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REGIONAL CONCENTRATION OF KNOWLEDGE INTENSIVE BUSINESS SERVICES IN EUROPE

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Summary/Abstract:

This article analyses the location patterns of Knowledge Intensive Business Services (KIBS) in Europe in light of the most recent theoretic contributions relating to the area. The KIBS sector comprises of several such as computer services, consultation services, engineering and Research and Development, activities that have experienced large growth in the last number of years with respect to the European Economy. Our aim is to gather information relating to the concentration of these services in European regions and the different patterns of Regional Specialisation, as well as the manner in which these factors have changed over recent years. The results suggest that these activities are highly concentrated in Europe, where the capital cities have emerged as regions that are strongly specialised in these services. "However, it has also been found that there is evidence of a tendency of sparse dispersal of these activities throughout the countries in other regions."

JEL Classification: R1, L84

Keywords: KIBS, concentration, agglomeration economies, spatial diffusion

1 Introduction

There exists a long standing debate about the location patterns of production activities and, in particular, new and emerging production activities. The majority of studies carried out with regards to this aspect have concentrated mainly on manufacturing rather than services activities; however, for obvious reasons, the interest in these activities has increased each time. In our case, we want to delve in to the location patterns Knowledge Intensive Business Services (KIBS). These activities are of critical importance with regards to the recent dynamics of the production system, as much for its increasing volume of added value and employment as for its key function in the creation and diffusion of knowledge and innovation among other activities. They are just as important to the industrial sector as to the services/tertiary sectors and just as important to private and public companies also. The specialised services provide a flow of knowledge and its functions allows a reduction in the risks and opportunity costs in the processes of innovation, proportioning knowledge on different subjects like governmental regulation, standards, marketing, engineering, financing etc. The question that concerns us here is the geographical location patterns of all these activities.

Before looking at the area of the geographical location patterns of these activities we must remember the type of activities that we include under this label. Although several taxonomies has been used referring to KIBS we regard here to companies

belonging to computer and related activities (branch 72 NACE-Rev 1.), research and development (branch 73) and some other business activities (branch 74). We are aware that in this last branch not all sub-branches can be considered as KIBS (like for instance industrial cleaning activities). It will therefore depend on the disaggregation level of the statistics used that we can approximate more or less to KIBS.

The text is structured as follows: In the following section we conduct a brief review of the literature that allows us to develop an understanding of the factors that influence the location patterns of these activities. In the third section we present some empirical evidences about the regional patterns of KIBS activities in Europe and how have they changed during the last few years. The fourth brings together the principal results and conclusions.

2 KIBS location patterns: The dominance of metropolitan areas and capital cities

The location of production activities is determined by the tensions arising between the forces of agglomeration and the forces of dispersion. In the case of KIBS, the available literature shows that they are highly concentrated in metropolitan areas (Coffey 2000). Different analysis of the situation carried out in various countries in the European Union also confirmed that the capital city of a country is usually the area where a relatively large proportion of this sector is concentrated in each country (Daniels, 1995; Schamp, e. W., 1995; Tödtling, F. and Traxler, J. 1995; Illeris, S. and Sjöholt, P. 1995; Cavola, L. and Martinelli, F. 1995; Ferrao, J. and Domingues, A. 1995; Rubalcaba, L. and Gago, D. 2003; Vence, X and González, M. 2005; Vence, X and González, M. 2007). This could be considered as evidence that the national area still plays an important role with regards to the differentiation of markets for many activities. Besides, the specialised character of many of these activities makes necessary the existence of larger markets than the regional ones.

A review of the available economic literature can allow us to organise the wide range of factors explaining why metropolitan areas generate and attract this type of activities. Among these factors we can highlight some relatively new ones linked to the importance of knowledge in new activities and innovation as well as others related to more traditional factors, such as the size of markets or the economies of agglomeration. Other perspectives highlight the need to take into consideration factors such as institutional and systemic interdependences that may influence the evolutionary dynamics of the locations of activities, this is a particularly important factor when we look at the emergence of new activities.

To understand how these factors can act we will need to look at some particular characteristics of the KIBS. Firstly, they are knowledge-intensive activities that require a large proportion of highly trained and qualified individuals. Secondly, their provision requires a direct relationship with the customers. Thirdly, the type of service they provide and the type of information they handle for their clients requires a high level of confidence between the relevant stakeholders. Fourthly, although the emergence of new technologies allows certain tasks to be carried out over long distances, the fact is

that a physical presence and contact remains an important factor so that problems such as proximity, connectivity, and the mobility of highly skilled individuals are very important factors with regards to the location of these activities.

The following is a brief summary of the principal factors which affect the location patterns of the KIBS activities.

2.1 The size of the market matters with regards to KIBS

With regards to activities that are generally specialised, such as KIBS, the size of the market is a key factor due to the fact that if it falls below a certain threshold it becomes unfeasible to establish this type of specialised supply (due to indivisibilities). Besides, the established market size affects the creation of economies of scale and specialisation. Therefore this can be considered a crucial factor in order to understand why the KIBS appear to be highly concentrated in metropolitan areas. Among the authors who have explicitly referred to this are Hitchens *et al* (1996) and particularly Martinelli, F. (1991b). The famous Adam Smith quote “The division of Labour is limited by the extent of the market”, which later became the title of a well known article by Stigler (1951), is the underlying reason for the importance that is placed on the size of the market with regards to KIBS. The argument put forward by Stigler (1951) centred around the conditions surrounding the birth of a new companies through vertical disintegration processes; thus such companies will only appear where their potential demand reaches a critical size. The level of demand (from the market) could be understood as being a “necessary condition” for new companies in order to allow them to reach a production scale large enough to survive independently. The importance of this factor is strengthened if we add the proximity factor, the fact that a close proximity to their customer is significantly important for companies involved in KIBS makes it difficult for them to locate outside their main market, at least until the market in peripheral locations reaches a threshold that allows the survival of such businesses in these areas.

The role of the size of the market with regards to this type of activity brings importance in a certain way to the “Central Place Theory” outlined by W. Christaller or A Losch. Thus, in the manner pointed out by Camagni (2006, 107): *“The economies of scale are less evident (with regards to services) than in the industrial sector, but it is very evident that there is a hierarchical distribution of minimum production thresholds”*. This theory leads to a hierarchy of areas, with first-class cities that would provide certain services which are more specialized and smaller cities which would have less specialized services. Therefore these factors also explain the increasing trend in the emergence of some (less specialized) KIBS in non-metropolitan areas as well.

2.2 The concentration of Management and Decision-Making functions

The metropolitan areas do not only contain the biggest markets but also the central headquarters and key functions of large companies which, in the opinion of different authors, are normally the principal clients of KIBS (Moulaert y Tödtling, 1995). In this regard, in the case of manufacturing companies and considering the role of KIBS, it would appear reasonable to think that these services will be mainly needed in the stage prior to production (R+D, planning, engineering, designing, etc), after this

process (marketing, advertising and with regards to logistics, etc) as well as in functions involved in the planning and management stages within a company. Furthermore, although most of the theories tend to be limited to the incorporation of factors arising from the private market there is evidence that public institutions and, in particular, administration and public bodies are high-profile clients of KIBS. In this regard, we could differentiate two opposing location factors. Firstly, the central public institutions tend to concentrate their main functions in big capital cities, which is an additional factor to explain the concentration of KIBS in these regions (Aslesen and Isaksen 2004). On the other hand, the existence or the creation of an autonomous regional administration may lead to a decentralized demand, becoming more and more important, helping to explain the occurrence of the diffusion phenomena of KIBS across regions and the creation of an independent local supply, particularly in the field of consultation and computer activities.¹

2.3 The Spatial Dimension of the product cycle: Emergence of new activities, the division of labour and specialisation

A different perspective to address the location of these activities is to analyze its genesis from the point of view of supply. An important part of KIBS come about as spin-offs or due to outsourcing of services previously developed within the company and complex entities, especially large companies. Various studies show, for example, that the new companies that emerge as spin-off's working as external sources of knowledge are usually located near the original organization (Dorfman, 1983; Audretsch, 2003). This effect can be very important (van Helleputte y Reid, 2004), and allows the undertaking of opportunities and means, in fact, a transfer of knowledge to other productive sectors. Thus, the appearance of numerous service companies and computer engineering companies is a product of the separation of functions previously carried out at the headquarters of large companies, which already largely concentrated in big cities. For example, in the Spanish case and as outlined by Cal Pardo (2006), the origin of the engineering sector would have come about as a result of the release by the large utilities and construction companies of their engineering departments. It should be noted also that many of the major European groups belonging to the sectors mentioned already and others, for example telecommunications companies, originated as public companies (and many still are public in some cases) and thus their headquarters tended to be in the capital (mainly for political reasons). This factor clearly introduces historical and institutional factors as explanations of the economic phenomena of the concentration of activities such as KIBS in capital regions. Therefore, the importance lies not only in market conditions in order for these activities to be concentrated in metropolitan areas once developed, but the fact that these areas were where they first arose can also be an important factor.

To understand the dynamics of the location of these activities over time it is necessary to introduce an analysis of the product cycle and the functional logic of the geographical distribution of economic activities. The fact that it is in big cities where new products and new services appear we can interpret this in the light of the ideas

¹In fact, some studies about the impact of public demand on KIBS supply has come to the conclusion that such demand is of great importance in less developed areas (Smallbone, 1993; Toivonen, 2006)

outlined by Vernon (1966) on the relationship between place and the product cycle. In line with this view, the stages of conception and creation of new business lines, products, etc. occur in a particular type of region (central and metropolitan areas) and they then spread to the peripheral regions. The new activities arise from breaking away from previous activities in a process of empowerment of tasks and functions which had previously been associated with more complex processes and functions; hence, the birth and first phases of new activities would principally take place in the more advanced regions then passing on to other stages in which they will produce a wider dissemination of these activities into new areas and some standardisation of content, where the knowledge base is more widespread and in which the costs (including labour) would be more relevant in explaining the location of these economic activities. In any case, those activities which are less standardised, more knowledge intensive and more linked to the critical functions of its clients, which are already located in large cities, also tend to remain localised in this environment.

The spatial logic of the product cycle initially sought to explain the relocation of the standardised production stages in manufacturing, but the truth is that at the same time it seeks to find an explanation of why they remain centrally located with regards to management functions, management, design, innovation, marketing, etc, highlighting the existence of a functional logic in the geographical distribution of economic activities. An argument that would be developed by, among others, Aydalot (1984), Veltz (1986) and by some development of the theories of the concept of Centre-Periphery (Mouhoud, 92). As pointed out by Vence (1989, 20), "in the later stage of the cycle, the regions will be characterised not by the type of goods produced but by hierarchical functions and positions. It comes from a discontinuous space formed by a juxtaposition of autonomous territorial organisations to a structured space ... with hierarchical relationships, center / periphery. "

This logic helps explain the persistent central location for strategic tertiary functions of enterprises and the emergence of new activities of knowledge intensive services from them or to provide expertise. The central metropolitan regions, by specialising in the KIBS, would therefore be responding to a functional logic where these activities would play a particular role, while in peripheral regions there would be a less highly developed sector, precisely because they would depend on the first region for such functions. Only those standardised segments of these activities would gradually be implanted in these regions. The latter is what would help to explain the cadence "broadcaster" and the innovator of the KIBS gradient in the country.

2.4 The externalities of knowledge and proximity

The economies of industrialisation arise from the linkages and synergies between a variety of activities which are key to explaining the concentration of KIBS in large cities. The need for a highly qualified workforce which is more easily found in large cities has been identified as one of the factors that explain the location of the KIBS (Illeris, 1997). The rationality of this phenomenon, enunciated over a century ago by Marshall (1920), is related to the need to match the preferences of both workers and companies. Thus, to reduce risk, workers prefer places where there is a greater number of companies that are potential users of their skills profile. The same can be cited with regards to

companies. Veltz (2004) rightly states that the size of the labour market is probably the main competitive advantage of large cities compared to smaller cities.

On the other hand, some authors like Marinelli, F. (1991), have stated that KIBS are concentrated in large cities in order to access external sources of "knowledge" from the agglomeration of firms within the same industry (economies of localisation) which are also located there, or else from different sectors and activities located in these areas (economies of urbanisation). This factor would have a particular importance in the case of KIBS because of the fact that their activities and technology are knowledge intensive. Some authors like Illeris (1989) understand that these factors become extremely important in order to explain and compare the concentration of KIBS in relation to other services, for which proximity is no longer as relevant and thus can provide remote services using new communication technologies and transportation. *"Many services, though not all, and in particular production services are no longer tied to locations which are close to customers. This does not mean that other location factors are not decisive (...). Big cities can be particularly attractive due to their large markets, high accessibility, a large supply of skilled people and high quality services."* Illeris, S. (1989, 145-146).

In the same vein, Feldman (1994), Karlsson (1997) or Feldman and Audresch (1999) have emphasised that the extent of spatial clustering across industries varies depending on the stage of the product life cycle or the importance of tacit knowledge in each of them. This would strengthen the hypothesis that the more knowledge-intensive activity is the stronger its tendency to agglomerate and concentrate geographically would be. This does not mean that they tend to all be in one single agglomeration, but there may be several clusters of different specialised activities. In fact, some intensive and highly specialized knowledge based activities, such as R & D activities, are relatively decentralised.

Also Simmie and Sennet (1999) emphasise the importance of the various economies of agglomeration in large cities and state that these can make excellent locations for the most innovative activities. The authors include, among other factors, the economies of urbanization and outline that these would have great importance with regards to innovation. The authors link this type of economy with the initial phases of the product cycle, i.e, the most innovative are often found in large metropolitan areas. During this phase of the cycle require greater flexibility in relation to inputs would be required and so they would require a higher diversity of them (inputs). On the other hand, the main concern would be the introduction into the market which would require a very fluid communication with not only customers, but also with suppliers and even competitors. Somehow the economies of urbanization that are present in the major urban areas would provide a fundamental support for the development of the innovative activities of the new services. The concentration of many companies that develop in these types of regions that carry out highly innovative functions would result in not only an important market for more knowledge intensive activities, but also a very fertile environment for innovation. Also Veltz (2004, 2005) has pointed out that large cities have become laboratories for new products, new services and new forms of life. These would be especially efficient in accelerating the process of finding

new combinations that are the basis of growth in a Schumpeterian. In this way it refers the author to the dynamic effects of economies of agglomeration.

Moreover, the companies that provide these types of services often possess specialised knowledge and can therefore benefit from the existence and proximity of other local companies that can provide complementary expertise to be incorporated in a customised package deal for their clients. As noted by Justman and Teubal (1995), in the field of technology services, capabilities and needs require alternative means in order to bring a product/service market and these are not easily translatable into the concept of supply and demand. This could be identified as a particular type of economy of localisation. The flexibility and ability to build ad hoc networks of collaboration is something that strengthens the competitiveness of companies in complex services and, in general, is something that is reinforced by the metropolitan location.

2.5 Localised Fixed Social Capital: Communications Infrastructure

In contrast to a relatively common view, the reduction in communication costs could not favour peripheral location of KIBS but it could strengthen the concentration of such activities in large cities or metropolises (Veltz 2005, Vence and Gonzalez, 2007). The metropolitan areas and capital cities of a country are usually better equipped with regards to communication infrastructure than other areas of a country. This localised fixed social capital, as well as enabling economies of urbanisation, makes it easier to connect with other regions and other countries (a clear example of this would be international airports). With regards to the location of KIBS this is an important advantage for two reasons. Firstly, because KIBS companies intend to provide their services to a wider market than the local or regional markets and they tend to be located where access to other parts of the country or the world is easier. Particularly telling is the existence of extensive air connections, i.e. a first-class airport, as the way in which KIBS are "exported" is based largely on the movement of personnel. The second reason is linked to the increasing globalization of the economy and the internationalization of different types of flows (information, knowledge, culture etc). Therefore, only those regions that are internationally well connected can attract certain types of highly intensive knowledge activities (Moulaert, F. and Gallouj, F. 1993, Wood, P. 1998; Veltz, P. 1996).

Moreover, it can also occur that non-metropolitan regions, either due to public policy or rapid diffusion, achieve an adequate ICT infrastructure endowment. However, as Coffey W.J. and Polèse, M. (1989) point out, there is usually a temporary advantage of adoption of these technologies is the urban hierarchy and this could result in a decisive advantage (in fact the same could be applied to the case of physical infrastructure). This temporary advantage is critical when changes in ICT performances are more or less continuous.

The communications infrastructure, combined with the "exportability" of KIBS, is, from our point of view, a relevant factor explaining the concentration of such activities in metropolitan areas. Thus, for many companies in this sector, non-metropolitan regions (especially less developed regions) do not contain large and sophisticated enough

markets to locate there; the modest demand located in these regions could be served from the metropolitan regions themselves (even when the contacts are indispensable "vis a vis"), moving "ad hoc" workers or by opening a temporary office there. This could be the main reason why the capital and metropolitan regions act as exporters of KIBS in their respective countries. Within this context, new technologies and possibilities of communication and transport may, rather than undermine the advantages of metropolitan regions, even strengthen them and act as a major force with regards to the concentration of KIBS.

This argument is linked to the Keynesian theories of the export-base led, linked both to the urban economy and to the explanation of regional development. In this regards the specialisation in these types of services act to compensate for the loss of importance of manufacturing activities of low and medium technology intensity (Vence and Gonzalez, 2007).

2.6 Economies of Globalisation

Economies of agglomeration confined to an enclosed nation-wide space are not of sufficient importance to explain the concentration of innovation and knowledge intensive activities in large metropolitan areas. In fact, the role of economies of agglomeration (as presently understood) in order to explain the location of KIBS have been questioned by several authors. For example, Moulaert and Gallouj (1993) suggest that for some high level services it is more important to have international connections (ie, become partners in international networks and knowledge flows) rather than have connections with other companies geographically closer. In line with the emergence of the global space of flows (supported by a network of mega-cities) postulated by Castells (1995), numerous papers in the field of urban studies show that the metropolitan areas allow for easier and faster access to other regional or international markets, mainly due to the usually better infrastructure/services of transport or communication links, both for the quantity and quality of those available in these areas and also because the introduction of new generations of technologies usually give a temporary advantage to such regions over the peripheral regions. When opening new markets there may be a benefit from the fact of "accompanying" a metropolitan companies affiliates with which they have trade links.

Kujatch (2005) points to the importance of the communication infrastructure available with regards to the transfer of knowledge and information. The author analyses the importance of the sources of knowledge in two German metropolitan regions (Berlin and Munich), and by doing so it appears that there is no clear preponderance with regards to the sources of knowledge and information on an intra-regional or extra-regional basis. Thus knowledge sources outside the region are also important when dealing with the incorporation of knowledge and thus, being well connected with the outside world plays a key role in explaining the location of KIBS. Therefore, high capacity transport and communication links of large urban agglomerations (international airports, infrastructure, ICT, etc), strengthens its role in a knowledge-based economy.

Such connections would lead to what Simmie and Sennet (1999) call “economies of globalisation”. In this context, there is a consensus in pointing out the importance of international airports and high capacity ITC as key infrastructures in these agglomerations and in the density of relationships among them.

2.7. Some qualifications on activities and proximity

Finally, the question arises with regards to what extent the tendency towards agglomeration and concentration differs across different knowledge-intensive services. A relevant issue here refers to the importance of the proximity of these services to customers/users and the actual geographical distribution of the latter (Vence & González, 2002) (see Table 1). We can assume that service providers such as consulting firms or engineering firms require direct contact with their clients in a way that they must depend on the location of industry, but in the standardised and routinised the provision may be more centrally developed, on the basis of a more or less hierarchical network (subsidiaries, branches, franchises, etc).

Table 1. Proximity of KIBS to customers

Activities	Main Clients	Geogrpahic Location
* Computer Activities		(1.5): Some geographical proximity especially for more routine and common services. Relatively low in knowledge.
Hardware consultancy (1)	Businesses, Public and	
Software consultancy (2)	Private Organisations	
Data processing (3)		(2, 3, 4) relatively high content in knowledge. Less need for geographical proximity.
Databases (4)		Concentration.
Maintenance and Repair (5)		
Other activities (6)		
*R & D Activities	Companies/Public Services	Concentration in environments that have better scientific infrastructure and human capabilities
Other business activities		They all need a certain proximity to the customer but
Legal, accounting, business consulting, etc. (1)	Companies (Sole Traders, Small Enterprises and	can be configured as a centralised hierarchical structure:
Architectural and engineering (2)	Administration services	(1): Strong concentration but need a certain proximity to the customer in their provision.
Technical testing and analysis (3)		(4): Strong concentration. Centralised Provisions.
Advertising (4)		(5, 6, 7): Proximity to the customer.
Personnel Placement Services (5)		
Investigation and security (6)		
Industrial cleaning (7)		

Source: Elaboración propia

However, just the need for proximity of certain services can, in some cases, act as a factor leading to deconcentration when, for whatever reason, customers are relocating. The close relationship between some of these services and manufacturing (particularly in the case of Business Services), may lead to an effect of "tracking" the

first in terms of localisation patterns of each manufacturing industry (and does not respond to the same logic as services). Thus, the combination of manufacturing relocation processes and outsourcing strategies by companies may lead to a domino effect on certain services to these new locations.

Therefore, it is conceivable that there is a single flat trend in the change of location of KIBS which can lead to varied and even opposing trends. It is therefore necessary to move forward in the empirical study of these trends, it is clear that the available statistical information does not provide a sufficiently detailed study of them. By looking at the aggregate data provided by industry or sets of branches of industry, we can see that the balancing of these conflicting trends shows which of these have predominated over others.

3 The regional dynamics of KIBS activities in Europe

In the following sections we present some empirical evidence about the regional patterns of KIBS activities in Europe and changes during the last few years. We first analyse the regional concentration degree of KIBS activities and later we focus on the regional specialisation degree in those activities. We use data contained in the *Structural business statistics (SBS)* database provided by Eurostat. Data refers to the number of local units and employment from 1999 to 2007. Since the SBS uses a 2-digits disaggregation level of the NACE Rev-1 classification, we include as KIBS the following branches: computer and related activities (NACE Rev-1, 72), research and development (NACE Rev-1, 73) and other business activities (NACE Rev-1, 74). Although for most regions the reference years are 1999 and 2007 in some cases, because of data lacks, we will refer to different years. Finally, since there are important data lacks referring to total local units in each region, specialisation is only analysed for employment in KIBS. Total employment leaves apart the agriculture and fishing sectors, not included in the SBS. Besides, because of data lacks, employment in financial activities is not included either.

We are aware that using a two-digits classification for KIBS encompasses some problems firstly because some sub-branches within other business activities cannot be considered as KIBS (e.g. industrial cleaning activities) and secondly because there is a significant heterogeneity within the two digits KIBS branches (that we won't be able to capture). In any case we think that these problems do not impede to extract some conclusions about KIBS general dynamics.

3.1 Concentration and specialisation of KIBS activities in EU regions: a slow process of dissemination but with capital-region predominance

a. Changes in KIBS regional concentration levels

As mentioned above, we analyse here the regional concentration degree of KIBS activities between 1999 and 2007. We aim at knowing how the concentration patterns of KIBS activities (measured as both the number of companies and their employment)

have changed in this period. In order to measure the concentration degree the GINI coefficient has been used. The main results are summarised in table 1.

First of all, KIBS activities are clearly more concentrated than the total activities average. As we can see, the KIBS employment GINI coefficient almost duplicates the value corresponding to total employment. Second, KIBS activities as a whole have clearly decreased their concentration degree during the period regardless we measure it using the number of local units or the employment. Nevertheless, while the regional concentration of the number of companies has decreased during the period in all KIBS branches but R&D, when dealing with KIBS employment this pattern is observed only for the case of other business activities. This fact could be illustrating a pattern where KIBS companies are progressively being established in all kind of regions although not all kind of companies but the smallest ones. As we could expect, the emergence of KIBS in the periphery regions is a matter of small companies or small local units. Larger companies would remain more concentrated and so the employment.

Related to the last finding, we see that the regional concentration level is higher in KIBS employment than in the number of firms. This fact, that is particularly evident in the case of computer and related activities, might be related to a higher level of concentration of largest companies. Finally, when comparing the three branches included in our analysis we see that in all cases other business activities (NACE Rev-74) show the lowest concentration degree while computer and related activities show the highest when dealing with employment and R&D do it when referring to the number of local units.

Table 1. Concentration of KIBS activities in European regions. Gini coefficient

	Number of local units		Number of persons employed	
	1999	2007	1999	2007
Computer and related activities	0,0426	0,0389	0,0710	0,0712
Research and development	0,0424	0,0425	0,0474	0,0531
Other business activities	0,0407	0,0363	0,0495	0,0423
KIBS	0,0400	0,0365	0,0517	0,0458
TOTAL	-	-	0,0251	0,0266

Source: Own elaboration based on SBS data

b. Changes in KIBS regional specialisation levels

The analysis of specialisation in different years allows us to catch some tendencies referring to KIBS localisation patterns. Thus, calculating the standard deviation of KIBS regional specialisation indexes we can see whether there is a tendency towards a more homogeneous regional presence of KIBS or not. The results observed for the period 1999-2007 show that a certain homogenisation process in KIBS regional presence has been going on. The same trend is observed for the three KIBS branches although is more clear in the case of computer and related activities and very poor for R&D. These results, in the case of KIBS as a whole sector, are quite consistent with the ones observed when analysing concentration patterns. Nevertheless, when dealing with employment in computer and related activities we can observe that the homogenisation process has not come together with a de-concentration process.

Table 2. Standard Deviation of Regional Specialisation Indexes

	Employment	
	1999	2007
Computer and related activities	0,7031	0,5796
Research and development	1,0953	1,0220
Other business activities	0,3799	0,3445
KIBS	0,3968	0,3544

Source: Own elaboration based on SBS data

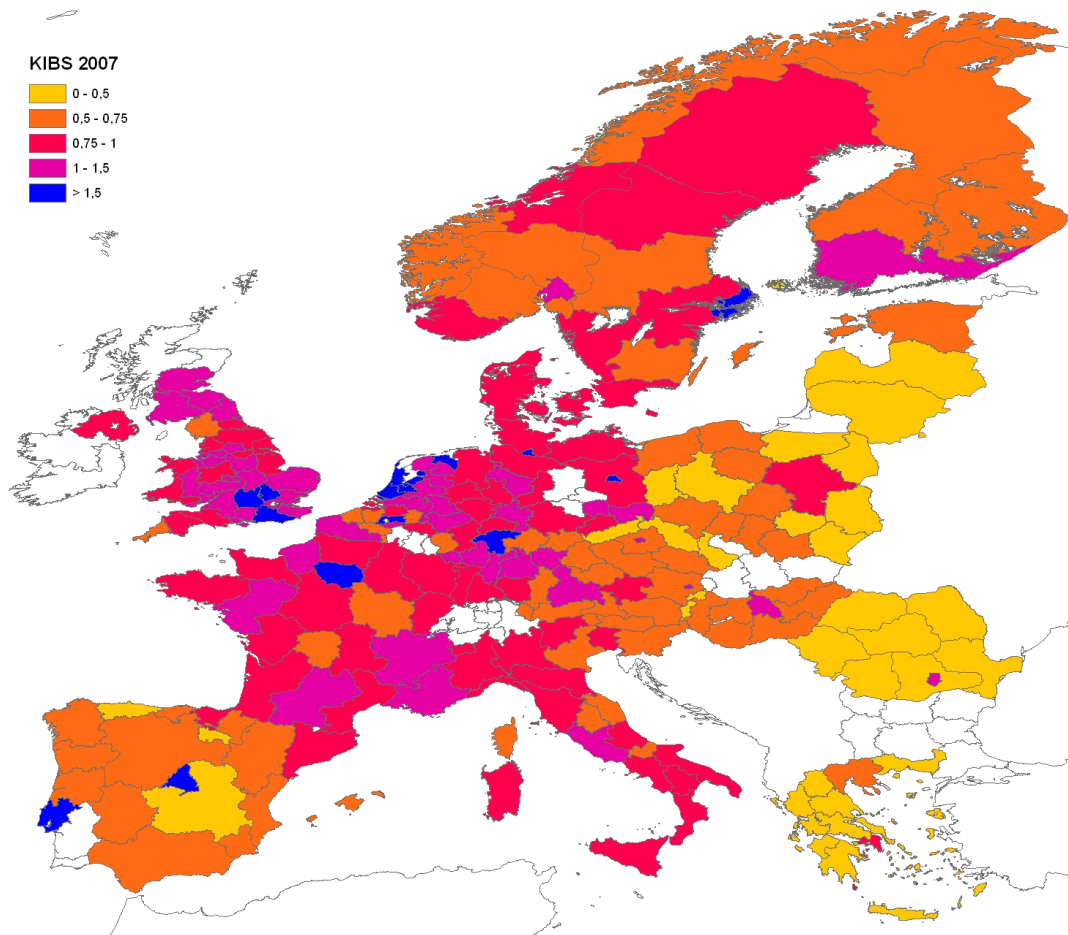
c. The map of KIBS specialisation in European regions

KIBS are not only highly concentrated in European regions but they are much more present in some countries and some regions than in others. As we can see at the maps (map 1 and map 2), regions comparatively specialised in KIBS are mainly located in Core European countries (France, Germany and the Netherlands) together with the UK. On the other side, there is a block of very low specialisation that comprises Eastern regions (from Romania, Poland and the Baltic Republics) and Southern regions (mainly from Greece and to a less extent Spain). Therefore and as expected, KIBS seem to be more present in the regions belonging to richer European countries. Nevertheless, there is an important exception to this pattern that refers to the role of capital regions. In general, these regions show a very high level of specialisation when dealing with KIBS, regardless the country they belong to. Later on we will come to this in more detail.

If we compare the specialisation index in 2007 with the one in 1999 we can observe that there have not been significant changes in relative positions apart from the case of some Spanish, Greek and Norwegian regions that have reduced its level specialisation. On the other side some Eastern regions from Poland have increased their specialisation. The observed trend in the Spanish case needs a more careful analysis but a very preliminary approach suggests that the sharp increase of building

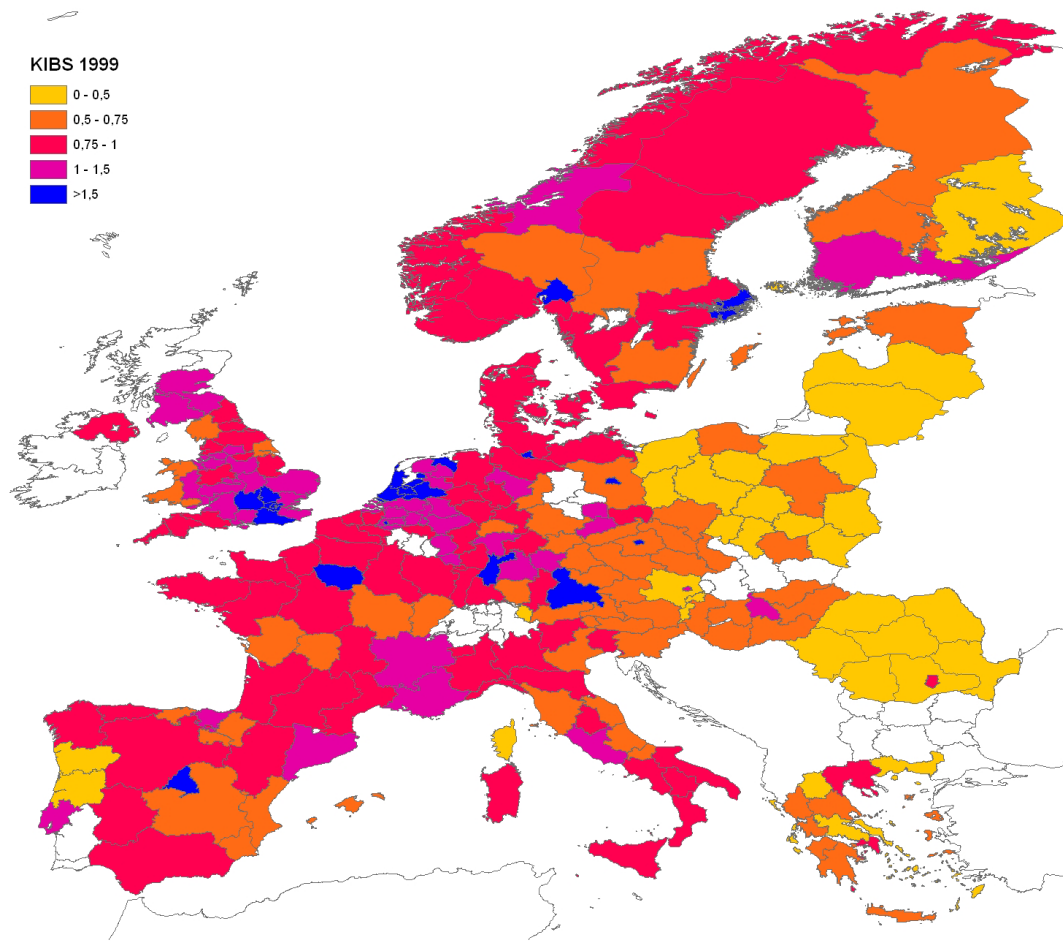
and construction during this period (vg, the real state bubble) distorts the evolution of specialisation index.

Map 1. Relative Specialisation Indexes of European Regions. KIBS. 2007



Source: Own elaboration based on SBS data

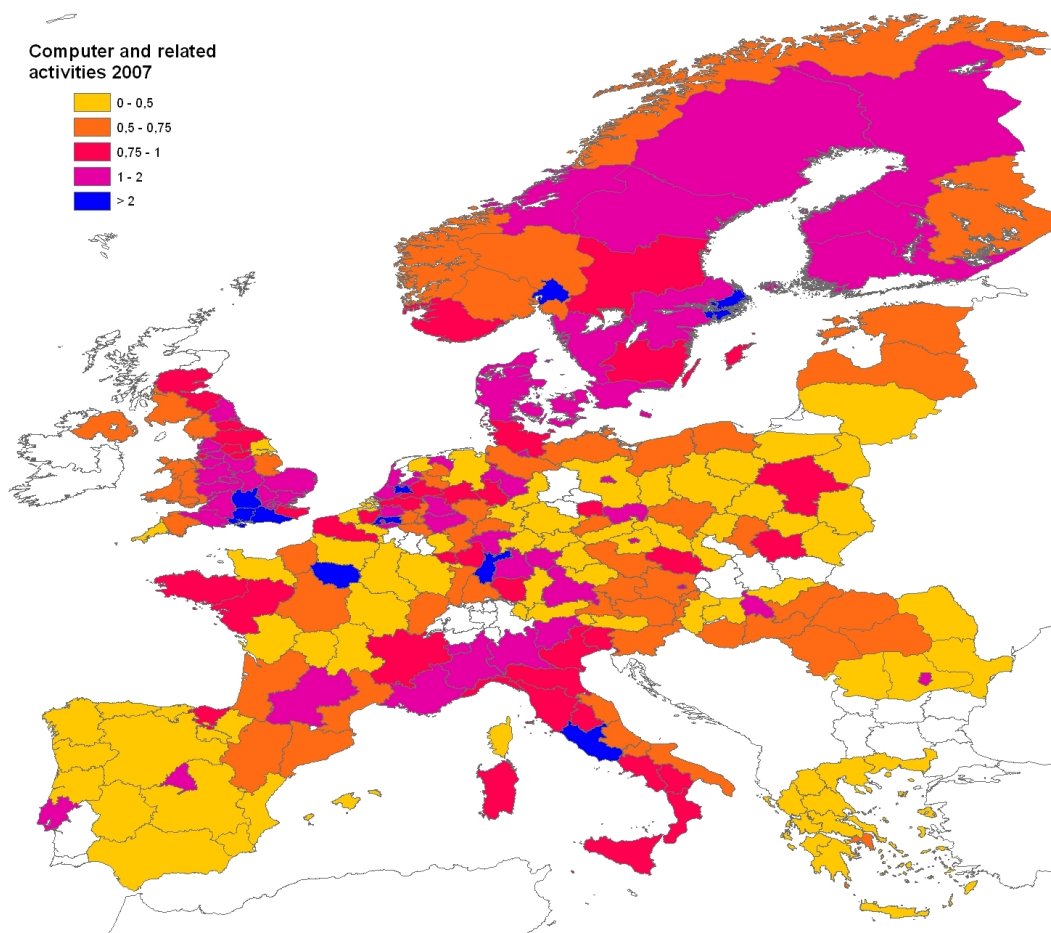
Map 2. Relative Specialisation Indexes of European Regions. KIBS. 1999



Source: Own elaboration based on SBS data

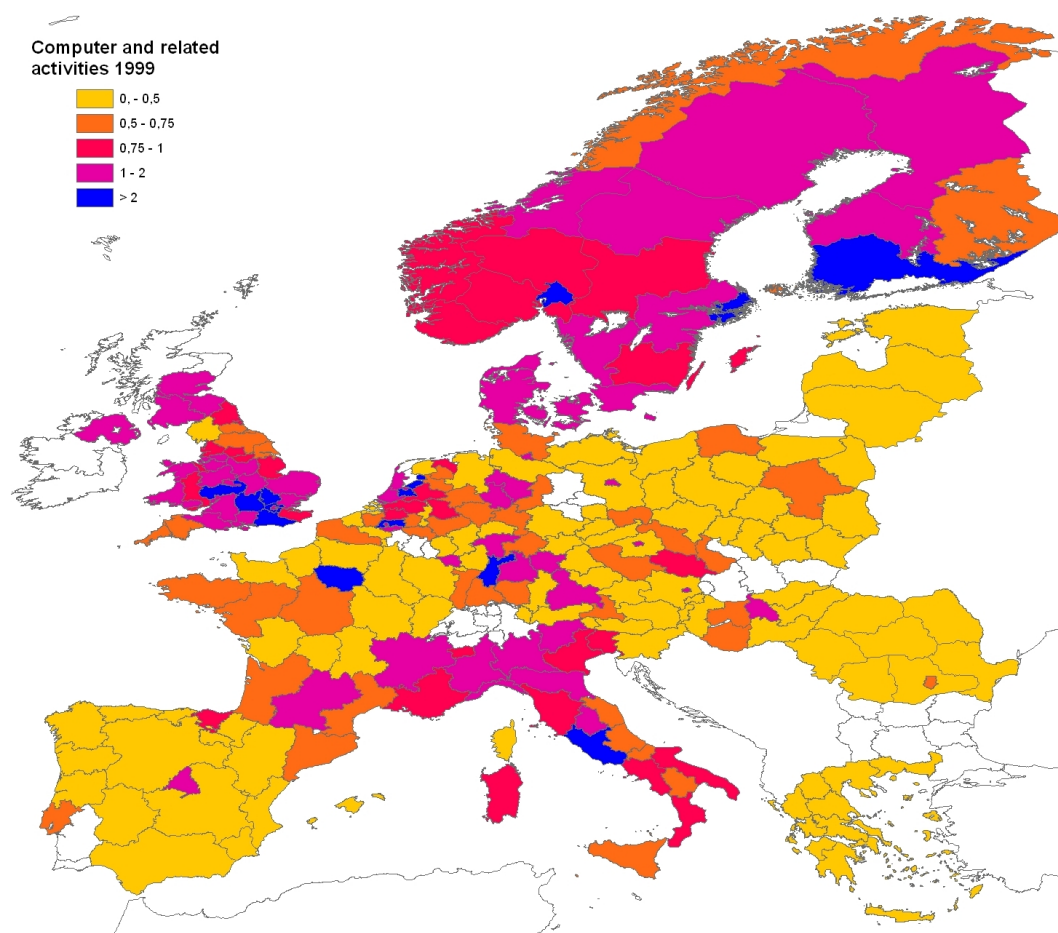
When dealing with regional specialisation in computer and related activities we can observe that a group of specialised regions in northern countries (Sweden, Finland and Denmark) and the UK. Some few regions from Germany and the North of Italy show also a relative specialisation in these activities. Finally, almost all capital regions show a specialisation level that usually outstands within their countries. Only some few changes are observed in the specialisation map of computer and related activities between 1999 and 2007. The major change refers to the improvement of some eastern regions mainly from Poland, Romania and Hungary and the Baltic countries.

Map 3. Relative Specialisation Indexes of European Regions. Computer and related activities 2007



Source: Own elaboration based on SBS data

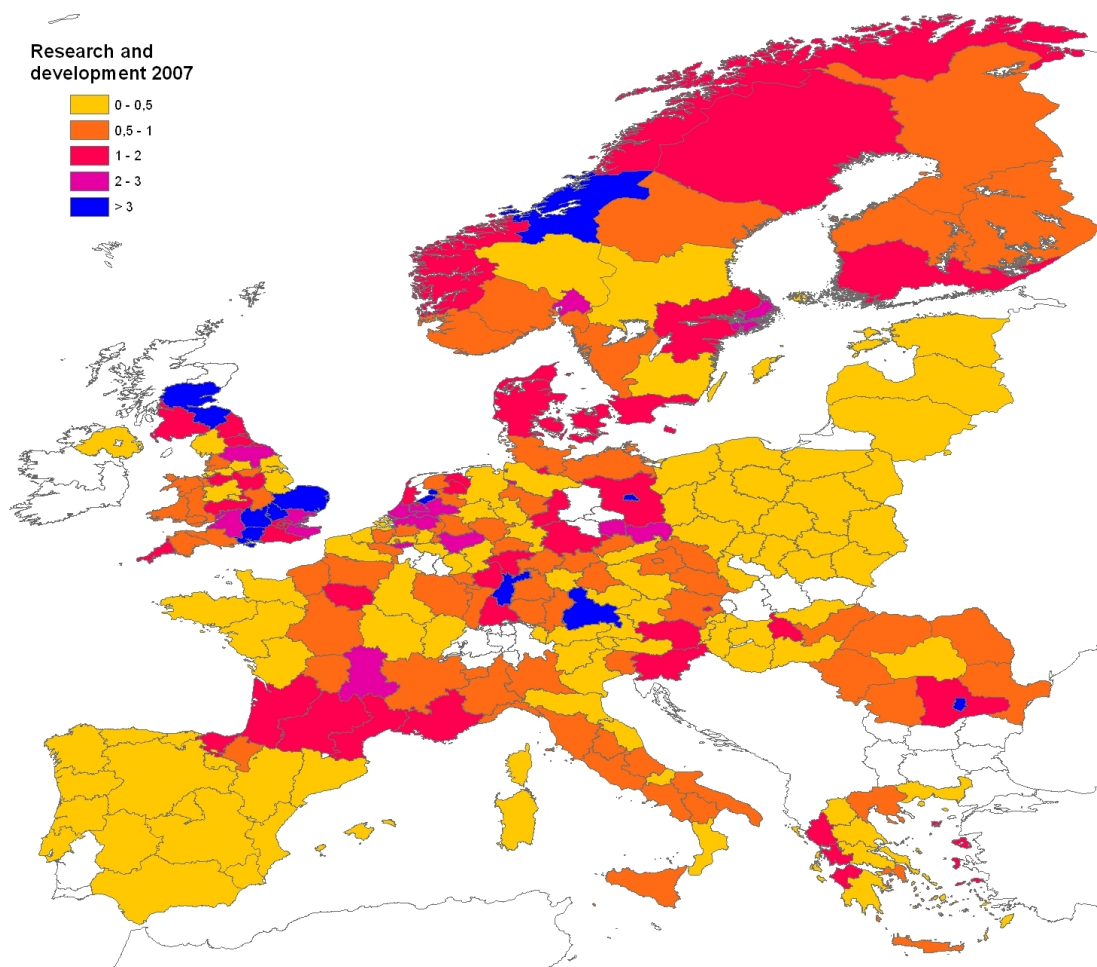
Map 4. Relative Specialisation Indexes of European Regions. Computer and related activities, 1999



Source: Own elaboration based on SBS data

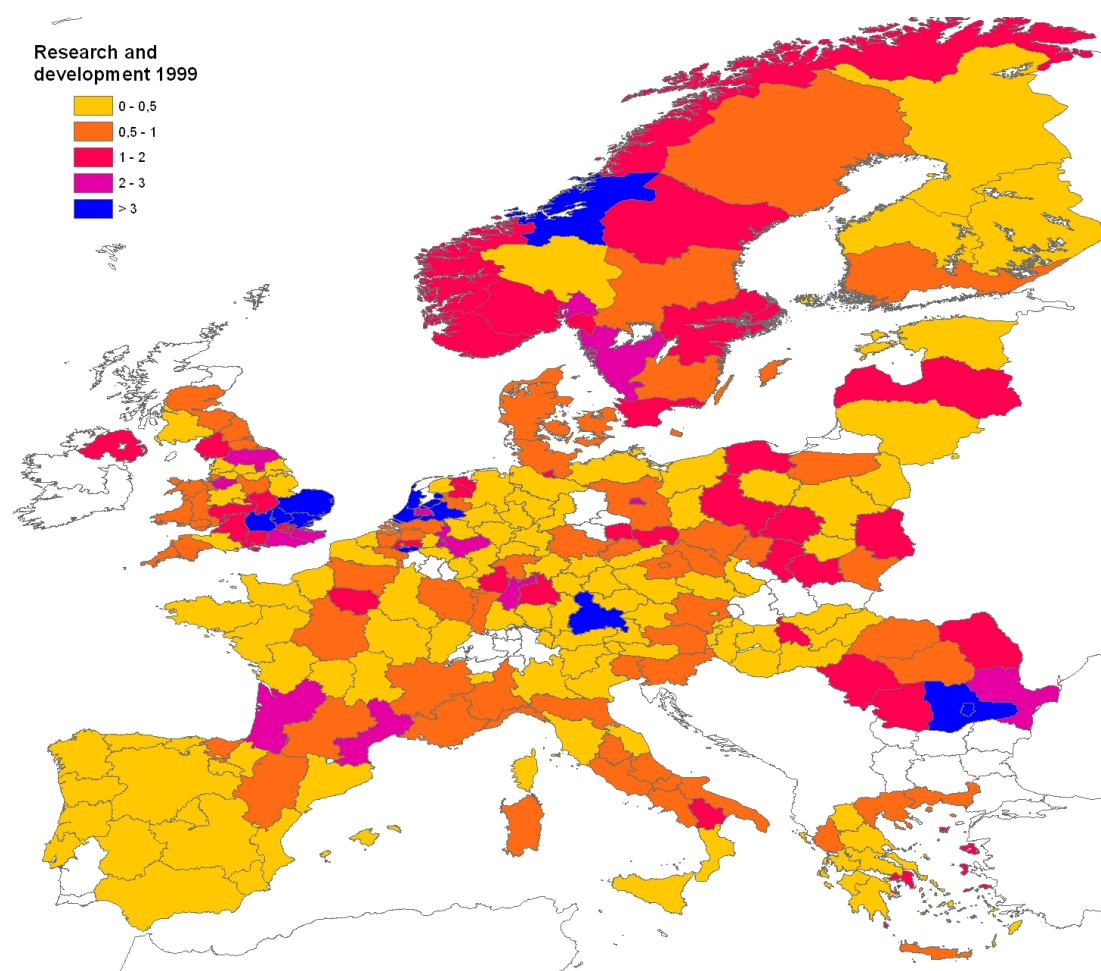
With regard to R&D activities we can observe that it is the case where the capital-region effect is less relevant (although it is still present). Thus, some regions with important high-tech industry presence are among the ones showing higher specialisation levels (Overbayern, the English Southeast, etc). On the other hand, regions from Southern and Eastern countries (apart from Romania) show a relative despecialisation. Regarding the changes between 1999 and 2007 we observe that the area comprising central-european regions are now more specialised while Romanian regions are less specialised. We must be carefully when interpreting these results since the SBS shows some methodological problems. Thus, regarding the size of companies companies with less than 5 employees are not included in the database before 2001. Moreover, there could be some problems regarding the institutional character of R&D firms since many of the firms of this branch are actually partly (or completely) public owned. The number of companies included in this branch could therefore be influenced by the institutional framework of each country or by the own criteria of the national statistical office.

Map 5. Relative Specialisation Indexes of European Regions. Research and development, 2007



Source: Own elaboration based on SBS data

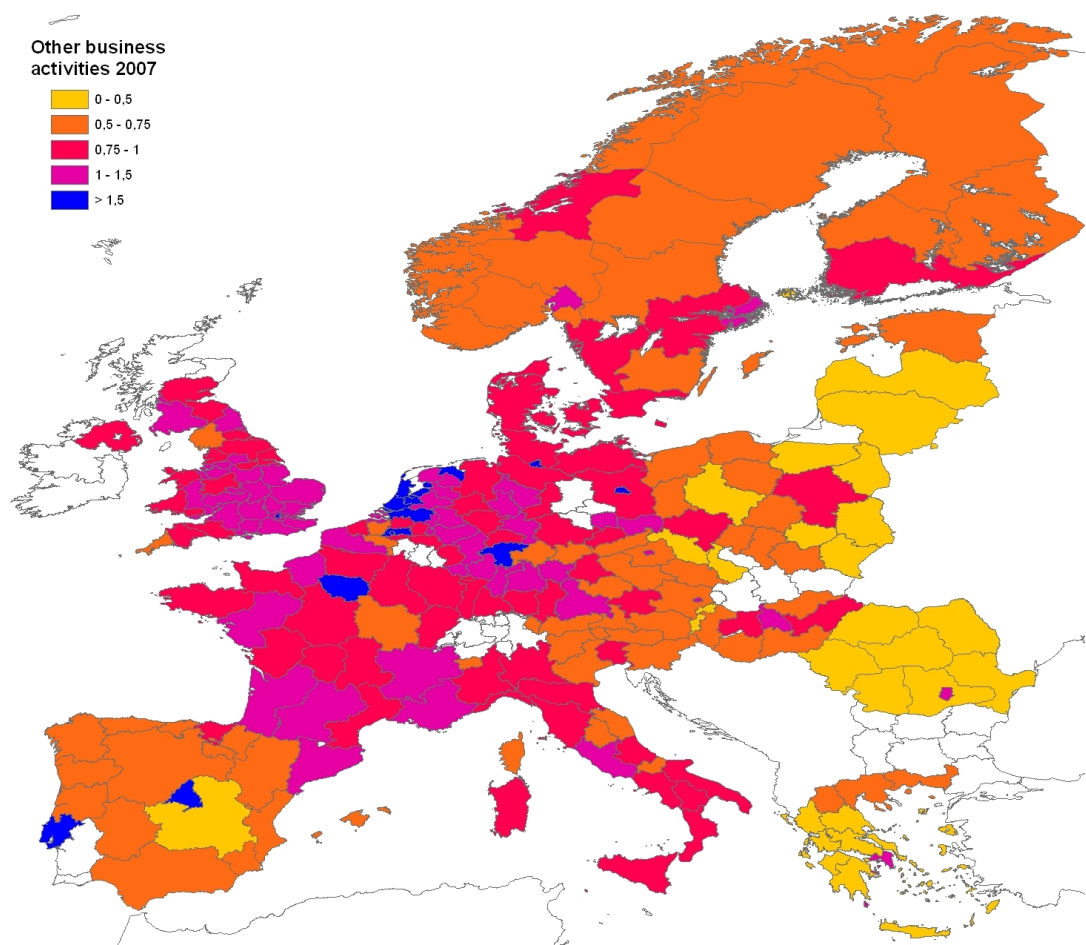
Map 6. Relative Specialisation Indexes of European Regions. Research and development, 1999



Source: Own elaboration based on SBS data

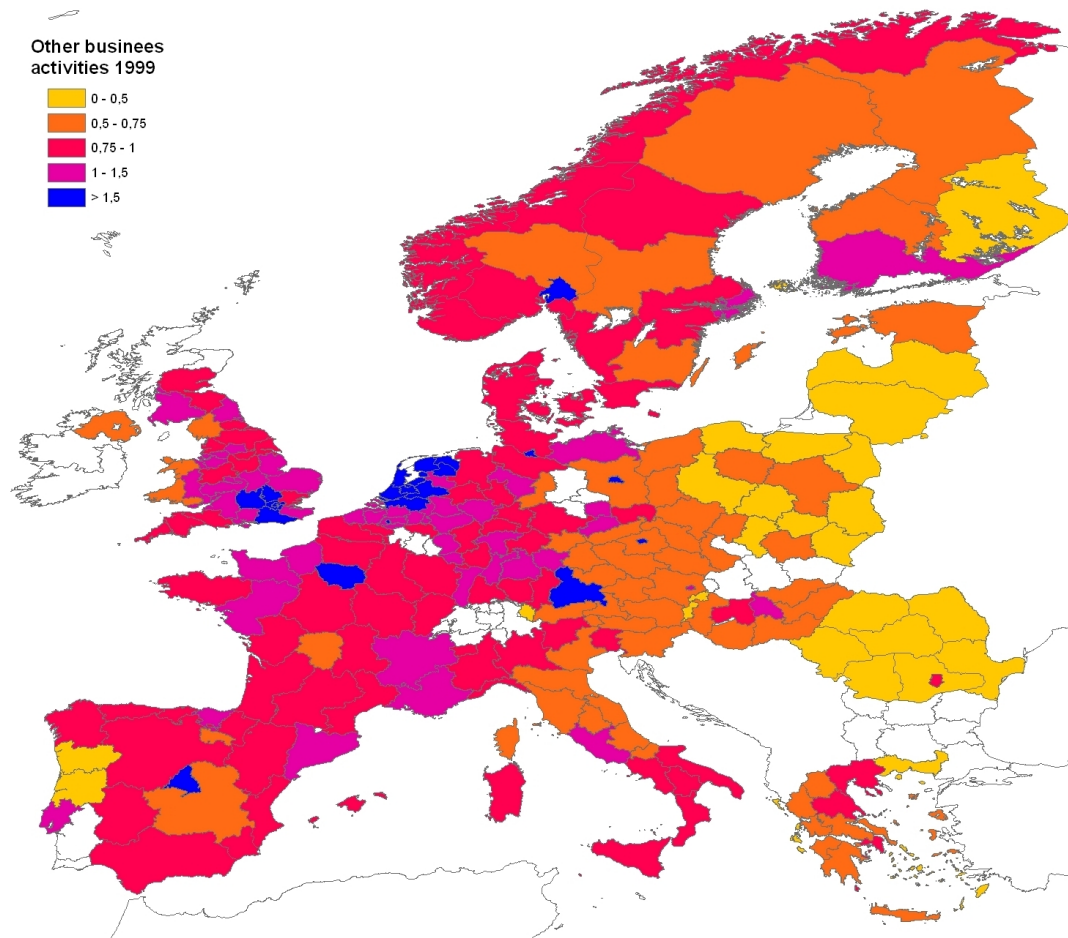
Other business activities comprise different types of consultancy firms (legal, accountant, engineering, etc). We should take into account that, as indicated before, it also includes some sub-branches not considered as KIBS like industrial cleaning. Being clearly the largest KIBS sub-branch the map of regional relative specialisation is not very different from the one of KIBS. Thus, capital regions together with English and central European regions dominate the specialisation ranking while Eastern regions and to some extent Southern regions show a specialisation index below the average. Regarding the changes between 1999 and 2007, they have not been very significant and only a reduction in specialisation is observed in Spanish regions and an increasing in Eastern European regions (particularly from Poland).

Map 7. Relative Specialisation Indexes of European Regions. Other business activities, 2007



Source: Own elaboration based on SBS data

Map 8. Relative Specialisation Indexes of European Regions. Other business activities, 1999



Source: Own elaboration based on SBS data

d. The predominance of capital-regions is still there

As stressed in the theoretical section of the paper, large metropolitan regions -and within then capital-regions- are the main actor when referring to KIBS concentration and specialisation. The European case is a good example of such dominance of capital regions, as we are going to see next.

In table 3 we can observe that the 16 capital regions contained in our database of 255 regions concentrated 24,33% of KIBS companies and 24,71% of KIBS employment in 2007. In both cases (number of companies and employment) the concentration quote has slightly increased between 1999 and 2007. This quote is well above the quote referring to total employment which is also a little higher in 2007 (16,71%) than in 1999 (16,06%). The predominance of capital regions is particularly high when dealing with computer and related activities in such a way that more than 30% of the

employment in this branch is concentrated in these regions. Besides, the concentration quote referred to employment has clearly increased in the period.

Table 3. Weight of capital-regions in European KIBS activities

	Number of local units		Number of persons employed	
	1999	2007	1999	2007
Computer and related activities	25,87%	25,67%	28,55%	30,14%
Research and development	25,73%	23,87%	22,53%	22,78%
Other business activities	23,73%	24,15%	24,11%	23,99%
KIBS	24,02%	24,33%	24,62%	24,71%
TOTAL			16,06%	16,71%

Source: Own elaboration based on SBS data

Note: Capital regions included: Région de Bruxelles-Capitale, Praha, Berlin, Athens, Com. Madrid, Île de France (Paris), Lazio (Rome), Közép-Magyarország (Budapest); Zuid-Holland (Amsterdam), Lisboa, Bucarest, Mazowieckie (Warsaw); Etelä-Suomi (Helsinki), Stockholm, Inner&Outer London, Oslo

Nevertheless, as we have seen above, the predominance of capital regions is not only due to their size but to their KIBS relative specialisation. As can be observed in table 4 the relative presence of KIBS at European Capital regions in 2007 was, in average, clearly higher than the rest of regions and just a bit lower than in 1999. Capital regions relative specialisation is particularly high when referring to computer and related activities and less when dealing with other business activities. In general, we can affirm that the predominance of capital regions when referring to KIBS specialisation has not changed significantly in the period and that keeps well above the average.

Table 4. Relative Specialisation Indexes of Capital Regions (Average)

	Employment	
	1999	2007
Computer and related activities	1,753	1,749
Research and development	1,570	1,587
Other business activities	1,432	1,397
KIBS	1,475	1,443

Source: Own elaboration based on SBS data

Note: Capital regions included: Région de Bruxelles-Capitale, Praha, Berlin, Athens, Com. Madrid, Île de France (Paris), Lazio (Rome), Közép-Magyarország (Budapest); Zuid-Holland (Amsterdam), Lisboa, Bucarest, Mazowieckie (Warsaw); Etelä-Suomi (Helsinki), Stockholm, Inner&Outer London, Oslo

4 Conclusions

Accordingly with the literature the location of KIBS activities shows that they are highly concentrated in metropolitan areas and, more specifically, capital cities are usually the areas where a relatively large proportion of this sector is concentrated in each country. This could be considered as evidence that the national scope still plays an important role with regards to the differentiation of markets for many activities. Besides, the specialised character of many of these activities makes necessary the existence of larger markets than the regional ones.

In this sense, when dealing with the European case, we have seen how KIBS are highly concentrated in comparison to the rest of activities. On the other side, when we deal with the evolution we observe the opposite trend: KIBS shows a smooth trend to deconcentration while the economic activity as a whole tends to a slight concentration. Effectively, a slow deconcentration process of KIBS activities can be reported for the period 1999-2007. This pattern is clearer when dealing with the number of local units than when we are dealing with employment. In any case, when referring to employment, this trend is clearly observed for the case of other business activities but not for computer and related activities and R&D.

There has also been a certain process of homogenization when dealing with KIBS regional specialisation in Europe, i.e. regions were in 2007 more equally specialised in KIBS than they were in 1999.

Nevertheless, important asymmetries persist when referring to KIBS specialisation. Thus Central and Northern European regions show higher specialisation levels than Southern and Eastern regions. However, there is an important exception to this pattern. The exception refers to Capital regions that, regardless the country they belong to show a very high level of specialisation in KIBS activities.

In fact, despite the deconcentration and homogenization process commented above, we can affirm that the predominance of capital regions when referring to KIBS has not changed significantly in the period.

More in depth analysis is needed in order to check for the factors explaining these trends. A review of the available economic literature can allow us to organise the wide range of factors explaining why metropolitan areas generate and attract this type of activities; nonetheless, more attention should be paid to the analysis of factors explaining the increasing dissemination of some KIBS activities. Among these factors we can highlight some relatively new ones linked to the importance of knowledge in new activities and innovation as well as others rather traditional, such as the size of markets or the economies of agglomeration. Other relevant factors such as institutional and systemic interdependences must be considered as well, particularly when we look at the emergence of new activities and when we experience process of devolution or some empowerment of regions.

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6 Annex

The table shows the 255 regions and the reference year for each of them of our analysis.

	Years		Years		Years		Years
Région de Bruxelles-	99-07	Anatoliki Makedonia,	99-07	Piemonte	99-07	Norte	99-07
Prov. Antwerpen	99-07	Kentriki Makedonia	99-07	Valle d'Aosta/Vallée	99-07	Centro (PT)	99-07
Prov. Limburg (B)	99-07	Dytiki Makedonia	99-07	Liguria	99-07	Lisboa	99-07
Prov. Oost-Vlaanderen	99-07	Thessalia	99-07	Lombardia	99-07	Região Aut. dos Açores	99-07
Prov. Vlaams Brabant	99-07	Ipeiros	99-07	Provincia Autonoma	99-07	Região Aut. da Madeira	99-07
Prov. West-Vlaanderen	99-07	Ionía Nisia	99-07	Provincia Autonoma	99-07	Nord-Vest	99-07
Prov. Brabant Wallon	99-07	Dytiki Ellada	99-07	Veneto	99-07	Centru	99-07
Prov. Hainaut	99-07	Stereá Ellada	99-07	Friuli-Venezia Giulia	99-07	Nord-Est	00-07
Prov. Liège	99-07	Peloponnisos	99-07	Emilia-Romagna	99-07	Sud-Est	00-07
Praha	02-07	Attiki	99-07	Toscana	99-07	Sud - Muntenia	00-07
Strední Čechy	02-07	Voreio Aigaio	99-07	Umbria	99-07	Bucuresti - Ilfov	00-07
Jihozápad	02-07	Notio Aigaio	99-07	Marche	99-07	Sud-Vest Oltenia	00-07
Severozápad	02-07	Kriti	99-07	Lazio	99-07	Vest	00-07
Severovýchod	02-07	Galicia	99-07	Abruzzo	99-07	Slovenia	00-07
Jihovýchod	02-07	Principado de Asturias	99-07	Molise	99-07	Itä-Suomi	01-07
Strední Morava	02-07	Cantabria	99-07	Campania	99-07	Etelä-Suomi	01-07
Moravskoslezsko	02-07	Pais Vasco	99-07	Puglia	99-07	Länsi-Suomi	01-07
Denmark	02-07	Comunidad Foral de	99-07	Basilicata	99-07	Pohjois-Suomi	01-07
Stuttgart	00-07	La Rioja	99-07	Calabria	99-07	Åland	01-07
Karlsruhe	00-07	Aragón	99-07	Sicilia	99-07	Stockholm	99-07
Freiburg	00-07	Comunidad de Madrid	99-07	Sardegna	99-07	Östra Mellansverige	99-07
Tübingen	00-07	Castilla y León	99-07	Latvia	99-07	Småland med öarna	99-07
Oberbayern	00-07	Castilla-la Mancha	99-07	Lithuania	99-07	Sydsverige	99-07
Niederbayern	00-07	Extremadura	99-07	Közép-Magyarország	01-07	Västsverige	99-07
Oberpfalz	00-07	Cataluña	99-07	Közép-Dunántúl	01-07	Norra Mellansverige	99-07
Oberfranken	00-07	Comunidad Valenciana	99-07	Nyugat-Dunántúl	01-07	Mellersta Norrland	99-07
Mittelfranken	00-07	Illes Balears	99-07	Dél-Dunántúl	01-07	Övre Norrland	99-07
Unterfranken	00-07	Andalucia	99-07	Észak-Magyarország	01-07	Tees Valley and	99-07
Schwaben	00-07	Región de Murcia	99-07	Észak-Alföld	01-07	Northumberland, Tyne	99-07
Berlin	00-07	Canarias (ES)	99-07	Dél-Alföld	01-07	Cumbria	99-07
Brandenburg	00-07	Île de France	99-07	Groningen	99-07	Cheshire	99-07
Bremen	00-07	Bassin Parisien	99-07	Friesland (NL)	99-07	Greater Manchester	99-07
Hamburg	00-07	Champagne-Ardenne	99-07	Drenthe	99-07	Lancashire	99-07
Hessen	00-07	Picardie	99-07	Overijssel	99-07	Merseyside	99-07
Darmstadt	00-07	Haute-Normandie	99-07	Gelderland	99-07	East Yorkshire and	99-07
Gießen	00-07	Centre	99-07	Flevoland	99-07	North Yorkshire	99-07
Kassel	00-07	Basse-Normandie	99-07	Utrecht	99-07	South Yorkshire	99-07
Mecklenburg-	00-07	Bourgogne	99-07	Noord-Holland	99-07	West Yorkshire	99-07
Braunschweig	00-07	Nord - Pas-de-Calais	99-07	Zuid-Holland	99-07	Derbyshire and	00-07
Hannover	00-07	Lorraine	99-07	Zeeland	99-07	Leicestershire, Rutland	00-07
Lüneburg	00-07	Alsace	99-07	Noord-Brabant	99-07	Lincolnshire	00-07
Weser-Ems	00-07	Franche-Comté	99-07	Limburg (NL)	99-07	Herefordshire,	00-07
Düsseldorf	00-07	Pays de la Loire	99-07	Burgenland (A)	99-07	Shropshire and	00-07
Köln	00-07	Bretagne	99-07	Niederösterreich	99-07	West Midlands	00-07
Münster	00-07	Poitou-Charentes	99-07	Wien	99-07	East Anglia	00-07
Detmold	00-07	Aquitaine	99-07	Südösterreich	99-07	Bedfordshire,	99-07
Arnsberg	00-07	Midi-Pyrénées	99-07	Kärnten	99-07	Essex	99-07
Koblenz	00-07	Limousin	99-07	Steiermark	99-07	Inner London	99-07
Trier	00-07	Rhône-Alpes	99-07	Westösterreich	99-07	Outer London	99-07
Rheinessen-Pfalz	00-07	Auvergne	99-07	Oberösterreich	99-07	Berkshire, Bucks and	99-07
Saarland	00-07	Languedoc-Roussillon	99-07	Salzburg	99-07	Surrey, East and West	99-07
Sachsen	00-07	Provence-Alpes-Côte	99-07	Tirol	99-07	Hampshire and Isle of	99-07
Chemnitz	00-07	Corse	99-07	Vorarlberg	99-07	Kent	99-07
Dresden	00-07	French overseas	99-07	Lódzkie	99-07	Gloucestershire,	99-07
Leipzig	00-07	Guadeloupe (FR)	99-07	Mazowieckie	99-07	Dorset and Somerset	99-07
Sachsen-Anhalt	00-07	Martinique (FR)	99-07	Malopolskie	99-07	Cornwall and Isles of	99-07
Schleswig-Holstein	00-07	Guyane (FR)	99-07	Slaskie	99-07	Devon	99-07
Thüringen	00-07	Reunion (FR)	99-07	Lubelskie	99-07	West Wales and The	99-07
Estonia	00-07			Podkarpackie	99-07	East Wales	99-07
				Świętokrzyskie	99-07	Eastern Scotland	99-07
				Podlaskie	99-07	South Western	99-07
				Wielkopolskie	99-07	Northern Ireland	99-07
				Zachodniopomorskie	99-07	Oslo og Akershus	00-07
				Lubuskie	99-07	Hedmark og Oppland	00-07
				Dolnoslaskie	99-07	Sør-Østlandet	00-07
				Opolskie	99-07	Agder og Rogaland	00-07
				Kujawsko-Pomorskie	99-07	Vestlandet	00-07
				Warmińsko-Mazurskie	99-07	Trøndelag	00-07
				Pomorskie	99-07	Nord-Norge	00-07

Table 5. Regional ranking according to the quote of employment in KIBS branches

Computer and relatedactivities				R&D Activities		Otherbusinessactivities			
		1999	2007		1999	2007		1999	2007
1	Île de France	7,39%	7,40%	Lombardia	4,26%	4,51%	Île de France	5,29%	4,57%
2	Com. de Madrid	2,64%	4,22%	KözépMagyarország	4,01%	4,01%	Com. de Madrid	2,57%	3,58%
3	Lombardia	3,38%	3,26%	Lazio	4,01%	3,50%	InnerLondon	3,28%	2,84%
4	InnerLondon	2,55%	2,60%	Attiki	4,28%	2,72%	Lombardia	2,22%	2,34%
5	Berkshire,	2,71%	2,17%	KentrikiMakedonia	0,77%	2,56%	Cataluña	1,91%	2,08%
6	Lazio	2,08%	2,01%	Toscana	2,49%	2,52%	Hessen	1,44%	2,00%
7	Stockholm	1,67%	1,82%	Île de France	2,88%	2,37%	BassinParisien	1,64%	1,56%
8	Hessen	1,74%	1,58%	Emilia-Romagn	2,20%	2,29%	Darmstadt	1,13%	1,56%
9	Stuttgart	1,61%	1,50%	Stockholm	1,61%	2,06%	Düsseldorf	1,53%	1,49%
10	Darmstadt	1,56%	1,44%	Campania	1,75%	1,81%	Lisboa	1,19%	1,32%
11	OuterLondon	2,31%	1,43%	Sicilia	1,82%	1,67%	Rhône-Alpes	1,21%	1,29%
12	Közép-	1,37%	1,41%	Veneto	1,72%	1,67%	OuterLondon	1,58%	1,28%
13	Surrey,	2,03%	1,40%	Ooberbayern	1,14%	1,60%	Zuid-Holland	1,50%	1,27%
14	Ooberbayern	1,63%	1,35%	Slovenia	0,79%	1,37%	Denmark	1,28%	1,27%
15	Cataluña	1,28%	1,35%	DytikiEllada	0,16%	1,31%	Köln	1,32%	1,23%
16	Karlsruhe	1,31%	1,21%	Piemonte	1,86%	1,30%	Noord-Holland	1,39%	1,19%
17	Düsseldorf	0,78%	1,15%	Västsverige	1,21%	1,25%	Lazio	1,02%	1,18%
18	Piemonte	1,48%	1,09%	Sydsverige	0,99%	1,17%	Ooberbayern	1,34%	1,13%
19	Köln	0,79%	1,08%	Noord-Holland	1,07%	1,02%	Stuttgart	1,00%	1,10%
20	Southern and	0,84%	1,07%	ÖstraMellansverige	0,98%	0,99%	StereiaEllada	0,66%	0,94%

Source: Own elaboration based on SBS data

Table 6. Regional ranking according to the quote of number of firms in KIBS branches

Computer and relatedactivities				R&D Activities		Otherbusinessactivities			
		1999	2007		1999	2007		1999	2007
1	Lombardia	4,65%	4,29%	Lombardia	4,3%	4,6%	Île de France	4,45%	4,02%
2	Île de France	3,96%	4,27%	KözépMagyarország	4,0%	4,1%	Lombardia	3,90%	3,86%
3	Közép-	2,61%	2,36%	Lazio	4,0%	3,6%	Attiki	1,95%	3,06%
4	Stockholm	1,90%	2,28%	KentrikiMakedonia	0,8%	2,6%	Cataluña	2,11%	2,20%
5	OuterLondon	4,13%	2,07%	Toscana	2,5%	2,6%	Com.de Madrid	2,33%	2,17%
6	Lazio	2,14%	1,86%	Île de France	2,9%	2,4%	Lazio	2,04%	2,05%
7	InnerLondon	3,25%	1,83%	Emilia-Romagna	2,2%	2,3%	Lisboa	0,67%	1,70%
8	Com. de Madrid	1,15%	1,80%	Stockholm	1,6%	2,1%	Emilia-Romagna	1,63%	1,59%
9	Mazowieckie	1,15%	1,55%	Campania	1,7%	1,8%	Veneto	1,53%	1,53%
10	Berkshire,	2,48%	1,54%	Sicilia	1,8%	1,7%	Közép-	2,00%	1,52%
11	Surrey,	2,44%	1,44%	Veneto	1,7%	1,7%	ÎnnerLondon	1,72%	1,47%
12	Veneto	1,51%	1,44%	Oberbayern	1,1%	1,6%	Andalucia	1,48%	1,44%
13	Denmark	1,32%	1,39%	Slovenia	0,8%	1,4%	Campania	1,33%	1,38%
14	Toscana	1,30%	1,35%	DytikiEllada	0,2%	1,3%	Piemonte	1,47%	1,34%
15	Cataluña	1,26%	1,33%	Piemonte	1,9%	1,3%	Stockholm	1,26%	1,34%
16	Piemonte	1,50%	1,33%	Västsverige	1,2%	1,3%	Praha	2,08%	1,31%
17	Emilia-Romagna	1,42%	1,31%	Sydsverige	1,0%	1,2%	Toscana	1,36%	1,30%
18	Attiki	0,50%	1,27%	Noord-Holland	1,1%	1,0%	Norte	0,33%	1,19%
19	Praha	1,41%	1,04%	ÖstraMellansverige	1,0%	1,0%	BassinParisien	1,17%	1,18%
20	Oberbayern	0,76%	1,03%	Puglia	0,9%	1,0%	Rhône-Alpes	1,06%	1,08%

Source: Own elaboration based on SBS data

Table 7. Regional ranking of relative specialization index of employment in KIBS

		Computer and related activities			R&D Activities			Other business activities	
		1999	2007		1999	2007		1999	2007
1	Berkshire, Bucks	4,013	3,557	Oberbayern	3,012	6,423	Région de Bruxelles-Capitale	1,865	2,134
2	Utrecht	3,833	3,469	Trøndelag	5,943	5,927	InnerLondon	2,194	2,051
3	Stockholm	3,156	3,335	Berkshire, Bucks and Oxfordshire	7,494	5,120	Noord-Holland	1,981	1,784
4	Oslo og Akershus	3,519	2,660	EasternScotland	0,691	4,647	Berlin	1,894	1,777
5	Île de France	2,584	2,462	Berlin	2,705	4,561	Groningen	1,875	1,732
6	Surrey, East and WestSurrey	3,158	2,448	Bucuresti - Ilfov	6,843	4,436	Darmstadt	1,402	1,705
7	Hampshire and WestSurrey	1,982	2,436	EastAnglia	3,782	4,299	Lisboa	1,445	1,677
8	Karlsruhe	2,287	2,170	Flevoland	4,264	4,103	Zuid-Holland	1,872	1,670
9	Prov. Vlaams-Brabant	2,508	2,086	Bedfordshire, Hertfordshire	5,096	3,875	Hamburg	1,872	1,643
10	Lazio	2,344	2,024	Karlsruhe	2,952	3,326	Comunidad de Madrid	1,554	1,627
11	Comunidad de Madrid	1,604	1,928	Hampshire and WestSurrey	1,275	3,017	Utrecht	1,952	1,611
12	Praha	1,824	1,928	NorthYorkshire	2,235	2,983	Hessen	1,232	1,549
13	InnerLondon	1,711	1,884	Auvergne	0,425	2,982	Prov. Vlaams-Brabant	1,314	1,525
14	Etelä-Suomi	2,350	1,878	Kent	2,400	2,913	Flevoland	1,710	1,521
15	Közép-Magyarország	1,826	1,842	Gelderland	4,443	2,747	Île de France	1,842	1,516
16	Flevoland	3,388	1,820	Dresden	1,734	2,734	Noord-Brabant	1,510	1,506
17	Wien	1,654	1,818	Bremen	0,492	2,482	Düsseldorf	1,481	1,470
18	Bedfordshire, Hertfordshire	3,010	1,798	Gloucestershire, Wiltshire and	1,607	2,455	OuterLondon	1,545	1,464
19	Stuttgart	1,781	1,678	Oslo og Akershus	2,490	2,444	Overijssel	1,460	1,438
20	Cheshire	1,326	1,667	Köln	2,029	2,409	Bedfordshire, Hertfordshire	1,514	1,429

Source: Own elaboration based on SBS data

(*) HTS: NACE Rev-1 branches 64, 72 and 73. KIMS: NACE Rev-1 branches 61, 62, 70, 71 and 74