloucester, Lechlade, Longhope, Lydbrook, Lydney, Mitcheldean, Moreton-In-Marsh, Newent, Newnham, Ruardean, Stonehouse, Stroud, Tetbury, Tewkesbury, Westbury-On-Severn, Wotton-Under-Edge
GU	Aldershot, Alton, Bagshot, Bordon, Camberley, Cranleigh, Farnborough, Farnham, Fleet, Godalming, Guildford, Haslemere, Hindhead, Lightwater, Liphook, Liss, Midhurst, Petersfield, Petworth, Sandhurst, Virginia Water, Windlesham, Woking, Yateley
GY	Guernsey
HA	Edgware, Harrow, Northwood, Pinner, Ruislip, Stanmore, Wembley
HD	Brighouse, Holmfirth, Huddersfield
HG	Harrogate, Knaresborough, Ripon
HP	Amersham, Aylesbury, Beaconsfield, Berkhamsted, Chalfont St Giles, Chesham, Great Missenden, Hemel Hempstead, High Wycombe, Princes Risborough, Tring
HR	Bromyard, Hereford, Kington, Ledbury, Leominster, Ross-On-Wye
HS	Isle Of Barra, Isle Of Benbecula, Isle Of Harris, Isle Of Lewis, Isle Of North Uist, Isle Of Scalpay, Isle Of South Uist, Stornoway
HU	Beverley, Brough, Cottingham, Hessle, Hornsea, Hull, North Ferriby, Withernsea
HX	Elland, Halifax, Hebden Bridge, Sowerby Bridge
IG	Barking, Buckhurst Hill, Chigwell, Ilford, Loughton, Woodford Green
IM	Isle Of Man
IP	Aldeburgh, Brandon, Bury St Edmunds, Diss, Eye, Felixstowe, Halesworth, Harleston, Ipswich, Leiston, Saxmundham, Southwold, Stowmarket, Thetford, Woodbridge

IV	Achnasheen, Alness, Ardgay, Avoch, Beauly, Cromarty, Dingwall, Dornoch, Elgin, Fochabers, Forres, Fortrose, Gairloch, Garve, Invergordon, Inverness, Isle Of Skye, Kyle, Lairg, Lossiemouth, Muir Of Ord, Munlochy, Nairn, Plockton, Portree, Rogart, Strathcarron, Strathpeffer, Strome Ferry, Tain, Ullapool
JE	Jersey
KA	Ardrossan, Ayr, Beith, Cumnock, Dalry, Darvel, Galston, Girvan, Irvine, Isle Of Arran, Isle Of Cumbrae, Kilbirnie, Kilmarnock, Kilwinning, Largs, Mauchline, Maybole, Newmilns, Prestwick, Saltcoats, Stevenston, Troon, West Kilbride
KT	Addlestone, Ashtead, Chertsey, Chessington, Cobham, East Molesey, Epsom, Esher, Kingston Upon Thames, Leatherhead, New Malden, Surbiton, Tadworth, Thames Ditton, Walton-On-Thames, West Byfleet, West Molesey, Weybridge, Worcester Park
KW	Berriedale, Brora, Dunbeath, Forsinard, Golspie, Halkirk, Helmsdale, Kinbrace, Kirkwall, Latheron, Lybster, Orkney, Stromness, Thurso, Wick
KY	Anstruther, Burntisland, Cowdenbeath, Cupar, Dunfermline, Glenrothes, Inverkeithing, Kelty, Kinross, Kirkcaldy, Leven, Lochgelly, St Andrews
L	Bootle, Liverpool, Ormskirk, Prescot
LA	Ambleside, Askam-In-Furness, Barrow-In-Furness, Broughton-In-Furness, Carnforth, Coniston, Dalton-In-Furness, Grange-Over-Sands, Kendal, Kirkby-In-Furness, Lancaster, Millom, Milnthorpe, Morecambe, Sedbergh, Ulverston, Windermere
LD	Brecon, Llanelwedd, Builth Wells, Knighton, Llandrindod Wells, Llangammarch Wells, Llanwrtyd Wells, Presteigne, Rhayader
LE	Ashby-De-La-Zouch, Coalville, Hinckley, Ibstock, Leicester, Loughborough, Lutterworth, Market Harborough, Markfield, Melton Mowbray, Oakham, Wigston
LL	Aberdovey, Abergele, Amlwch, Arthog, Bala, Bangor, Barmouth, Beaumaris, Betws-Y-Coed, Blaenau Ffestiniog, Bodorgan, Brynteg, Caernarfon, Cemaes Bay, Colwyn Bay, Conwy, Corwen, Criccieth, Denbigh, Dolgellau, Dolwyddelan, Dulas, Dyffryn Ardudwy, Fairbourne, Gaerwen, Garndolbenmaen, Harlech, Holyhead, Llanbedr, Llanbedrgoch, Llandudno, Llandudno Junction, Llanerchymedd, Llanfairfechan, Llanfairpwllgwyngyll, Llangefni,Llangollen, Llanrwst, Llwyngwril, Marianglas, Menai Bridge, Moelfre, Penmaenmawr, Penrhyndeudraeth, Pentraeth, Penysarn,

	Porthmadog, Prestatyn, Pwllheli, Rhosgoch, Rhosneigr, Rhyl, Ruthin, St Asaph, Talsarnau, Talybont, Trefriw, Ty Croes, Tyn-Y-Gongl, Tywyn, Wrexham, Y Felinheli
LN	Alford, Horncastle, Lincoln, Louth, Mablethorpe, Market Rasen, Woodhall Spa
LS	Ilkley, Leeds, Otley, Pudsey, Tadcaster, Wetherby
LU	Dunstable, Leighton Buzzard, Luton
M	Manchester, Sale, Salford
ME	Aylesford, Chatham, Faversham, Gillingham, Maidstone, Queenborough, Rochester, Sheerness, Sittingbourne, Snodland, West Malling
MK	Bedford, Buckingham, Milton Keynes, Newport Pagnell, Olney
ML	Airdrie, Bellshill, Biggar, Carluke, Coatbridge, Hamilton, Lanark, Larkhall, Motherwell, Shotts, Strathaven, Wishaw
N	London
NE	Alnwick, Ashington, Bamburgh, Bedlington, Belford, Blaydon-On-Tyne, Blyth, Boldon Colliery, Chathill, Choppington, Corbridge, Cramlington, East Boldon, Gateshead, Haltwhistle, Hebburn, Hexham, Jarrow, Morpeth, Newbiggin-By-The-Sea, Newcastle Upon Tyne, North Shields, Prudhoe, Riding Mill, Rowlands Gill, Ryton, Seahouses, South Shields, Stocksfield, Wallsend, Washington, Whitley Bay, Wooler, Wylam
NG	Grantham, Mansfield, Newark, Nottingham, Sleaford, Southwell, Sutton-In-Ashfield
NN	Brackley, Corby, Daventry, Kettering, Northampton, Rushden, Towcester, Wellingborough
NP	Abergavenny, Abertillery, Blackwood, Caldicot, Chepstow, Crickhowell, Cwmbran, Ebbw Vale, Monmouth, New Tredegar, Newport, Pontypool, Tredegar, Usk
NR	Attleborough, Beccles, Bungay, Cromer, Dereham, Fakenham, Great Yarmouth, Holt, Lowestoft, Melton Constable, North Walsham, Norwich, Sheringham, Walsingham, Wells-Next-The-Sea, Wymondham
NW	London

OL	Ashton-Under-Lyne, Bacup, Heywood, Littleborough, Oldham, Rochdale, Todmorden
OX	Abingdon, Bampton, Banbury, Bicester, Burford, Carterton, Chinnor, Chipping Norton, Didcot, Kidlington, Oxford, Thame, Wallingford, Wantage, Watlington, Witney, Woodstock
PA	Appin, Bishopton, Bridge Of Orchy, Bridge Of Weir, Cairndow, Campbeltown, Colintraive, Dalmally, Dunoon, Erskine, Gourock, Greenock, Inveraray, Isle Of Bute, Isle Of Coll, Isle Of Colonsay, Isle Of Gigha, Isle Of Iona, Isle Of Islay, Isle Of Jura, Isle Of Mull, Isle Of Tiree, Johnstone, Kilmacolm, Lochgilphead, Lochwinnoch, Oban, Paisley, Port Glasgow, Renfrew, Skelmorlie, Tarbert, Taynuilt, Tighnabruaich, Wemyss Bay
PE	Boston, Bourne, Chatteris, Downham Market, Hunstanton, Huntingdon, King's Lynn, March, Peterborough, Sandringham, Skegness, Spalding, Spilsby, St Ives, St Neots, Stamford, Swaffham, Wisbech
PH	Aberfeldy,Acharacle, Arisaig, Auchterarder, Aviemore, Ballachulish, Blairgowrie, Boat Of Garten, Carrbridge, Corrour, Crieff, Dalwhinnie, Dunkeld, Fort Augustus, Fort William, Glenfinnan, Grantown-On-Spey, Invergarry, Isle Of Canna, Isle Of Eigg, Isle Of Rum, Kingussie, Kinlochleven, Lochailort, Mallaig, Nethy Bridge, Newtonmore, Perth, Pitlochry, Roy Bridge, Spean Bridge
PL	Bodmin, Boscastle, Callington, Calstock, Camelford, Delabole, Fowey, Gunnislake, Ivybridge, Launceston, Lifton, Liskeard, Looe, Lostwithiel, Padstow, Par, Plymouth, Port Isaac, Saltash, St Austell, Tavistock, Tintagel, Torpoint, Wadebridge, Yelverton
PO	Bembridge, Bognor Regis, Chichester, Cowes, East Cowes, Emsworth, Fareham, Freshwater, Gosport, Havant, Hayling Island, Lee-On-The-Solent, Newport, Portsmouth, Rowland's Castle, Ryde, Sandown, Seaview, Shanklin, Southsea, Totland Bay, Ventnor, Waterlooville, Yarmouth
PR	Chorley, Leyland, Preston, Southport
RG	Basingstoke, Bracknell, Crowthorne, Henley-On-Thames, Hook, Hungerford, Newbury, Reading, Tadley, Thatcham, Whitchurch, Wokingham
RH	Betchworth, Billingshurst, Burgess Hill, Crawley, Dorking, East Grinstead, Forest Row, Gatwick, Godstone, Haywards Heath, Horley, Horsham, Lingfield, Oxted, Pulborough, Redhill, Reigate
RM	Dagenham, Grays, Hornchurch, Purfleet, Rainham, Romford, South Ockendon, Tilbury, Upminster

S	Barnsley, Chesterfield, Dronfield, Hope Valley, Mexborough, Rotherham, Sheffield, Worksop
SA	Aberaeron, Ammanford, Boncath, Burry Port, Cardigan, Carmarthen, Clarbeston Road, Clynderwen, Crymych, Ferryside, Fishguard, Glogue, Goodwick, Haverfordwest, Kidwelly, Kilgetty, Lampeter, Llanarth, Llandeilo, Llandovery, Llandysul, Llanelli, Llanfyrnach, Llangadog, Llanwrda, Llanybydder, Milford Haven, Narberth, Neath, New Quay, Newcastle Emlyn, Newport, Pembroke, Pembroke Dock, Pencader, Port Talbot, Saundersfoot, Swansea, Tenby, Whitland
SE	London
SG	Arlesey, Baldock, Biggleswade, Buntingford, Henlow, Hertford, Hitchin, Knebworth, Letchworth Garden City, Much Hadham, Royston, Sandy, Shefford, Stevenage, Ware
SK	Alderley Edge, Buxton, Cheadle, Dukinfield, Glossop, High Peak, Hyde, Macclesfield, Stalybridge, Stockport, Wilmslow
SL	Ascot, Bourne End, Gerrards Cross, Iver, Maidenhead, Marlow, Slough, Windsor
SM	Banstead, Carshalton, Morden, Sutton, Wallington
SN	Calne, Chippenham, Corsham, Devizes, Faringdon, Malmesbury, Marlborough, Melksham, Pewsey, Swindon
SO	Alresford, Brockenhurst, Eastleigh, Lymington, Lyndhurst, Romsey, Southampton, Stockbridge, Winchester
SP	Andover, Fordingbridge, Gillingham, Salisbury, Shaftesbury, Tidworth
SR	Peterlee, Seaham, Sunderland
SS	Basildon, Benfleet, Canvey Island, Hockley, Leigh-On-Sea, Rayleigh, Rochford, Southend-On-Sea, Stanford-Le-Hope, Westcliff-On-Sea, Wickford
ST	Leek, Newcastle, Stafford, Stoke-On-Trent, Stone, Uttoxeter
SW	London
SY	Aberystwyth, Bishops Castle, Borth, Bow Street, Bucknell, Caersws, Church Stretton, Craven Arms, Ellesmere, Llanbrynmair, Llandinam, Llanfechain, Llanfyllin, Llanidloes, Llanon, Llanrhystud, Llansantffraid, Llanymynech, Ludlow, Lydbury North, Machynlleth, Malpas, Meifod, Montgomery, Newtown, Oswestry, Shrewsbury, Talybont, Tregaron, Welshpool,

	Whitchurch, Ystrad Meurig
TA	Bridgwater, Burnham-On-Sea, Chard, Crewkerne, Dulverton, Highbridge, Hinton St George, Ilminster, Langport, Martock, Merriott, Minehead, Montacute, Somerton, South Petherton, Stoke-Sub-Hamdon, Taunton, Watchet, Wellington
TD	Berwick-Upon-Tweed, Cockburnspath, Coldstream, Cornhill-On-Tweed, Duns, Earlston, Eyemouth, Galashiels, Gordon, Hawick, Jedburgh, Kelso, Lauder, Melrose, Mindrum, Newcastleton, Selkirk
TF	Broseley, Market Drayton, Much Wenlock, Newport, Shifnal, Telford
TN	Ashford, Battle, Bexhill-On-Sea, Cranbrook, Crowborough, Edenbridge, Etchingham, Hartfield, Hastings, Heathfield, Mayfield, New Romney, Robertsbridge, Romney Marsh, Rye, Sevenoaks, St Leonards-On-Sea, Tenterden, Tonbridge, Tunbridge Wells, Uckfield, Wadhurst, Westerham, Winchelsea
TQ	Brixham, Buckfastleigh, Dartmouth, Kingsbridge, Newton Abbot, Paignton, Salcombe, South Brent, Teignmouth, Torquay, Totnes
TR	Camborne, Falmouth, Hayle, Helston, Isles Of Scilly, Marazion, Newquay, Penryn, Penzance, Perranporth, Redruth, St Agnes, St Columb, St Ives, Truro
TS	Billingham, Guisborough, Hartlepool, Middlesbrough, Redcar, Saltburn-By-The-Sea, Stockton-On-Tees, Trimdon Station, Wingate, Yarm
TW	Ashford, Brentford, Egham, Feltham, Hampton, Hounslow, Isleworth, Richmond, Shepperton, Staines, Sunbury-On-Thames, Teddington, Twickenham
UB	Greenford, Hayes, Northolt, Southall, Uxbridge, West Drayton
W	London
WA	Altrincham, Frodsham, Knutsford, Lymm, Newton-Le-Willows, Runcorn, St Helens, Warrington, Widnes
WC	London
WD	Abbots Langley, Borehamwood, Bushey, Kings Langley, Radlett, Rickmansworth, Watford
WF	Batley, Castleford, Dewsbury, Heckmondwike, Knottingley, Liversedge, Mirfield, Normanton, Ossett, Pontefract, Wakefield

WN	Leigh, Skelmersdale, Wigan
WR	Broadway, Droitwich, Evesham, Malvern, Pershore, Tenbury Wells, Worcester
WS	Burntwood, Cannock, Lichfield, Rugeley, Walsall, Wednesbury
WV	Bilston, Bridgnorth, Willenhall, Wolverhampton
XZ	
YO	Bridlington, Driffield, Filey, Malton, Pickering, Scarborough, Selby, Thirsk, Whitby, York
ZE	Shetland

APPENDIX 3: HIGHEST PERFORMING SIC CATEGORIES OVER 3 PERIODS (TOP 5)

	1a			1b			2a			2b			3			4a			4b			
	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	TOTAL
73.1	0.39	-	0.64	0.39	-	0.62	0.28	0.36	0.34	-	-	0.34	-	-	-	0.38	0.38	0.47	-	-	-	11
72.6	0.34	-	-	0.32	-	-	0.28	0.33	-	0.36	0.36	-	-	-	-	0.35	0.28	-	-	-	-	8
24.4	-	0.50	0.40	-	0.26	0.31	-	-	-	-	-	-	0.42	0.36	0.42	-	-	-	-	-	-	7
32.3	-	0.37	-	-	-	-	-	-	0.33	-	-	0.25	0.29	0.39	-	-	0.23	0.25	-	-	-	7
74.5	-	-	-	-	-	-	0.35	0.27	-	-	-	-	-	-	-	0.27	-	-	0.30	0.26	0.22	6
30.0	-	0.41	0.50	-	-	0.33	-	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	4
72.2	-	0.35	-	0.28	0.35	-	-	-	-	-	-	-	-	-	-	-	0.24	-	-	-	-	4
32.2	0.33	-	-	-	-	0.40	-	-	-	-	-	-	0.42	-	-	-	-	-	-	-	-	3
33.1	-	-	-	-	0.32	-	-	-	-	-	-	-	0.30	0.37	-	-	-	-	-	-	-	3
50.2	-	-	-	-	-	-	-	-	0.27	-	0.30	-	-	-	-	-	-	-	-	-	0.21	3
55.4	-	-	-	-	-	-	-	-	0.43	0.28	-	-	-	-	-	-	-	-	-	-	0.39	3
64.1	-	-	-	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	0.25	-	0.27	-	3
70.1	-	-	-	-	-	-	-	0.46	-	-	0.54	-	-	-	-	-	-	-	-	0.46	-	3
74.7	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-	-	-	-	-	0.34	-	0.21	3
92.1	-	-	-	-	-	-	-	-	-	-	0.40	-	-	-	-	-	0.23	-	-	0.25	-	3
14.2	-	-	0.46	-	-	-	-	-	-	-	-	-	-	-	0.36	-	-	-	-	-	-	2
15.9	-	-	-	-	-	-	-	-	-	-	-	-	0.41	-	0.39	-	-	-	-	-	-	2
20.1	-	-	-	-	-	-	-	-	0.27	-	-	0.27	-	-	-	-	-	-	-	-	-	2
29.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	0.50	-	-	-	-	-	-	2
34.2	-	-	-	-	-	-	0.30	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	2

67.1	-	-	-	-	-	-	-	0.26	-	-	-	-	-	-	-	-	-	0.33	-	-	-	-	2
70.3	-	-	-	-	-	-	-	-	-	-	0.27	-	-	-	-	-	0.33	-	-	-	-	-	2
73.2	-	-	-	-	-	-	0.30	-	-	0.30	-	-	-	-	-	-	-	-	-	-	-	-	2
14.1	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
15.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	1
15.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.38	-	-	-	-	-	-	-	1
22.2	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
24.6	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
26.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.36	-	-	-	-	-	-	-	1
28.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	-	-	-	-	1
28.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	-	-	-	-	-	-	1
31.1	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	1
31.3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.43	-	-	-	-	-	-	-	-	1
31.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-	-	1
33.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-	-	1
34.1	-	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
36.2	-	-	-	-	-	-	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-	-	-	1
36.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	-	-	-	-	-	-	1
37.1	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
37.2	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
45.4	-	-	-	-	-	-	-	-	-	0.26	-	-	-	-	-	-	-	-	-	-	-	-	1
45.5	-	-	-	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
50.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	-	1
52.4	-	-	-	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-	-	-	-	-	1
55.1	-	-	-	-	-	-	-	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
55.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28	-	-	-	1
60.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	1
61.1	-	-	0.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

63.2	-	-	-	-	-	0.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
74.4	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	1
74.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	-	1

APPENDIX 4: HIGHEST PERFORMING SIC CATEGORIES OVER 3 PERIODS (TOP 10)

	1a			1b			2a			2b			3			4a			4b			
	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009	TOTAL
73.1	0.39	-	0.64	0.39	0.23	0.62	0.28	0.36	0.34	0.17	0.20	0.34	-	-	-	0.38	0.38	0.47	-	-	-	14
72.2	0.30	0.35	0.29	0.28	0.35	0.30	0.21	0.25	0.21	-	0.22	-	-	-	-	0.23	0.24	-	-	0.20	-	13
72.6	0.34	-	-	0.32	0.20	0.23	0.28	0.33	-	0.36	0.36	0.20	-	-	-	0.35	0.28	0.18	-	-	-	12
32.3	0.26	0.37	-	-	0.23	0.19	-	-	0.33	-	-	0.25	0.29	0.39	-	0.20	0.23	0.25	-	-	-	11
24.4	-	0.50	0.40	-	0.26	0.31	-	-	-	-	-	-	0.42	0.36	0.42	-	-	-	-	-	-	7
74.5	-	-	-	-	-	-	0.35	0.27	-	-	-	-	-	-	-	0.27	-	0.19	0.30	0.26	0.22	7
30.0	-	0.41	0.50	0.23	-	0.33	-	-	0.33	-	-	-	-	-	0.33	-	-	-	-	-	-	6
32.2	0.33	0.29	0.39	-	-	0.40	-	-	-	-	-	-	0.42	0.33	-	-	-	-	-	-	-	6
92.1	-	-	-	-	-	-	-	0.24	-	-	0.40	0.19	-	-	-	-	0.23	0.20	-	0.25	-	6
34.1	-	0.38	0.33	-	-	0.23	-	-	-	-	-	-	0.25	-	-	-	-	-	0.23	-	-	5
64.1	-	-	-	-	-	-	-	0.25	-	0.24	-	-	-	-	-	0.21	-	0.25	-	0.27	-	5
33.1	-	-	-	-	0.32	-	-	-	-	-	-	-	0.30	0.37	0.34	-	-	-	-	-	-	4
33.2	-	-	0.30	-	-	-	-	-	-	-	-	-	0.26	0.35	0.35	-	-	-	-	-	-	4
35.3	-	0.33	-	0.25	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24	-	-	4
37.2	-	-	-	0.24	0.25	-	-	-	-	0.20	-	0.20	-	-	-	-	-	-	-	-	-	4
50.2	-	-	-	-	-	-	-	-	0.27	-	0.30	-	-	-	-	-	-	-	-	0.20	0.21	4
55.1	-	-	-	-	-	-	-	0.26	0.22	-	-	-	-	-	-	-	-	-	-	0.24	0.19	4
55.4	-	-	-	-	-	-	-	-	0.43	0.28	-	-	-	-	-	-	0.20	-	-	-	0.39	4
70.3	-	-	-	-	-	-	-	0.22	-	-	0.27	-	-	-	-	-	0.33	-	-	0.22	-	4
74.7	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-	-	-	0.18	-	0.34	-	0.21	4
14.2	0.29	-	0.46	-	-	-	-	-	-	-	-	-	-	-	0.36	-	-	-	-	-	-	3
24.6	-	-	0.29	0.27	-	-	-	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-	3

29.7	-	-	-	-	-	-	-	-	-	-	-	-	0.26	0.35	0.50	-	-	-	-	-	-	3
34.2	-	-	-	-	-	-	0.30	-	-	-	-	-	-	-	-	-	-	0.18	0.25	-	-	3
45.4	-	-	-	-	-	-	0.24	-	-	0.26	-	-	-	-	-	0.25	-	-	-	-	-	3
52.4	-	-	-	-	-	-	-	-	-	0.24	0.19	-	-	-	-	-	0.20	-	-	-	-	3
55.3	-	-	-	-	-	-	-	0.20	-	0.21	-	-	-	-	-	-	-	-	0.28	-	-	3
60.2	-	-	-	-	-	-	0.22	-	-	-	-	-	-	-	-	0.22	-	-	0.25	-	-	3
63.2	-	-	-	-	-	0.31	-	-	-	-	-	0.20	-	-	-	-	-	-	0.20	-	-	3
70.1	-	-	-	-	-	-	-	0.46	-	-	0.54	-	-	-	-	-	-	-	-	0.46	-	3
73.2	-	-	-	-	-	-	0.30	-	-	0.30	-	0.20	-	-	-	-	-	-	-	-	-	3
74.8	-	-	-	-	-	-	-	-	-	0.18	0.19	-	-	-	-	-	-	-	0.20	-	-	3
15.1	-	-	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-	-	-	-	0.30	2
15.9	-	-	-	-	-	-	-	-	-	-	-	-	0.41	-	0.39	-	-	-	-	-	-	2
20.1	-	-	-	-	-	-	-	-	0.27	-	-	0.27	-	-	-	-	-	-	-	-	-	2
26.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.36	0.20	-	-	-	-	-	2
28.1	-	-	-	-	-	-	-	-	0.21	-	-	-	-	-	-	-	-	0.30	-	-	-	2
29.4	-	-	-	-	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-	0.21	-	2
31.6	-	-	-	-	-	-	-	-	-	-	-	-	0.25	0.35	-	-	-	-	-	-	-	2
33.4	-	-	0.29	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	2
37.1	0.35	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
64.2	-	-	-	-	-	-	-	-	0.21	-	-	-	-	-	-	-	-	0.20	-	-	-	2
65.1	-	-	-	0.20	-	-	-	-	-	-	-	-	-	0.32	-	-	-	-	-	-	-	2
65.2	-	-	-	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	2
67.1	-	-	-	-	-	-	-	0.26	-	-	-	-	-	-	-	-	-	0.33	-	-	-	2
74.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	-	0.20	-	-	-	2
74.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	0.25	-	2
11.1	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
14.1	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

15.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.38	-	-	-	-	-	-	1
15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33	-	-	-	-	-	-	-	1
15.7	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
18.2	-	-	-	-	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-	-	-	1
20.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	1
21.1	-	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	1
22.2	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
24.5	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
26.6	-	-	-	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
27.5	-	-	-	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
28.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	-	-	-	-	-	1
29.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33	-	-	-	-	-	-	1
31.1	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	1
31.3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.43	-	-	-	-	-	-	-	1
32.1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.32	-	-	-	-	-	-	-	1
35.1	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	1
36.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	-	-	-	-	1
36.2	-	-	-	-	-	-	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-	-	1
36.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	-	-	-	-	-	1
36.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	-	-	-	-	1
40.1	-	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
41.0	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
45.5	-	-	-	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
50.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	1
50.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	1
51.1	-	-	-	-	-	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
51.3	-	-	-	-	-	-	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

52.6	-	-	-	-	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-	-	1
55.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	1
61.1	-	-	0.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
70.2	-	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-	-	-	-	-	1
71.3	-	-	-	0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
72.1	-	-	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
74.4	-	-	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	1

APPENDIX 5: HIGHEST PERFORMING SIC CATEGORIES BASED ON SIMPLE PROPORTIONS

Innovator category	UKIS date	UK %	Range across SIC categories %	SIC Code category with highest %age positive respondents
Enterprises identified as innovation active	2005	62	26-100	33.4 Manufacture of optical instruments and photographic equipment
	2007	69	40-95	33.4 Manufacture of optical instruments and photographic equipment
	2009	61	32-100	36.5 Manufacture of games and toys
Enterprises with innovation input (1a)	2005	52	17-88	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
	2007	59	29-89	29.7 Manufacture of domestic appliances not elsewhere classified
	2009	46	11-100	36.5 Manufacture of games and toys
Enterprises with innovation output (2a)	2005	26	0-81	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
	2007	23	0-68	33.2 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
	2009	22	0-71	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
Enterprises engaged in innovation activities (3)	2005	59	26-96	33.4 Manufacture of optical instruments and photographic equipment
	2007	68	40-93	26.8 Manufacture of other non-metallic mineral products
	2009	57	22-100	36.5 Manufacture of games and toys

Contd/…

Highest performing SIC categories based on simple proportions contd/…

Innovator category	UKIS date	UK %	Range across SIC categories %	SIC Code category with highest %age positive respondents
Enterprises with new-to-market innovation (4a)	2005	14	0-54	24.6 Manufacture of other chemical products
	2007	11	0-46	33.2 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
	2009	11	0-47	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
Enterprises identified with new-to-firm innovation (4b)	2005	24	0-75	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
	2007	21	0-68	29.7 Manufacture of domestic appliances not elsewhere classified
	2009	20	0-65	32.3 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods

APPENDIX 6: HIGHEST PERFORMING POST CODE AREAS BASED ON SIMPLE PROPORTIONS

Innovator category	UKIS date	UK %	Range across Post Code areas %	Post Code area with highest %age positive respondents
Enterprises identified as innovation active	2005	62	43-73	Milton Keynes
	2007	69	51-82	Bradford
	2009	61	50-77	Huddersfield
Enterprises with innovation input (1a)	2005	52	33-68	Kirkcaldy
	2007	59	39-75	Inverness
	2009	46	28-59	Southend on Sea
Enterprises with innovation output (2a)	2005	26	15-43	Llandrindod Wells
	2007	23	13-37	Cambridge
	2009	22	15-41	Sutton
Enterprises engaged in innovation activities (3)	2005	59	38-72	Kirkcaldy
	2007	68	49-81	Bradford
	2009	57	41-70	Huddersfield/Berwick upon Tweed
Enterprises with new-to-market innovation (4a)	2005	14	9-32	Llandrindod Wells
	2007	11	6-27	Berwick upon Tweed
	2009	11	6-19	Berwick upon Tweed
Enterprises identified with new-to-firm innovation (4b)	2005	24	15-34	Llandrindod Wells
	2007	21	13-36	Berwick upon Tweed
	2009	20	14-41	Sutton

REFERENCES

Acs, Z. J., Anselin, L., & Varga, A. (2002). Patents and innovation counts as measures of regional production of new knowledge.*Research Policy*, *31*, 1069-1085.

Adams, R. J. (forthcoming). *The distribution of innovation in the UK: an exploration of UK Innovation Survey data 2005, 2007 and 2009*.NESTA, London.

Adams, R. J., Neely, A., Yaghi, B., & Bessant, J. (2008).Proposal for Measures of Firm-Level Innovation Performance in 12 Sectors of UK Industry.*Innovation*. London: NESTA.

Andriani, P., Jones, C., Perkmann, M., Propris, L. de, Sena, V., Delbridge, R., et al. (2005).*Challenging clusters.The prospects and pitfalls of clustering for innovation and economic development.Summary report from an AIM management research forum in cooperation with the Welsh Economy Research Unit*.London (www.aimresearch.org).

Arvanitis, S., Sydow, N., & Woerter, M. (2008). Do specific forms of university-industry knowledge transfer have different impacts on the performance of private enterprises? An empirical analysis based on Swiss firm data. *Journal of Technology Transfer*, *33*, 504-533.

Baptista, R., & Swann, P. (1998). Do firms in clusters innovate more? *Research Policy*, *27*, 525-540.

Battista, G., & Stoneman, P. (2010). How innovative are UK firms? Evidence from the fourth UK community innovation survey on synergies between technological and organizational innovations.*British Journal of Management*, *21*(1), 171-186.

BERR.(2009). *New industry, new jobs.BERR/Pub 8854/1k/04/09/NP. URN 09/922*. London.

Canina, L., Enz, C. A., & Harrison, J. S. (2005). Agglomeration effects and strategic orientations: evidence from the US lodging industry. *Academy of Management Journal*, *48*, 565–581.

DBIS.(2008). *Innovation nation. www.bis.gov.uk Cm 7345*. London.

DBIS. (2010). *New industry, new jobs: 1 year on. www.bis.gov.uk BIS/03/10/NP. URN 10/857*. London.

DTI.(2002). *A practical guide to cluster development*.

Dyson, J. (2010). *Ingenious Britain Making the UK the leading high tech exporter in Europe A report by James Dyson March 2010*. *Europe*.

Ejermo, O. (2009). Regional Innovation Measured by Patent Data—Does Quality Matter? *Industry & Innovation,16*(2), 141 — 165.

European Commission. (2008). European innovation scoreboard 2007: comparative analysis of innovation performance. *Innovation*. Luxembourg.

FORA. (2004). *Benchmarking innovation policy and innovation framework conditions*.

Gordon, A.D. (1996) Hierarchical classification. In: Arabie, P., Hubert, L.J. and de Soete, G., (Eds.) *Clustering and classification*, pp. 65-121. River Edge, NJ: World Scientific Publishing Co. Pte. Ltd.

Gordon, I. R., & McCann, P. (2005).Innovation, agglomeration, and regional development.*Journal of Economic Geography*, *5*(5), 523-543.

Heidenreich, M. (2009).Innovation patterns and location of European low- and medium-technology industries.*Research Policy*, *38*, 483-494.

Hendry, C., & Brown, J. (2006).Dynamics of clustering and performance in the UK opto-electronics industry.*Regional Studies*, *40*(7), 707-72.

Hirsch-Hreinsen, H. (2008). " Low-technology": a forgotten sector in Innovation Policy. *Journal of Technology Management and Innovation*, *3*(3), 11-20.

Howells, J., & Tether, B. (2004). Innovation in Services: Issues at Stake and Trends. *Contract*. Brussels-Luxembourg: ESRC Centre for Research on Innovation and Competition, Institute of Innovation Research, University of Manchester for Commission of the European Communities.

Howells, J. (2005). Innovation and regional economic development: a matter of perspective?.*Research Policy*, 34, 1220-1234.

Iammarino, S., & McCann, P. (2006). The structure and evolution of industrial clusters: transactions, technology and knowledge spillovers. *Research Policy*, *35*, 1018-1036.

Lambert, R., & Frenz, M. (undated) *Innovation modes and productivity in the UK*. London.

Laursen, K., & Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, *27*, 131-150.

Mariotti, F., Delbridge, R., & Munday, M. (n.d.).*How motorsport companies collaborate and share knowledge. Evidence from the UK and Italian motorsport industries*.

McCann, B. T., & Folta, T. B. (2009). Demand- and supply-side agglomerations: distinguishing between fundamentally different manifestations of geographic concentration. *Journal of Management Studies*, *46*(3), 362-392.

NESTA. (2009). *The Innovation Index: Measuring the UK's investment in innovation and its effects*. *Technology*. London.

Oakey, R., & Pearson, A. (1996). The contribution to innovation and regional growth of high technology based firms in the United Kingdom. *Proceedings of the 29th Annual Hawaii International Conference on System Sciences, 03 Jan 1996 - 06 Jan 1996* (pp. 87-95 (vol2)). Wailea, HI, USA.

Porter, M. E. (1998). *On competition*. Boston, MA: Harvard Business School Press.

Pouder, R. W., & St. John, C. (1996). Hot spots and blind spots: geographical clusters of firms and innovation. *Academy of Management Review*, *21*(4), 1192-1225.

Prevezer, M. (1997).The dynamics of industrial clustering in biotechnology.*Small Business Economics*, *9*, 255–271.

Robson, S., & Haigh, G. (2008).First findings from the UK Innovation Survey 2007.*Economic and Labour Market Review2*, *2*(4), 47-53.

Robson, S., & Kenchatt, M. (2010).First findings from the UK Innovation Survey 2009.*Economic and Labour Market Review*, *4*(3), 28-35.

Robson, S., & Ortmans, L. (2006).First findings from the UK Innovation Survey, 2005.*Economic Trends*, *628*(March), 58-64.

St. John, C. H., & Pouder, R. W. (2006). Technology Clusters versus Industry Clusters: Resources, Networks, and Regional Advantages. *Growth and Change*, *37*(2), 141–171.

Tellis, G. J., Prabhu, J. C., & Chandy, R. K. (2007). Innovation in firms across nations: new metrics and drivers of radical innovation. *Social Science Research*.

This publication is also available on our website at http://www.bis.gov.uk

Any enquiries regarding this publication should be sent to:
Department for Business, Innovation and Skills
1 Victoria Street
London SW1H 0ET

If you require this publication in an alternative format, email enquiries@bis.gsi.gov.uk, or call 020 7215 5000.

URN 11/831