Sectoral Innovation Foresight

Knowledge-Intensive Services

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1 Introduction

This interim report is part of Task 2 (Sectoral Innovation Foresight) of the Europe INNOVA Sectoral Innovation Watch (SIW) project. It presents interim findings on possible future developments in the sector under study. Particular emphasis is put on the one hand on future changes that are likely to significantly influence the evolution and emergence of innovation activities and associated markets, and on developments that are likely to be of cross-sectoral relevance to innovation on the other. Sectoral innovation foresight thus complements Task 1 of the SIW project, which analyzes current sectoral innovation performance.

The main objectives of Task 2 can be summarised as follows:

- Explore and identify the main drivers of change in the nine sectors. These drivers will be both internal and external to the sectors, with several of them being of a cross-cutting nature.
- Identify and assess key future developments in the nine sectors as well as in terms of cross-cutting developments. The emphasis is put on likely future innovation themes and emerging markets, more specifically also on the requirements and impacts they raise in terms of skills requirements, organisational, institutional and structural changes in the sectors concerned.
- Develop scenario sketches for the sectors under study.
- Highlight key policy issues for the future, with a view to enhancing the innovation performance and competitiveness of firms operating in these sectors.
- Stimulate debate and contribute to the creation of expert networks, based on the participatory elements of this task.

The time horizon of these foresight papers is five to ten years (2015-2020), depending on the specific characteristics and the pace of change in the respective sectors. Knowledge-intensive business services (KIBS) being a service sector, the innovation patterns differ in many respects from those of other industrial sectors. The time horizon given, however, seems to be well suited to capture important upcoming changes in the sector.

This Interim Report is based on a review of available foresight material on the KIBS sector. Together with the corresponding report on the eight other sectors addressed by the SIW project (aeronautics and space, automotive, biotechnology, construction, food and beverage, knowledge-intensive business services, wholesale and retail trade), it serves as background material for a first expert and stakeholder workshop (June 2009). The report concentrates on drivers and innovation themes, but provides already some first findings and thoughts on emerging markets, requirements and future scenarios, i.e. as far as these issues can be derived from the review work. The first workshop aims on the one hand at reviewing the interim findings and on the other at exploring future scenarios of the sector in an interactive mode. The results of this first workshop and some further interviews with experts and stakeholders will then be incorporated in a draft final report that will serve as input to a second foresight workshop (November 2009). This second workshop will focus on the main policy issues that arise from the exploratory scenarios, both within the individual sectors and at their intersection. The final report will bring together in a consistent form the results generated in the different phases of the foresight exercise, i.e. will be based on revised and amended versions of the initial chapters of this interim report and additional chapters dealing with refined scenarios, future requirements and policy issues.
The interim results are presented in six chapters, starting with a situational analysis where the sector stands today to contextualize possible future developments (Chapter 2). Building on this context, Science & Technology (S&T) and demand drivers will be outlined (Chapter 3), as a basis for discussing emerging innovation themes (Chapter 4). These are expected developments resulting from the interaction of supply (technological advances) and demand (societal / customer needs) forces. In this chapter, implications of these innovation themes at firm level will also be addressed. Institutional and structural requirements and implications of the innovation themes for the sector will be highlighted in Chapter 5. This is complemented with first scenario sketches (Chapter 6) and some key questions to be addressed in the remainder of the Sectoral Innovation foresight task (Chapter 7).
2 Current situation

Knowledge Intensive Business Services (KIBS) include a rather heterogeneous group of industries (Table 1) which will be divided into three sub-groups. The first sub-group are computer services (NACE 72), which include software development, as well as IT-related consulting and data processing activities such as the provision of internet-based services.

A second sub-group is research and development (NACE 73). Here we find organisations that provide R&D services to other firms, but also to public authorities. This group includes contract research organisations, but also public research centres and corporate R&D units organized in independent firms.

Finally, other business services (NACE 74.1-74.4) include, on the one hand, legal and economic consulting activities including advertising, and, on the other hand, technical consultancy such as Architectural and engineering activities and technical testing and analysis.

Table 1: A classification of Knowledge Intensive Business Services

<table>
<thead>
<tr>
<th>Computer and related activities</th>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware consultancy</td>
<td>72.1</td>
</tr>
<tr>
<td>Software consultancy and supply</td>
<td>72.2</td>
</tr>
<tr>
<td>Data processing</td>
<td>72.3</td>
</tr>
<tr>
<td>Database activities</td>
<td>72.4</td>
</tr>
<tr>
<td>Maintenance and repair of office, accounting and computing machinery</td>
<td>72.5</td>
</tr>
<tr>
<td>Other computer related activities</td>
<td>72.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research and development</th>
<th>73</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and experimental development on natural sciences and engineering</td>
<td>73.1</td>
</tr>
<tr>
<td>Research and experimental development on social sciences and humanities</td>
<td>73.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Business activities</th>
<th>74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal, accounting, book-keeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consultancy; holdings</td>
<td>74.1</td>
</tr>
<tr>
<td>Architectural and engineering activities and related technical consultancy</td>
<td>74.2</td>
</tr>
<tr>
<td>Technical testing and analysis</td>
<td>74.3</td>
</tr>
<tr>
<td>Advertising</td>
<td>74.4</td>
</tr>
</tbody>
</table>

Source: EUROSTAT

Despite the high degree of heterogeneity in the KIBS sectors, there are some common features shared by all industries. First, the role of knowledge accumulated in their employees and organisational routines is the main feature that distinguishes KIBS from other service industries (Rubalcaba et al. 2008, p. 25 ff).

This does not mean that financial or transport services do not need knowledge for innovation. It can be shown, however, that other inputs to innovation are equally or more important than knowledge in these sectors. Innovation in transport, a network-based service, is mainly based on investment in transport technologies, while finance, a scale-intensive industry, increasingly relies on information and communication technologies to develop new products. The client-centred mode of innovation found in many KIBS is similar to personal services, but KIBS – in contrast to personal services – often significantly contribute to the innovation processes of their clients.

Second, KIBS among the most innovative sectors in the economy, with high levels of R&D intensity and innovation patterns similar to those of high-tech and medium-tech manufacturing firms. This distinguishes KIBS from other service industries (like retail trade) which are far less innovative or tend to innovate in a more continuous, non-technological and incremental way.
Moreover, the share of staff with tertiary education on all employees is higher in KIBS than in most other sectors.

Third, the interest for KIBS industries in current debates also results from the fact that they are growing faster than other sectors in many European countries (Rubalcaba et al. 2008, p. 31). Moreover, the growth of KIBS could be a driver for innovation in other sectors of the economy because they contribute to innovation in other sectors.

### 3 Drivers of innovation and change

The list of drivers of innovation draws from various Foresight reports on KIBS (Kox 2002; Toivonen 2004a, 2004b; EMCC 2005a; Miles 2005b; PREST et al. 2006) as well literature on innovation in services and in KIBS (Barras 1986; Sundbo 1998; Gallouj 2002; Miles 2005a).

#### 3.1 S&T drivers

There are different channels through which scientific and technological change influences the evolution of services and the evolution of KIBS in particular (Gallouj 2002). New technologies can open new opportunities for services or for their provision, thus widening the potential market for KIBS, but they can also provide substitutes to KIBS provision.

**Technological change creates new service opportunities**

First, technological change provides new opportunities for product and process innovation to KIBS firms in a very general sense because it stimulates demand for new types of knowledge. Consultants creating web-pages for their clients, for example, were unknown some 15 years ago. But also scientific knowledge can turn into new services; an example is the growth of research-oriented firms in the field of biotechnology which make their revenues from offering contract research to large pharmaceutical companies or by providing data analysis or the organisation of clinical trials (OECD 2009).

Moreover, growing technological complexity also creates growing demand for technical advice, and a number of KIBS have emerged to help clients deal with technologies. IT consulting services, for example, grow because a considerable number of firms prefer to rely on external rather than in-house expertise in this fast-changing field of knowledge. We find similar reasons for the growth of technical testing services, architectural and engineering services or commercial R&D services.

**Information and Communication Technologies**

Information and Communication Technologies (ICT) are certainly the most important class of technologies for innovation in KIBS and in services in general. Their importance is twofold: first, ICT allows developing new services and producing existing services more efficiently. Examples are new services around simulation and virtual testing which will become widely available with decreasing performance/price relationships in ICT. Another example are computer systems which allow to embody expert knowledge into software (codification).

A second effect of technological change in ICT is that it can alter the way existing knowledge-intensive services are provided. KIBS such as advisory and counselling services are characterised by an intense interaction between the client and the service provider (Miles...
Many types of KIBS are therefore geographically bound and have a strong local character (see below). Service provision over distance is only possible if client or service provider moves to the place of the other party.

3.2 Demand-side drivers and emerging markets

KIBS have considerably benefited from changes in science and technology, in particular new information and communication technologies in recent decades. The main reasons for their considerable growth, however, are factors related to the demand side (Peneder et al. 2003; Miles 2005b; Pilat and Wölfli 2005; Savona and Lorentz 2006): Manufacturing as well as service firms increasingly utilize services as inputs for their production processes. This is due to a number of different, but interrelated drivers which will be discussed below.

*Increasing knowledge-intensity in the economy*

A major demand-side driver of KIBS growth is the increasing knowledge intensity of a number of economic activities and, as a consequence, a higher need for special expertise. This is, at first, a result of technological change and the growing stock of information and knowledge available in society. Moreover, firms face an increasingly dense regulatory framework, for example in the field of environmental, health and safety regulation, taxation or other fields where KIBS provide advice. In a wider sense, we can also include the process of social change and functional differentiation of society which increases knowledge intensity of a number of businesses. Advertising, market research and public relations services take advantage of this process.

*Outsourcing*

Outsourcing means that manufacturing and service firms buy services which were previously provided in-house from external service providers. KIBS predominantly are consumed by other businesses and outsourcing has been a major driver of KIBS growth in the past (Peneder et al. 2003). Outsourcing is cost-driven to a certain degree, but also has to be seen in a larger context of corporate restructuring where firms increasingly focus on their core competencies and handle other activities to external suppliers. It is difficult to estimate the current extend of offshoring because reliable data is scarce. According to recent study on outsourcing activities in the Lombardy manufacturing sector (Cusmano et al. 2006), about half of all enterprises provide all service activities in-house, another 30% in-house and outsourced, and 5% have outsourced all their service activities.

It is likely that this growth trend will continue in the future because offshoring is not a zero-sum game but includes considerable specialisation and service quality aspects. Explanations of the current outsourcing trend that only refer to cost differentials therefore fall short of understanding the process and, in particular, conceal the dynamic aspects with respect to quality and flexibility. The growth of KIBS has cost- as well as quality-related aspects. External service providers can operate at a larger scale and therefore have a stronger internal specialisation and division of labour because they serve a larger group of potential clients than in-house service departments do. An in-house law department with five employees will hardly reach the same degree of specialisation like a law firm with 100 lawyers. As a result, KIBS may provide services of a higher quality and/or lower cost than in-house service departments could do. Outsourcing therefore enables KIBS to gain dynamic learning effects, increasing returns from scale and specialisation, and benefit from experiences with different clients (EMCC 2005a; Miles 2005b). Competition among different KIBS firms in one field may provide further incentives to increase quality.
Enterprises increasingly make use of external scientific and technological knowledge in their innovation process. In the words of Chesbrough (2003), many innovative enterprises have shifted to an ‘open innovation’ model where they exploit ideas and knowledge not only provided by internal R&D, but also from a broad range of external sources and actors. In the context of KIBS, this could further boost demand for R&D services and other KIBS providing and scientific and technological expertise. Hence, from the KIBS point of view, Open Innovation could be seen as an extension of the general trend towards outsourcing for R&D.

Moreover, the concept of Open Innovation also implies that firms employ various ways of commercialising the results of their innovation process. Besides own production, they sell patent rights and licences or promote the formation of start-ups for technologies they don’t want to commercialize themselves. This may provide new opportunities for services specialized in the commercialisation of technologies or advisory services on commercialisation.

The local character of KIBS

Technology has provided various new ways of delivering services over distance. These tools may help KIBS firms to enlarge their geographical range. There are, however, considerable hampering factors to such an expansion which are a result of the very nature of the process of service production in KIBS. As a result, these factors are negative drivers to outsourcing and the internationalisation of services.

One set of factors include differences in the rules and regulations concerning KIBS across countries such as price fixing, recommended prices, advertising restrictions, but also the diversity of professional qualifications including entry requirements in KIBS (European Commission 2004a, 2004b). This makes it difficult for KIBS firms to provide their services in other countries.

Moreover, differences in culture and language between countries can also hamper internationalisation, since a number KIBS industries such as advisory and counselling services are characterised by an intense interaction between the client and the service provider. Trust and mutual understanding are essential in such service relations and they are easier to establish in geographical proximity and face-to-face contact than over distance. Geographical proximity also helps service firms to understand the context of the client and to exchange more tacit pieces of knowledge with the client.

The reason for this fact lies in the propensities of knowledge and information. Knowledge, like information, is partly non-rival and non-excludable (Foray 2004, p. 91 ff). Despite its public good characteristics, the transfer and reproduction of knowledge is a far more expensive process than the reproduction of information because knowledge is ‘tacit’ to some extent. Tacitness results from the fact that cognitive capabilities and abstract concepts are not easy to articulate explicitly and to transfer between people. Tacitness both allows and limits the transferability of knowledge. It makes the transfer and reproduction of knowledge easy within a group of people (‘epistemic community’) who share a common vocabulary or ‘codebook’, but increases the cost of transferring it to outsiders (Cowan et al. 2000). The creation of such an epistemic community is a long process and involves mutual learning most often in geographic proximity. Moreover, knowledge (and new knowledge in particular) is context-specific and often produced for a local context and for a specific purpose (Cowan et al. 2000; Breschi and Lissoni 2001).
All these factors contribute to a strong local character of KIBS and we assume that many KIBS remain local even if technological change provides ways to deliver these services over distance. Even it would be possible for an accounting firm to acquire clients overseas, they may stick to their local market because there are familiar with its unwritten rules and prospective clients prefer to discuss their issues in face-to-face meetings than over videoconferences.

Recent empirical evidence on the local character of knowledge-intensive services and services offshoring has been presented by Corrocher et al (2009) and Cusmano et al (2006). In a survey of firms in the Lombardy region, they find that the vast majority of firms that do outsourcing of services rely in at least one case on a regional supplier of services (Table 2). Most of the outsourcing firms, however have a mix of regional and national suppliers. The share of firms with international suppliers of services is still small. These observations can be generalized for most sectors.

Table 2: Services Outsourcing and offshoring by industry (% of firms)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Outsourcing</th>
<th>Regional outsourcing</th>
<th>Exclusively regional</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy &amp; Chemistry</td>
<td>42,0</td>
<td>34,1</td>
<td>9,4</td>
<td>5,1</td>
</tr>
<tr>
<td>Food &amp; Tobacco</td>
<td>52,3</td>
<td>38,6</td>
<td>4,6</td>
<td>9,1</td>
</tr>
<tr>
<td>Textile &amp; Clothing</td>
<td>35,0</td>
<td>29,3</td>
<td>7,9</td>
<td>7,1</td>
</tr>
<tr>
<td>Wood &amp; Furniture</td>
<td>44,6</td>
<td>38,5</td>
<td>7,7</td>
<td>1,5</td>
</tr>
<tr>
<td>Paper &amp; Publishing</td>
<td>47,1</td>
<td>33,3</td>
<td>7,8</td>
<td>2,0</td>
</tr>
<tr>
<td>Mechanics &amp; Transport</td>
<td>36,2</td>
<td>32,0</td>
<td>10,5</td>
<td>3,9</td>
</tr>
<tr>
<td>Electronics &amp; Optics</td>
<td>32,6</td>
<td>24,4</td>
<td>4,7</td>
<td>7,0</td>
</tr>
<tr>
<td>Construction</td>
<td>45,6</td>
<td>45,6</td>
<td>14,0</td>
<td>0,0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39,5</strong></td>
<td><strong>33,6</strong></td>
<td><strong>9,3</strong></td>
<td><strong>4,3</strong></td>
</tr>
</tbody>
</table>

Source: Cusmano et al. (2006), p. 12

**International Outsourcing**

Despite the local character of many KIBS, some authors argue that international outsourcing or, more generally, foreign trade and exports in KIBS, will become considerably more prominent in the future. Their main argument is that ICT have created new ways for communication between service firms and clients and service provision over distance. As a consequence, ICT changed the local character and the tradability of many services. These types of services, as Blinder (2005, p. 13) puts it, "have more in common with manufactured goods that can be put in boxes than they do with personal services". Outsourcing, as a consequence, increasingly gets an international dimension with a growing share of outsourcing taking place between partners in different countries. International outsourcing, like domestic outsourcing, has a strong cost component, but is also fuelled by the effects from serving a larger range of clients such as economies of scale and increasing specialisation at the KIBS provider’s side.

It has been noted by various authors that current debates on offshoring are based only on weak empirical grounds because there are some major issues with respect to the measurement of international outsourcing (Bhagwati et al. 2004; Amiti and Wei 2005). The most frequent approach to measure international outsourcing is to use data on international trade in services, in particular balance of payments (bop) statistics. Data on KIBS can be found in two categories of the bop statistics, "Computer and information services", and "Other business services". The latter
category summarizes a number of different knowledge-intensive services such as legal, accounting, advisory, architectural or R&D services.

Today, the US, the UK and Germany are the most important exporters of ‘other business services’ in absolute terms and therefore the most important providers of offshoring (Figure 1). But also countries such as India, China, Ireland, or the Baltic states are seeing rapid growth in services exports. It seems, however, that China and India did not yet succeed in repeating their export success from manufacturing in business services. Readers should also notice that Figure 1 reports absolute numbers; these do not reveal the relative importance of services exports for different countries. Although countries like Sweden, Belgium or Ireland lag behind Germany or the UK in the total volume of their service exports, the relative importance of KIBS offshoring in terms of share on GDP is higher in these countries.

![Figure 1: International trade in other business services, 2006](image)


A quite different picture emerges when we look at offshoring of computer and information services. Here, India has taken the first position followed by Ireland and the United Kingdom. Offshoring of computer services, in other words, is not dominated anymore by the large industrial countries such as USA or Germany, but by two newcomers who have begun to export these services in considerable quantities only some 10 years ago. India is the only low-cost country that could reap considerable shares of the offshoring market. China has only the volume of Sweden or Belgium. Despite the success of India, service offshoring is still predominantly taking place between high-income countries and not between high- and low-income countries. This is consistent with data on foreign direct investment in services and other trade data. Moreover, KIBS exports to large developing countries such as China, India, or Brazil, in contrast are still small. It is, however, very likely that these countries will become important markets for European KIBS exporters with rising levels of GDP.
Figure 2: International trade in computer and information services, 2006

4 Emerging innovation themes and their requirements

4.1 New products, processes, technological trajectories

Identifying innovation themes and new products and processes in KIBS is difficult for two reasons; first, KIBS are often tailor-made products created as a response to the specific problems of the client and in interaction between client and service provider (Miles 2005a). The product is essentially co-produced with the client and very much content-specific. As a result, differences between singular service cases can be huge and it cannot be said if a particular product variation is an innovation or not.

**Simulation and virtual testing**

An example for new service opportunities created by technological change are services based on simulation and virtual testing. Increasing computing capabilities as well as advances in describing and analyzing natural and social systems will provide new technological opportunities for computer simulations. Possible areas of applications include drug discovery, materials sciences, engineering and construction, but also the simulation of traffic flows or the behaviour of firms. But simulation can also be used in ‘low-tech’ sectors such a construction. Here, architects and engineering firms can employ virtual reality and simulation technologies to visualize and better demonstrate the physical aspects of the design to clients. Moreover, simulation can be used to better plan and monitor the assembly processes and help to avoid inconsistencies in the construction process and save waste (EMCC 2005b).

This example demonstrates that simulation offers great advantages in terms of cost reduction, increased flexibility and faster developing time. It is very feasible that these opportunities will grow in the future since computing power as well as software development will further improve in the future. Simulation may therefore enhance the range of services architects, contract research organisations or engineering firms can offer to their clients. Moreover, the provision of simulation services itself may emerge as a new field within KIBS and lead to the creation of new firms and services.

**Codification of Knowledge**

A major issue related to any knowledge-based activity is the fact that many forms of knowledge, in particular “know-how” and know-why”, are inherently unarticulable and therefore not transferable in principle (Cowan et al. 2000). One may say that this is the very reason why KIBS exists – customers cannot buy knowledge alone, but only a service that builds up on this knowledge. Knowledge is inevitably associated with its bearer.

Knowledge however, can be codified (separated from its bearer and making it accessible for others) in principle, but only at high economic costs (Foray 2004). Modern ICT considerably lower the price of codification of knowledge and give way to a codification of various parts of knowledge. Knowledge of experts in a certain field, for example, can be used to build a set of rules that advise an individual on a certain topic. Such a software is known as an expert system (Lado and Zhang 1998). An expert system is a piece of software that contains knowledge of human experts on a certain topic and can reproduce this knowledge. Examples for such an expert system are tax preparation programmes which can help the user to generate tax statements in an interactive process. Another example is software that helps users to create their own webpage without having programming or designing skills or guides users through diagnosis.
and troubleshooting procedures which question/answer schemes. Tax preparation software and similar programmes are already widely used by private users, but rarely by firms. Advances in ICT may lead to more sophisticated software systems that can also be used in business environments.

If knowledge codified in software reach a state of maturity that allows widespread use in business environments, this may also considerable change the business models of KIBS. Codification may stop or even reverse the trend towards outsourcing. Consultancy services such as legal advising, accounting, book-keeping, tax consultancy, etc may, on the one hand, face new competition from self-servicing which can increase their possible range and quality be increased by the use of codified knowledge. This is more likely in consultancy and software services, but less likely in contract R&D.

Mass-market and tailor-made KIBS

On the other hand, KIBS itself could increasingly make use of codified knowledge and enlarge their activities by highly standardized and automated services. New IT technologies may bring about a trend to KIBS which has been labelled by Gallouj (2002) as the ‘dialectic between industrialisation and customisation’; firms, on the one hand, provide highly standardized automated services in some areas, and labour-intensive, tailor-made services in the other areas.

Banking, for example has seen the emergence of internet-based standard accounts with a high degree of automatisation and almost no labour input, but also asset management with almost no industrialisation a lot of personal contact between the service provider and the client. There may be also combinations of both trends, for example in the form of bespoke services based on a range of highly automatized standard products which can be customized to a certain extent.

ICT provides new ways of services provision

The interactive process of service creation between client and service provider often requires that both parties stay in the same place and have face-to-face conversation at least one time. Information and communication technologies provide new ways of service provision over distance and can relax the requirement that service producer and the client have to be in the same place (van Welsum and Vickery 2005). Examples are data exchange over the internet such as ftp or email, but also videoconferencing, groupware or applications of virtual reality.

As a consequence, the use of ICT has increased the tradability of services, in particular of services dealing with the exchange, storage, processing and retrieval of standardized, digitized and codified information (UNCTAD 2004, p. 148 f). This has opened new ways for service providers to meet the growing demand for services due to offshoring and to serve clients outside their town or region. These technologies, together with the removal of legal barriers for services exports, have considerably enhanced the geographical range of operation of nearly all industries within the KIBS sector. Hence, new ways of service provision are also related to the internationalisation of KIBS. The most prominent example is ICT-enabled offshoring in administrative and computer services (Garner 2004; UNCTAD 2004; Blinder 2006).

A study by the OECD (van Welsum and Reif 2006) suggests that services which currently employ up to 20% of the total workforce in the EU and the US could be provided over distance and therefore may be affected by offshoring. The share of employment possibly affected by offshoring in various sectors is summarized below.
4.2 Organisational change and firm strategies

Internationalisation of KIBS firms

New ways of service provision over distance allows KIBS firms to increasingly internationalize their business. We can observe two basic models of KIBS internationalisation. On the one hand, KIBS firms often have long-standing relationships with their clients and often follow them in the course of their international expansion KIBS internationalisation is a result of the internationalisation strategies of KIBS clients. On the other hand, some KIBS firms are oriented towards international market from the very beginning (‘born-global’), and internationalisation occurs in a number of different forms (co-operation, mergers, FDI, exports ...).

Convergence between KIBS and other sectors

By convergence we mean that activities that have their origins in two or more different KIBS industries are becoming increasingly entangled and sectoral boundaries inside the KIBS sector, but also between KIBS and some other service industries increasingly blurred (Toivonen 2004a). Toivonen identifies advances in ICT as one important reason for this trend. ICT consultancy increasingly requires knowledge from other fields as well. Consultants that implement enterprise planning software such as SAP, for example, also need considerable accounting knowledge. There is also convergence between ICT services, advertising and the creative industries, for example in the field of internet content creation. Moreover, firms from outside the KIBS industry increasingly provide KIBS to third parties. Financial organisations such as Venture Capital Funds, provide some types of advisory and accountancy services to their clients. Manufacturing firms complement their core products by a range of product-related services such as software...
development and implementation training, maintenance or operator models. Some firms even redefine themselves as KIBS – IBM being the most prominent example.

**Two-tier KIBS**

New technologies as well as a further increasing demand for KIBS may lead to a further specialisation and differentiation in the KIBS sector and the emergence of service providers that effectively intermediate between other KIBS firms and their clients (Toivonen 2004a; EMCC 2005a). These KIBS could be referred to as ‘service integrators’ or ‘coordinators’. This may have considerable consequences on clients and the KIBS sector alike, as in the case of the emergence of first-tier suppliers in the automotive industry.

### 4.3 Skills requirements and the knowledge base

The paramount importance of skills for innovation in KIBS is already indicated in the name. Moreover, a number of studies that compare skills intensity across the economy have pointed out the high skills requirements in KIBS. Business services are classified as “high” or “very high” in a sectoral classification of educational intensity brought forward by Peneder (2007). Other services such as retail, hotels, or the transport sector, in contrast, are rated as “intermediate”, “med-low”, or even “very low” in the case of the tourism sector. According to Peneder, skills requirements in KIBS are also higher than in most manufacturing sectors including automotive, chemicals or mechanical engineering. Additional figures are presented by Miles (2005b, p. 40), who shows that a total of 40 per cent of business services personnel in the EU15 and 36 per cent in the EU10 were classified under high skills. Moreover, compared to the business sector, personnel cost account for twice the share on total cost in KIBS (EUROSTAT 2007, p. 377).

The high importance of skills for KIBS in combination with the heterogeneity of the sector, however, makes it also difficult to say exactly what skills are important for future development. In general, we can identify three sets of skills related with different types of KIBS:

- First, it has already been mentioned that knowledge-intensive services are often project-based and produced in close co-operation with the client. Hence, there is a large and growing demand for skills related to general management as well as project management and co-ordination which also includes communication and ‘soft’ skills.

- Second, more ICT-related skills are not only required in computer and software services, but in all KIBS due to the wide spread of ICT-related services. A number of studies have identified the lack of ICT-related skills as main hampering factor for the emergence of an European information society (Mahroum et al. 2007). This includes professional skills (the ability to use advanced ICT tools and/or to develop, repair and create them) as well as user skills (the ability to use or apply ICT tools in general workplace situations that are not related to the ICT sector).

- Third, firms need hybrid skills that combine technical expertise, an understanding of the IST market, the business acumen to know what products have market potential, and customer-relations (i.e. communication) skills (Mahroum et al. 2007).

- Fourth, KIBS need customer-specific skills which vary according to the type of service provided. In general these skills include business as well as engineering skills; in the case of R&D services it also includes scientific skills. Customer-specific skills include
formal technological and business knowledge, but also process knowledge about markets, the business of the client, etc.

5 Institutional and structural requirements and implications

5.1 Institutional change

Security and Capability Concerns

Outsourcing and the usage of services as production inputs may raise security and confidentiality concerns since the firm has to reveal key information (for example from their accounting records) to external service providers. Moreover, concentrating on core competencies inevitably means to loose other competencies which may influence the ability to innovate in the future. Such potential limits exist, for example, for the outsourcing of strategic planning or research and development. Various authors argue that R&D cannot be outsourced because in order to understand and absorb external knowledge in a particular field, it is important to do R&D in this field (Cohen and Levinthal 1989, 1990).

Moreover, an increased public awareness of security issues may lead to more opposition against outsourcing. Firms may become more sceptical to hand over central business processes to third parties, even at the consequence that costs for in-house provision become higher. As a result, firms may see some limits to outsourcing, which pose, on a economy-wide stage, barriers to the process and may even reverse the level of outsourcing in the economy.

International regulatory frameworks for KIBS

It has already been mentioned that the degree knowledge can be codified and transferred, but also cultural factors such as common language reduce the transferability of services and hence internationalisation of the KIBS sector. These obstacles are difficult to remove for policy.

Regulation, however, can remove legislative barriers to the mobility of KIBS and KIBS workers. Regulation of KIBS is still national to a considerable degree, and there are huge differences in the regulation concerning KIBS across countries. An example is market access: there is a considerable diversity of professional qualifications in legal services, which makes it difficult for professionals from other countries to offer their services across borders. Other hampering factors for mobility of services and service workers include employment laws or social security legislation, such as the transferability of claims for retirement benefits.

We therefore expect that transborder operations of KIBS will be facilitated in the future by new international regulatory frameworks. An example is the current EU Directive on services in the internal market (Services Directive)\(^1\), an initiative by the European Commission to promote the European Single Market by providing the freedom of establishment for service providers in other EU Member States, and the free movement of services between EU Member States. Proponents

\(^1\) Directive 2006/123/EC, adopted on 12 December 2006 by the European Parliament and Council. It has to be noted that important parts of KIBS, such as security services or temporary work agencies, are excluded from the directive.
of this initiative see future benefits from increased quality, more choice and a higher economic growth in KIBS and other services due to higher specialisation and more competition. Opponents, on the other and, argue that the Directive and the application of the "Country of Origin"-principle to services in particular will lead to an erosion in social standards and in the quality of many services, in particular public services.

Global Protectionism

Another major driver of the growth of KIBS has been internationalisation. KIBS providers, on the one hand, follow their clients to markets abroad, and, on the other hand, increasingly gather contracts from international customers. An important pre-requisite for this internationalisation is the removal of trade barriers in services and market opening. In Europe, a main step towards such a removal was the creation of the European Single Market. On a worldwide scale, the World Trade Organisation (WTO) tries to enable a free flow of goods between countries. In the current economic climate there is a danger that some countries may regard protectionism and a policy of "buy National" as appropriate to overcome the effects of the economic crisis and shield their markets from competition from abroad.

This New Protectionism\(^2\) may include new types of trade barriers, a slower removal of national standards and entry requirements for business services that hamper foreign competition. One example of the tendencies for protectionism were policy discussions on the negative effects of service offshoring on domestic employment in the US electoral campaign of 2004 which led to claims for restrictions for trade in services (Bhagwati et al. 2004; Mankiw and Swagel 2006). A more recent event was the failure of the most recent round of negotiations on trade liberalisation (Doha round), which should also include steps toward the liberalisation of trade in services.

If countries start to increasingly protect domestic markets from foreign competition, the internationalisation trend and associated welfare gains from increased specialisation may come to an abrupt stop. KIBS service providers may instead focus on their domestic markets.

Structural change

Manufacturing as well as service firms will increasingly utilize services as inputs for their production processes and as complementary assets for their investments. This trend has lead to the growth of KIBS in all industrialized countries. We illustrate this trend in Figure 4.

\(^2\) See a special report on this issue by the Financial Times: http://www.ft.com/indepth/protectionism
The figure is based on a decomposition of the growth of various sectors of the German economy into its components based on input-output data by Savona and Lorentz (2006). In the case of KIBS, intermediate demand - this is the use of KIBS for the production of other goods - together with investment accounts for half of the growth of the sector. The other half of additional demand comes from final consumption. A similar growth pattern is found in finance, while growth in transport and communication, as well as in trade and in social services, can mainly be attributed to consumption.

Hence, the division of labour between service and manufacturing firms on the one and KIBS on the other will continue to deepen and KIBS will further grow, because specialized suppliers can provide many services at a lower price and in a better quality than in-house.

The trend of two-tier KIBS may even lead to a specialisation and structural change within the KIBS sector and the emergence of system integrators that mainly co-ordinate service provision and depend heavily on the supply of KIBS from other service providers.

If these trends that lead to the emergence of KIBS (growing knowledge intensity, new applications for ICT in KIBS, offshoring, internationalisation, ...) prevail in the future, it is feasible to assume a continuation of the growth pattern of KIBS that we saw in the past (Figure 5). During the last 10 years, employment in KIBS (renting, real estate and business activities) increased from 14 Mio persons to more than 20 Mio persons in the EU25. This is the fastest growth of all sectors included in the figure. In contrast, employment in manufacturing decreased from 34 Mio persons to 31 Mio in the same period.
6 First elements of scenarios

Three previous foresight exercises have suggested various scenarios for future KIBS development:

- Toivonen (2004a) presents three scenarios of future KIBS: first, a scenario where the differentiation between KIBS is further increased with the emergence of service integrators. Second, a possible future where KIBS - even more than today – intensify client relations and shape their clients’ businesses. Third, a scenario where large firms compete with KIBS by offering services previously only provided in-house.

- Kox (2002) describes two possible futures for Dutch KIBS sector – one where KIBS grow above average and perform well, the other where KIBS grow at the rate of other sectors. Besides the general economic growth, Kox identifies six key driving forces that may lead to a higher KIBS growth (Kox 2002, p. 96): Technology, outsourcing tendencies, final domestic demand, internationalisation, institutional changes and structural change in factor markets.

- The most recent scenario exercise comes from Miles (2005b). He drafts three scenarios – KIBS leadership, KIBS plateau and two-tier KIBS. In the first scenario, the growth of KIBS proceeds at higher levels than in most other sectors of the economy, fuelled by new technologies as well as new demand from client industries. Another important factor is standardisation. KIBS will also change qualitatively, by becoming an even more important
influence on the strategies of their clients. In a second scenario, Miles describes a situation where the growth of KIBS is haltered and a certain shift to in-house provision can be observed. This could be seen as a maturation, but possibly also a result of technology. The third scenario describes – following Toivonen – a further differentiation between various types of KIBS and the emergence of service integrators which act as lead suppliers to their clients and co-ordinate a number of specialized service suppliers.

I suggest three scenarios based on the work of Miles (2005b):

- **Growth scenario**: This scenario describes a possible future of KIBS that is characterized by a prolongation of current growth trends, fuelled by the use of new ICTs, outsourcing, favourable general economic conditions, the opening up of new international markets as well as growing knowledge intensity in the economy.

- **Do it yourself!**: The demand for KIBS will slow down in the future due to maturation and decreasing possibilities for outsourcing. Moreover, new ways of codification will allow that KIBS will be increasingly provided in-house which leads to a relative decline in external KIBS provision.

- **Security comes first**: The demand for KIBS will slow down in the future due to security concerns as well growing awareness for the problems associated with outsourcing such as growing communication needs and the decline of internal resources. At the aggregate level, a new protectionism will lead to growth stop of KIBS exports and international outsourcing.

7 Key questions and challenges

**Will the trend towards outsourcing continue?**

- Is there a technical, organisational, social or other limit to offshoring? Or is there still potential in manufacturing and services industries for new outsourcing ventures?

- Are security concerns and questions of trust increasingly hampering co-operation between KIBS and their clients?

- Are there technologies that could help to reduce co-ordination problems that may hamper outsourcing?

**Will Europe and the US firms hold their favourable position in international outsourcing markets?**

- Firms from India have become major players in international outsourcing of ICT services. Will they also gain a considerable share of the business services and consultancy market?

- Will firms from other developing countries or from Middle and Eastern Europe be able to follow the example of India?

- Today, most of the international trade in KIBS goes within Europe or between the US and Europe. Will India, China and other developing countries become interesting markets for KIBS services provided by European and US firms?
How to get the right skills and how to attract high-skilled and educated people?

- KIBS need all types of skills, from general skills to very specific skills that resemble the client’s capacities. But where exactly are the most severe shortages?

- Eight years ago a lot has been discussed about the ICT skills shortage. Is this still an issue, or already solved?

- Can codified knowledge substitute skilled personnel in some areas of KIBS or in KIBS user industries?

- Do we need a new approach to migration to meet skills requirements?

What could be new fields for KIBS?

- Are there technologies where KIBS have obvious advantages compared to in-house provision, maybe scale advantages or advantages from close links to science and universities?

- Are there new trends in outsourcing, maybe new services that has not been outsourced some 10 years ago?

- Will public regulation create new opportunities for KIBS, for example in environmental consulting?
8 References


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