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Towards a European Strategy in Support of Innovation in Services A review of key evidence and policy issues

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Towards a European Strategy in Support of Innovation in Services

A review of key evidence and policy issues

Draft report 1.0

Request for Services

(Relating to Task 1: Knowledge Intensive Services, and Wholesale and Retail Trade, and Task 4: Organizational Innovation in Services (HR2) and High-Growth Companies HR5))

14 July 2008

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Introduction

This report focuses on service innovation and the conditions in which service innovation can be promoted in European policies. The authors want to reinforce the current plans towards a European strategy in Support of Innovation in Services -SEC(2007) 1059 - within the preparatory works for the forthcoming communication in services innovation (expected for fall 2008).

This work has been prepared under the framework contract between the European Commission – DG Enterprise and Industry - and TNO for the Sectoral Innovation Watch.

The goal of the report is to precise guidelines indicated by the Commission's policy-officers and, at the same time, looks for providing new information and policy advice based on new analysis. The below listed reports are not explicitly cited and summarized here but constitute the starting point of the analysis:

- European Commission (2007) Towards a European strategy in support of innovation in services: challenges and key issues for future actions. Commission staff working document SEC(2007) 1059.
- Van Cruysen, A. and Hollanders, H. (2007) Are specific policies needed to stimulate innovation in services? Workshop of DG Enterprise and Industry, 4 February 2008.
- Arundel, A., Kanerva, M., van Cruysen, A and Hollanders, H. (2007) Innovation Statistics for the European Service Sectors. Final Report, Pro Inno Europe.
- Oxera (2006) Innovation market failures and state aid: developing criteria. Enterprise papers No 17/2006.

The report has four chapters. The first one deals with the concept and evidence on service innovation. The second chapter presents a foresight exercise on service innovation, while the third chapter investigates economic rationale behind a service innovation policy. Finally the fourth chapter discusses policy gaps and European value added for approaching and to better adopt a service innovation policy framework.

The report has been prepared by a team of experts on services innovation located in Germany, France, The Netherlands and Spain, and coordinated by Professors Rubalcaba, Hipp and Gallouj.

1 Innovation in services and competitiveness: concepts and statistical evidence¹

1.1 Introduction

Europe's economies are hit by several problems of unemployment (especially within low-educated people) and the same time a war of talents for highly qualified employees, slow growth, increasing international competition, technological change and budget deficits. At the top of the list, inflexibility and market failures (labour markets, "knowledge markets") are seen as one of the major factors for a delay in structural and economical change. Putting economic problems high on the agenda, politicians as well as researchers point at the important role of the service industry for the future successful development of European economies.

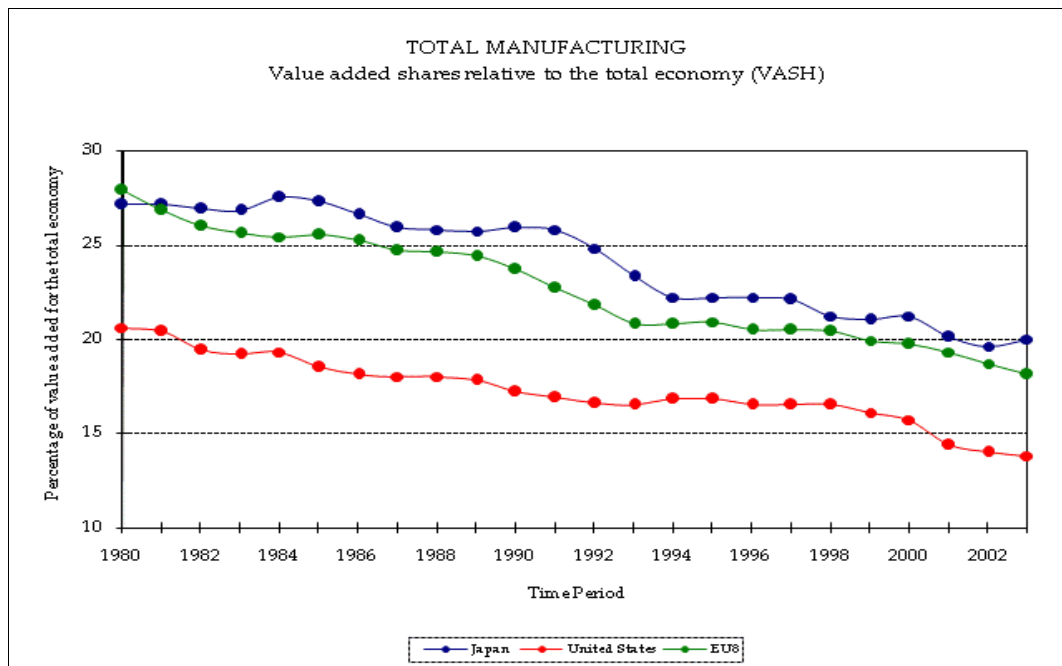
For a few decades now, the contribution of service industries to GDP has continuously risen to levels about 60 to 70 per cent in Europe for which business services account for 40 to 50 per cent while social and personal services account for around 20 per cent in 2003 (see Figures 1.1 to 1.3). The service sector in total absorbs around 60 to 70 per cent of European employment (see Figures 1.4 to 1.6). At the same time the proportion of contribution (value added and employees) of the manufacturing industries is shrinking.

Especially knowledge-intensive services (KIS) are often highlighted as important actors in an increasing knowledge-dependent society. Meri (2008) can show that value added – especially by the EU's high-tech KIS sector - increased at an average annual growth rate of 6.6 per cent between 2000 and 2005. In 2005, the EU's high-tech KIS sector counted 634 thousand enterprises and generated a value added of EUR 437 billion.

Given these facts, policy initiatives focus on stimulating growth, qualification, and structural change by a broad variety of measures. Firstly, it is intended to open up new markets for (knowledge-intensive) services, secondly productivity and qualification has to increase, and thirdly fostering knowledge and innovation in services and manufacturing seem to be highly appropriate strategies.

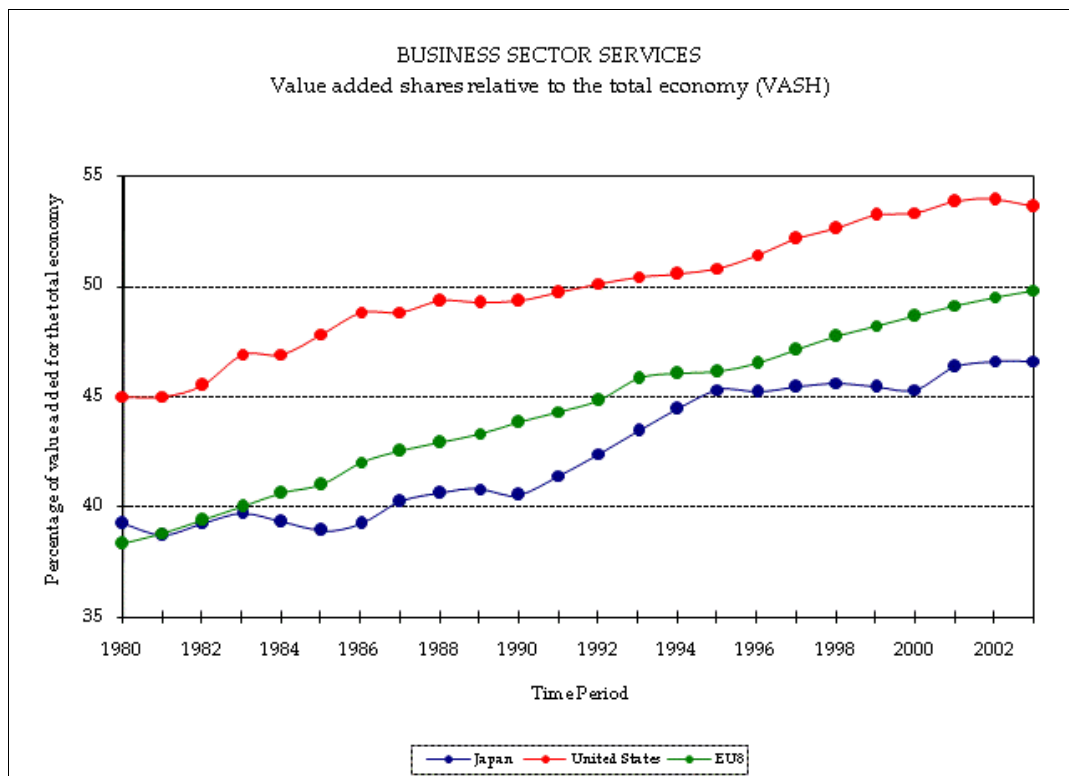
¹ This chapter has been prepared by Professor Hipp, with contributions from Dirk Fornahl (University of Karlsruhe, under the supervision of Professor Grupp) in the section related to the services Gazelles and Professor Rubalcaba in sector 1.3 related to the regional dimension of services.

Figure 1.1 Value added shares in manufacturing



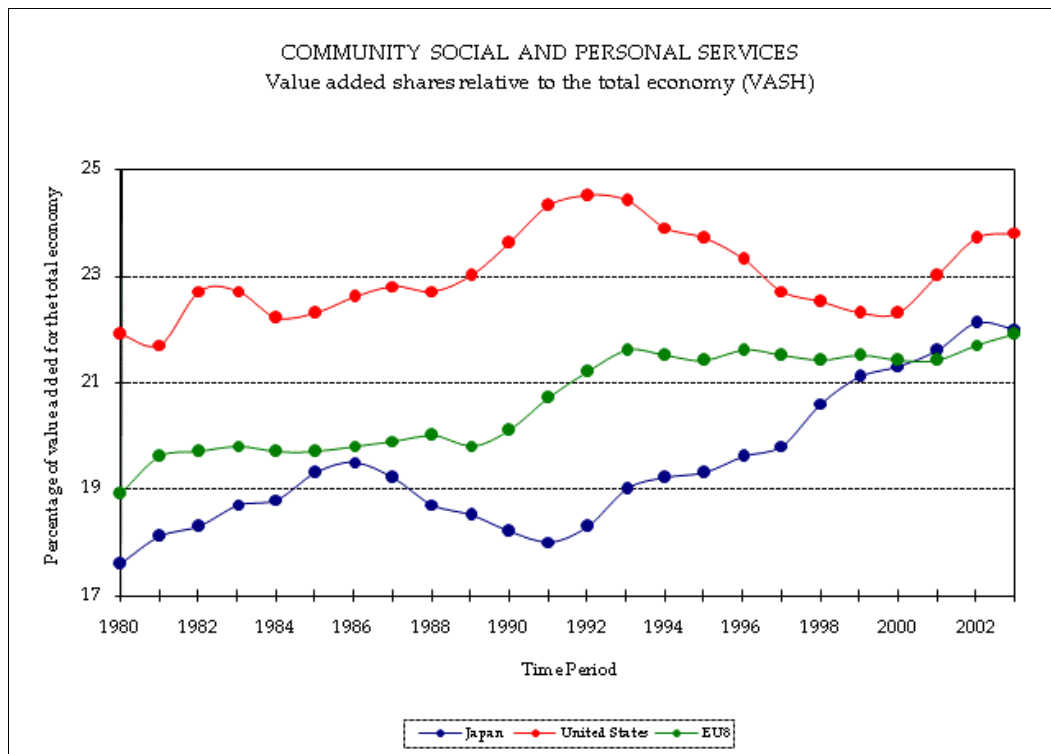
Source: Eurostat, Stan Database, 2003

Figure 1.2 Value added shares in business services



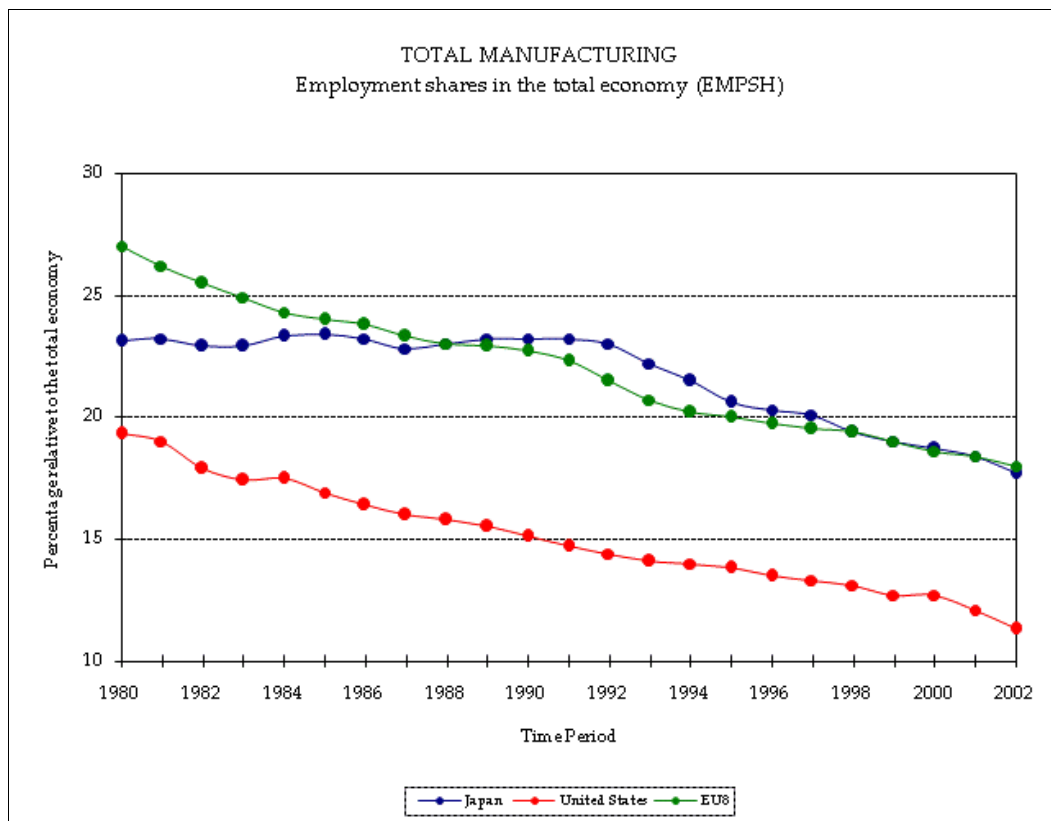
Source: Eurostat, Stan Database, 2003

Figure 1.3 Value added shares in community social and personal services



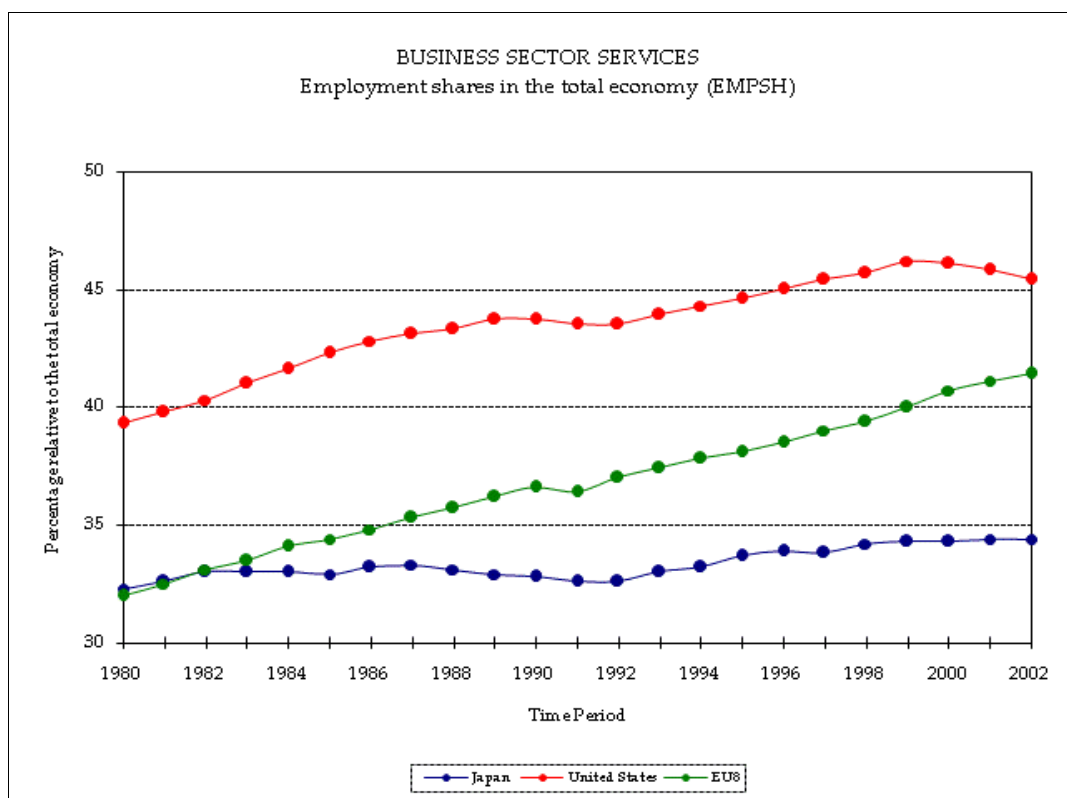
Source: Eurostat, Stan Database, 2003

Figure 1.4 Employment shares in manufacturing



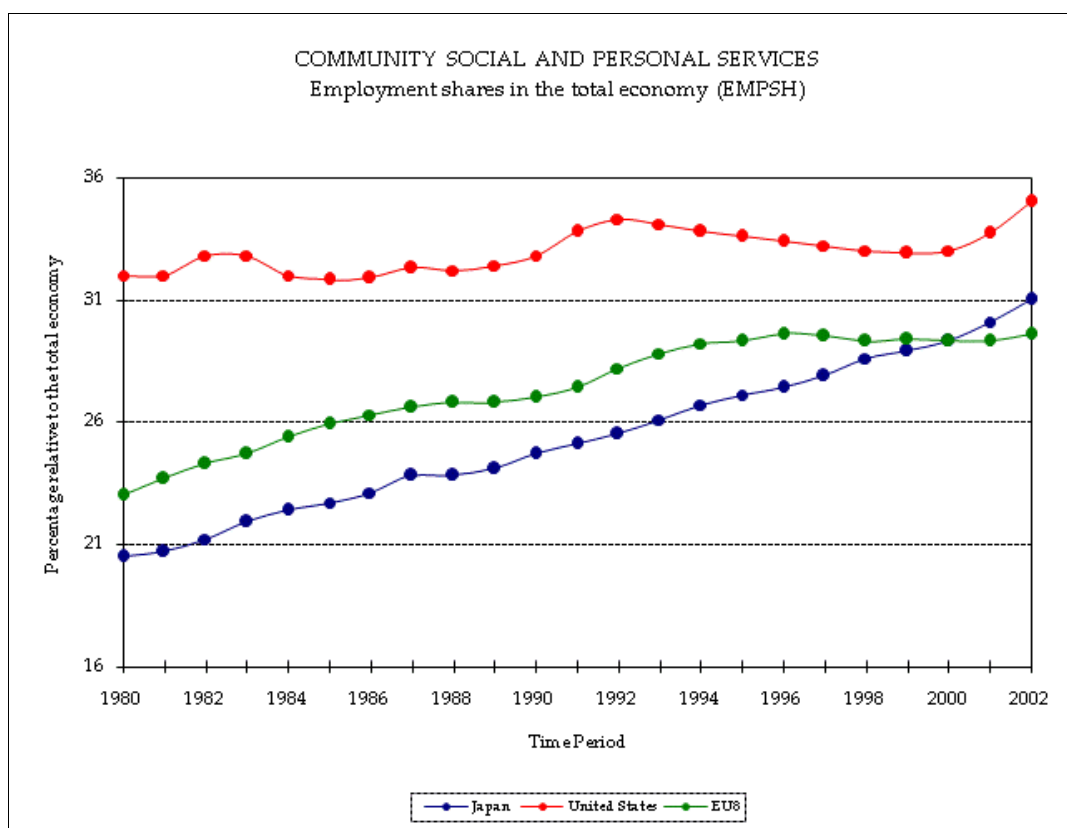
Source: Eurostat, Stan Database, 2003

Figure 1.5 Employment shares in business services



Source: Eurostat, Stan Database, 2003

Figure 1.6 Employment shares in community social and personal services



Source: Eurostat, Stan Database, 2003

1.2 Innovation in services: the concept

Approaches to analyse innovation activities in services face many problems. While concepts to identify and measure innovation in manufacturing have been elaborated in detail for some decades, it is still controversially discussed what innovation in services is about and how to interpret and include service peculiarities.

The OSLO Manual provides on the EU level standardized guidelines for collecting and interpreting technological innovation data. The proposed approach focuses very much on two of Schumpeter's categories like new and improved products and processes, with the minimum entry set as "new to the firm". Worldwide innovation occurs the very first time while firm-only innovation occurs when a firm implements a new or improved product or process which is technologically novel for the unit concerned - but is already implemented in other firms and industries. Between these two extremes various ways of diffusion and novelty levels can be defined - for instance by operating market (new to the operating market, easy to understand for survey respondents) or by geographical area (new to the country or region). The most important surveys on innovation in Europe (like the Community Innovation Survey) use the OSLO Manual as basis, so it is important to interpret the results accordingly.

Besides product and process innovations, organizational change, non-R&D innovation as well as delivery and design is highlighted as main determinants of dynamics in service industries. In contrast, the OSLO Manual looks at organizational and other institutional change just under the focus of technological product and process (TPP) innovation because the measurement of intangibles appears to be very difficult. The manual highlights for example that organizational change can only be included if a technological process innovation is underlined which influences the capabilities embodied in organizations and routines and if a measurable change in output can be observed. An example is provided saying that the introduction of just-in-time systems (new organizational form within manufacturing) should be treated as process innovation as it has a direct effect on the production of products for the market. But this is not always the adequate approach to measure the whole variety of service innovation activities.

The phenomenon of service innovation: Innovation typologies in services

In evolutionary economics when considering manufacturing a typology has proved useful for reducing the complexity of the innovation issue. The Freeman-Pavitt-Dosi model is particularly well established in the relevant literature (Pavitt, 1984; Freeman und Soete, 1997; Dosi, 1988) differentiating between scale-intensive, supplier-dominated and knowledge-intensive industries as well as specialist manufacturers.

This classification can be transferred to the service sector. The innovation typology for the service sector introduced by Soete and Miozzo (1989) is derived from Pavitt's taxonomy and was developed conceptually but never tested empirically. In summary, the following approach was developed by Hipp and Grupp (2005):

- *Knowledge intensity*: These companies named customers (from the service and the manufacturing sector) and universities or other research institutes as important or very important sources of external knowledge.
- *Network basis*: The technology-based network type is located in the field of information networks. Characteristically for these companies is that either their service products are substantially based on information and communication networks or, alternatively, they have to process large amounts of data.
- *Scale intensity*: These companies are classified dependant on their service output's degree of standardisation. Companies generating their entire turnover to standardized services were classified as scale-intensive.

- *Supplier dominance*: Service companies who indicated that their innovations had been developed externally and therefore had been supplied from the outside represent the supply-dominated service innovation type.

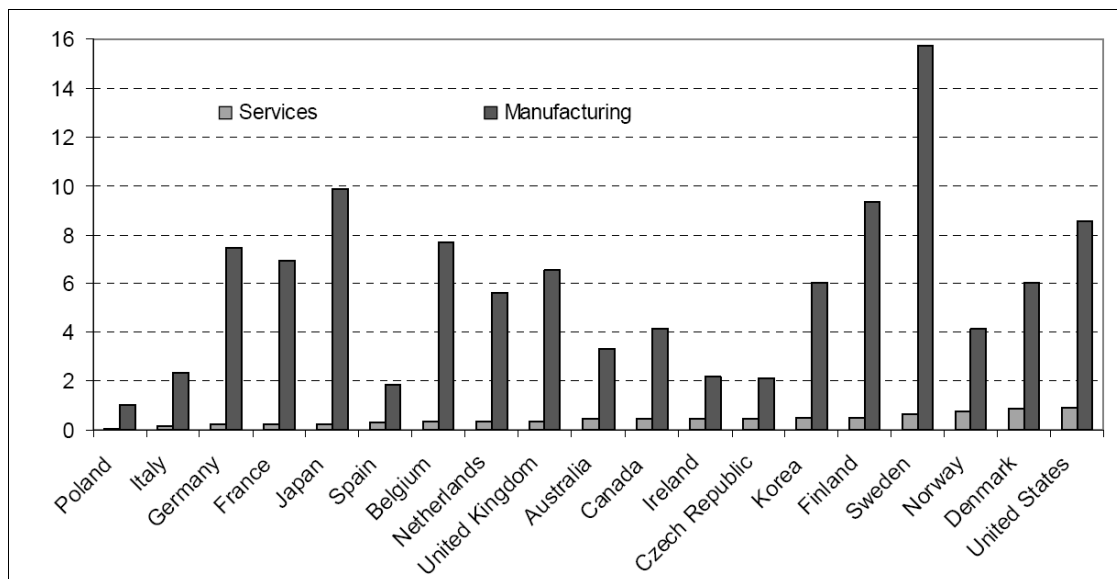
Miles (2008) improved the typology approach showing a more detailed analysis on different types of service innovators. He also identifies four different types. His *science-based and specialized suppliers* are represented by mostly small service companies which are specialized in R&D, software and information systems integration. *Professional knowledge-based services* are intensive adopters of new information technology developed outside the company. Knowledge for innovation is communicated and diffused through professional networks. Often *public and social services* are described as largely supplier dominated in terms of process technology innovations based on technical equipment and information and communication technologies. Their capabilities to conduct own R&D and the active links to universities are often underestimated. *Interactive services* are characterized by their close link with the customers in the production or coproduction of innovations. These service companies work with problems confronted by the client and combine this with own knowledge to generate solutions.

Hipp and Grupp (2005) demonstrated that innovation patterns in services are less sector-dependent than often assumed and that every type of innovator can be found within each individual service industry. Therefore, a strict sector-dependent approach neglects innovative companies in low-innovative sectors and over-estimates non-innovators in sectors like technical services.

How to innovate and develop new services

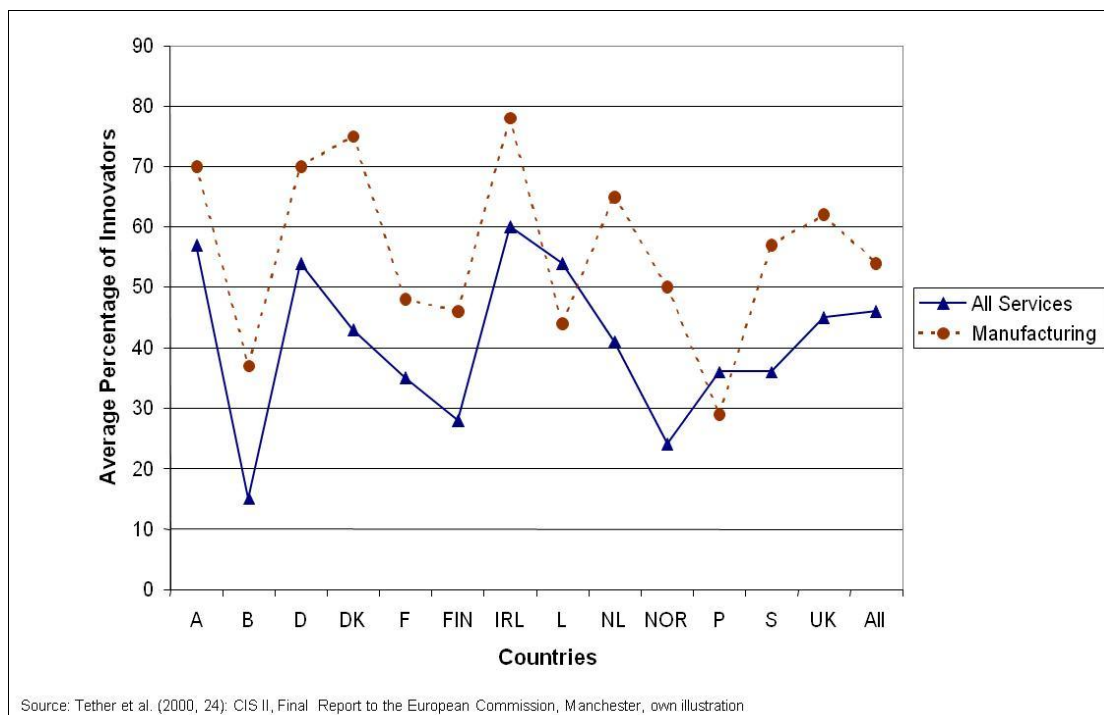
Scholars that study services often stress their differences from manufacturing, particularly in relation to the modes of operation, competitiveness and innovation. It is assumed that the character of innovation activities, their organization and implementation differs in certain aspects from those of the “traditional” industrial sector (see Figures 1.7 to 1.10). This appears to be valid for the type of newly developed products (incremental vs. radical, product vs. process), the character of the services (e.g. process orientation or intangibility), the customer integration and the respective provision processes, and also for the organizational aspects and the co-ordination of activities to develop new services. Coombs and Miles (2000) as well as Gallouj and Weinstein (1997) emphasize that service researchers are bringing neglected economical and social phenomena to the forefront of analysis. Yet, the authors assume that many so-called “service peculiarities” are relevant for both, manufacturing and service products and processes.

Figure 1.7 R&D intensity of the services and the manufacturing sector, 2001. Total BERD as a percentage of value added per sector



Source: RENESER Report (2006, 25)

Figure 1.8 Shares of innovators in manufacturing and services within different European countries



Source: Tether et al. (2000, 24): CIS II, Final Report to the European Commission, Manchester, own illustration

Figure 1.9 Shares of innovators in different service industries and size groups within different European countries

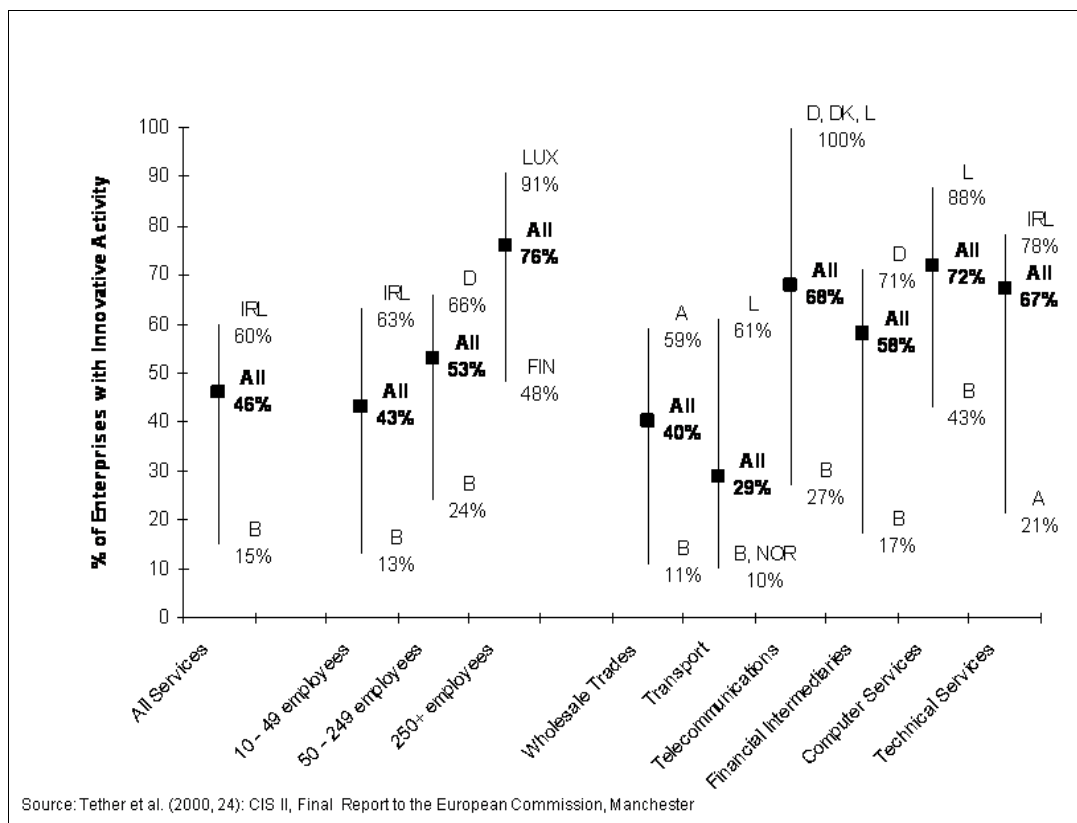
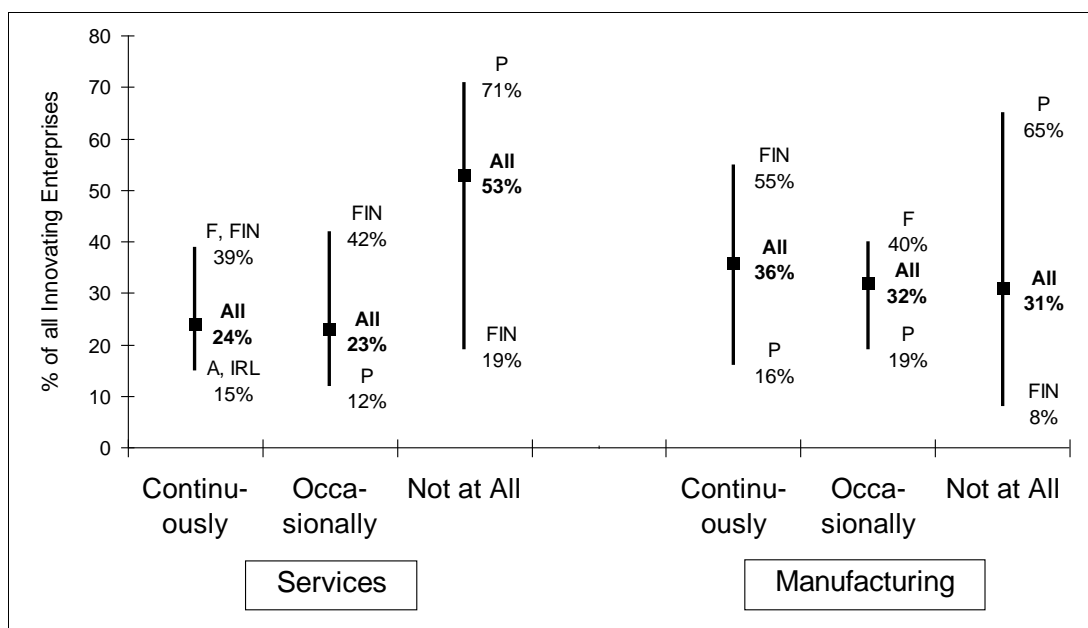


Figure 1.10 Shares of service and manufacturing companies undertaking different forms of R&D within different European countries



Source: Tether et al. (2000): CIS II, Final Report to The European Commission, Manchester

Specifically for services, Miles and Howells distinguished between product innovation – goods or services –, process innovation, organisational innovation and innovation in client interaction as a specific type. Gallouj (1994) distinguished between valorisation, anticipation and objectivization innovation processes, on the basis of the function carried out by each type of innovation. The works developed by Van Ark et al. (2003) showed the difference between several types of technological profile, also distinguishing among three types of non-technological innovation: new services conceptions, new interfaces with clients, and new systems of service delivery. These latter authors also made a distinction between innovation guided by the supplier, the client, the company itself, the use of services or by paradigmatic changes. In this respect, the customer-supplier duality is found in the delivery of services, where customers are suppliers of significant inputs to the innovative process (Fitzsimmons et al., 2004).

Hypotheses on the role of innovation and the innovation activities can be derived from the existing, continuously growing number of available publications. Innovation activities within companies are the major stimulating forces of organizational growth and change. Services do, contrary to the widespread assumption, produce original innovations and do not exclusively depend on industrial innovations. However, the character of R&D activities as well as the role of technology has to be analyzed in detail.

a) Role of R&D

In 1998, services accounted for about 17 per cent of total business sector R&D in the OECD area, an increase of 2 per cent from 1992 (OECD, 2001). Nowadays, approximately 80 per cent of total R&D is carried out in the manufacturing sector. The United States provide the highest degree of significance to service R&D – an important part of that expenditure allocated to defence – while in contrast, some of the main European economies, such as Germany and France, register lower levels than expected. Nordic countries such as Norway, Denmark, Sweden and Finland play an outstanding role, maintaining important levels of R&D intensity in services. In 2000, 48 per cent of total business R&D developed in Norway was carried out in the services sector and 37 per cent in the case of Denmark (OECD, 2001). In some other European countries the level of service R&D is also quite relevant, given the reduced level registered in manufacturing; this is the case of, for instance, Czech Republic, Ireland, and Spain, where the amount of service R&D is above 15 per cent over the manufacturing R&D level.

The main innovation activities, both in services companies and industrial organisations, include the acquisition of equipment, personnel training and functions of internal R&D. The latter are particularly remarkable regarding business services, where, on average, 72 per cent of the European organisations in this sector acknowledge the deployment of tasks related to internal R&D as part of their innovation effort, while this percentage is reduced to 55 per cent for industrial companies, and to 44 per cent for total services (see Table 1.1). Financial services, in turn, are reconfirmed as the economic sector which develops external R&D activities to the largest extent (29 per cent of companies), whereas this percentage only reaches 25 per cent in the industrial sector.

Table 1.1 Percentage of companies conducting internal R&D (%)

	<i>Total economy</i>	<i>Industry</i>	<i>Services</i>	<i>Business services</i>	<i>Financial services</i>	<i>Distributive trades</i>
Belgium	59.3	73.5	41.6	75.1	70.9	27.9
Germany	50.0	57.5	43.3	57.7	35.3	35.3
Denmark	64.3	70.6	55.3	82.3	58.5	44.5
Spain	33.9	37.7	24.0	70.3	28.4	6.8
Finland	70.9	79.1	57.7	87.9	:	38.3
France	58.4	66.3	42.6	59.7	:	20.4
Greece	56.0	53.1	66.7	84.7	49.5	66.7
Iceland	29.6	26.2	33.8	:	23.7	:
Italy	35.3	36.9	28.2	51.0	17.2	18.9
Luxembourg	38.0	:	:	:	:	:
Holland	54.3	61.4	46.8	70.7	52.1	37.1
Norway	55.1	60.6	49.6	75.6	24.0	33.8
Portugal	37.8	38.4	36.5	73.6	50.7	33.7
Average	49.5	55.1	43.8	71.7	41.0	33.0

Source: Based on the Eurostat database, CISIII

Finland and Denmark are the countries where the highest percentage of companies develops internal R&D activities, with values above 64 per cent. In 2001, almost 71 per cent of R&D expenditure in Finland was financed by the business sector and over 60 per cent in Denmark. The annual growth rates of R&D investment in both countries were around 2.15 per cent between 1998 and 2002, which proves to a certain extent the strong innovative effort made by the companies in these two Scandinavian countries above the European average levels.

Again, as an example of the relevant innovative capacity of business services, it is to mention that while there are about 4.5 per cent of employees involved in internal R&D tasks in industrial companies, this percentage reaches almost 12 per cent in the case of services organisations – information technologies, software, consultancy services, and so on. Despite this fact, the industrial sector keeps an average of employees who work in R&D activities above the levels registered in services, which indicate in some way the more explicit link between R&D – input – and innovation – output – in this former sector.

The proportion of companies developing activities for the introduction of innovations in the market and staff training is higher in services than in the industrial sector, as a consequence of the strong relationship between services and knowledge and informal interaction. However, as previously stated, the percentage of companies developing internal R&D activities is higher in the industrial sector than in services, despite the positive performance of some business services. In this key variable lies the proportional difference between both sectors, which greatly depends on the individual way that services organise their innovation processes; not so focused on specific R&D departments as in the case of the industrial sector, but by means of the work in different functional business areas (see also Kuusisto, 2008).

b) Role of technology and intellectual property

The OSLO Manual highlights that it is now accepted that the development and diffusion of new technologies are central to the growth of output and productivity. While traditional approaches still ignore the influences of technological innovations on the service sector – because of the intangibility of its services, close customer relations, and other special service features (Hauknes 1998, 21), there is now some literature focusing on the relationship of technological change and services (Hipp, 2008).

Licht et al. (1997) and Ebling et al. (1998) demonstrate the empirical importance of certain technologies for German service companies. The authors can show that 87 per cent of all innovative service companies regard computer, electronic data processing, and other hardware as important for their innovation activities between 1993 and 1995, closely followed by applications software. And 45 per cent of the innovative service providers utilise high performance communication networks for their innovation activities (e.g. broad band networks with digital optical or electronic communication). Other employed technologies are limited to a few service industries and a small number of companies. About a third of the surveyed service innovators in Germany use transport technologies as well as automatic measuring and control technologies, automation, and environmental technologies. Of lesser importance are materials technology, medical technology, and biotechnology. In general, the dominance of information and communication technologies can be confirmed. It can be observed, though, that information technology is merging with other technology areas. Telematics, for example, which combines network and transportation technologies, is of growing significance not only in transportation.

Because of the different role of technology for innovation in services the protection of innovation activities is seen to be extremely difficult whilst the majority of innovations in the manufacturing sector are protected by some kind of intellectual property rights.² It has often been noted that service-intensive firms lack an effective intellectual property regime, which might not only impede and restrict their innovative progress but inhibit their ability to protect their more intangible innovations. To address this issue, Blind et al. (2003) consulted the literature to build and test a series of assumptions. The outcome provided the first conceptual framework for the service sector that linked “knowledge regimes” and possible intellectual property right activities and strategies (see Figure 1.11).

² Cf. Blind et al. (2003, 26 onwards), Djellal and Gallouj (2001, 66). For a classification of intellectual property rights see Anderson and Howells (2000).

Figure 1.11 Classification of knowledge regimes

Knowledge type	Level of tangibility	
	Tangible	Intangible
Codified	Patents	Copyrights
	Copyrights Trademarks Contracts	Trademarks Contracts
Tacit	Informal mechanisms	Trademarks
	Confidentiality clauses Labour contracts Trademarks	Informal mechanisms Contracts

Source: Blind et al. (2003)

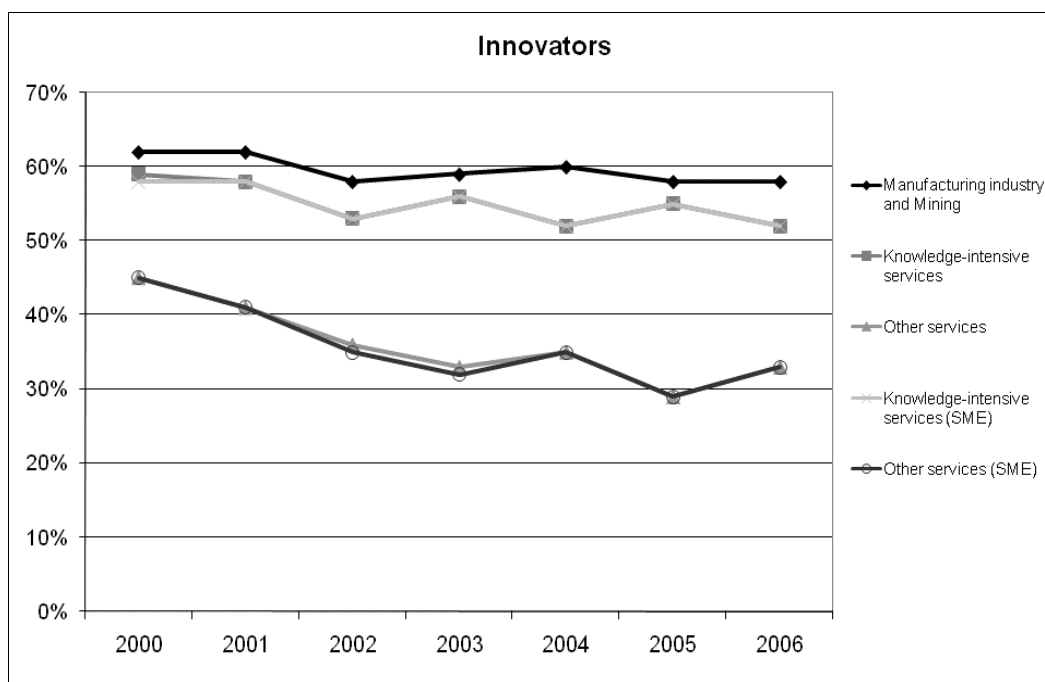
1.3 Innovation in services at firms' level

Empirical analysis of innovation activities based on the Community Innovation Surveys

The most recent available Community Innovation Surveys (CIS) data from Germany shows a clear difference between the shares of innovators in manufacturing and service industries (see Figure 1.12). Almost 60 per cent of the manufacturing companies are classified as innovators while other services show a share of 32 per cent. However, knowledge-intensive services are almost as innovative as the manufacturing sector. It can also be seen, that there is no difference between small and medium sized services and the whole service industry. This reflects the fact that most service companies (more than 90 per cent) have less than 100 employees. A special emphasis on SMEs within the analysis is therefore not necessary and all challenges of SMEs concerning innovation activities and the fostering of innovation can be applied for most of the service industries.

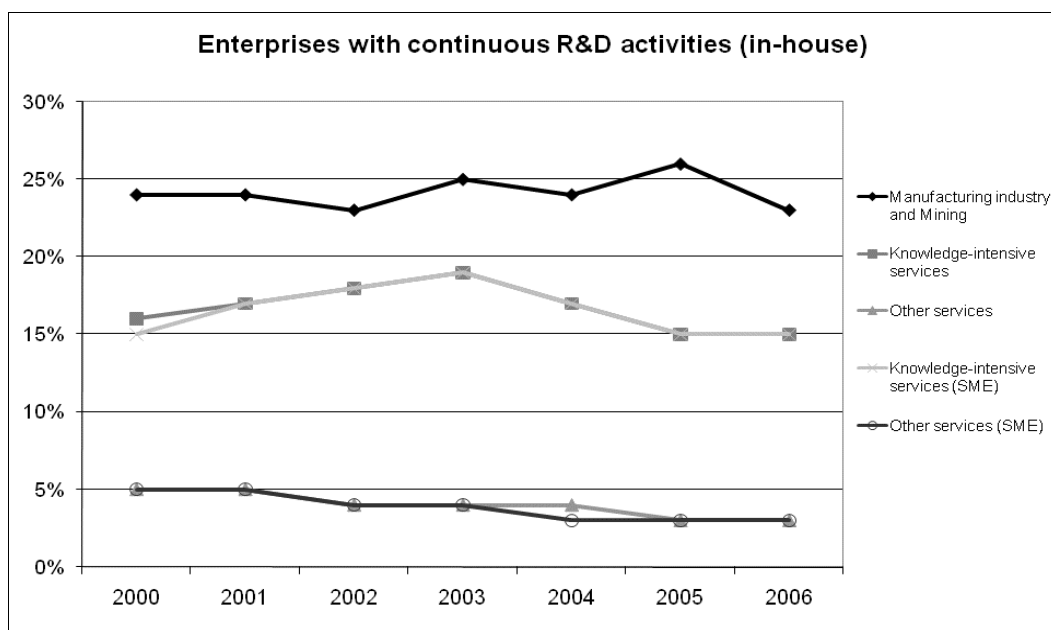
The CIS data for German companies shows also a clear difference between continuous internal R&D activities of manufacturing and services companies (see Figure 1.13). Here the difference between manufacturing firms and knowledge-intensive services is higher than in the previous Figure 1.12. This clearly indicates – at least for Germany – that internal and continuous R&D is of less importance for services industries – even for knowledge-intensive services.

Figure 1.12 Shares of German innovators in different industries



Source: CIS V, German data, ZEW Mannheim, 2008

These results underline the insufficient qualities of R&D as indicator to measure innovation activities in services. The outcome demonstrates that the structures of innovation expenditures in service companies must differ from those in the manufacturing sector. For Germany, the CIS I survey shows that 17 per cent of all innovation activities funds on internal and third party R&D – compared to 55 per cent in manufacturing. Market introduction, development of new services (design), but also software and patents require more than one third of all expenditures. 18 per cent are spent on employee qualification (Licht et al., 1997). Here, the manufacturing sector just invests 2 per cent of their innovation expenditure. The top position is taken by investment in machines and physical resources, on average this makes up one quarter of all innovation expenditures: an indication for the simultaneousness of a technology provider and supplier relationships in the service sector.

Figure 1.13 Shares of German companies with continuous R&D activities

Source: CIS V, German data, ZEW Mannheim, 2008

European CIS data from 2005 reflects that, while the procedure of implementing changes in the corporate image of a company is more characteristic of the manufacturing sector than of the service sector, the latter makes stronger efforts towards the fulfilment of advanced management techniques, the improvement of its organisational structures and the achievement of changes in concepts and marketing strategies. Financial services and business services are the economic activities where the majority of companies, to a greater or lesser extent, achieve improvements in their company's strategic structure. About 40 per cent of companies in these two sectors acknowledge the implementation of advanced management techniques and changes in concepts and marketing strategies, and over 55 per cent register changes in their organisational structures. All this demonstrates the fact that more than half of the services companies in these two sectors declare to have carried out changes in their corporate strategies, being this percentage around 42 per cent in the case of industrial organisations. On the one hand, these strategic and organisational business changes are more extensive in companies from Luxembourg, Germany and Austria. On the other hand, the ratio of companies undertaking changes in their business appearance or image is higher in South European countries such as Greece, Spain and Italy (Rubalcaba, 2008, Working paper)

In addition, the OSLO Manual gives some hints on non-R&D activities which supports or even substitute traditional innovation activities. Especially innovation marketing and the integration of users (lead users, ordinary users) into the innovation and design process are of main importance. Here concepts of customer-oriented product development are described in literature (Magnusson, 2003)³ - based on the product as a service concept proposed by Grönroos (1990). Also benchmarking and a close interaction with external partners like consultancies are of main importance.

The CIS III data shows that services companies exploit as innovation sources, to a higher degree than industrial companies, their own competitors and other companies of the same sector (34 per cent), conferences and professional meetings (37 per cent) and organisations within the business group they belong to (29 per cent). This latter variable demonstrates one of the main differences between the industrial and the service sector, with almost 29 per cent of services companies resorting to companies of the group as

³ Magnusson, 2003, Customer-oriented product development, Stockholm School of Economics, 2003.

agents facilitating innovation, while in the case of industry, this percentage falls to 20 per cent. Business services is the most active sector that registers the highest use of innovative sources including clients, universities and national research centres.

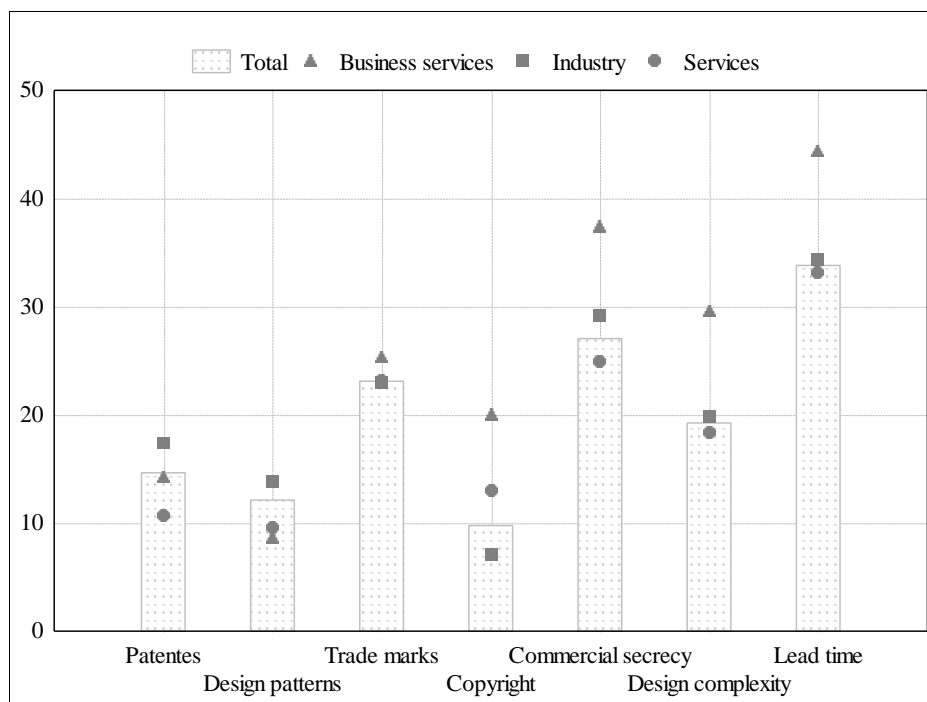
Rubalcaba (2008) found some differences in the innovation sources used by companies depending on their country of origin. In countries such as Sweden, Norway and Finland, firms tend to pay more attention to their relationships with clients (80 per cent of companies in Sweden), universities (21 per cent in Finland), and other national research centres (17 per cent in Norway). Moreover, the proportion of companies that resort to other companies of the group or to the organisation itself as agents facilitating innovation is more significant in these Nordic countries.

The use of patents amongst service sector organizations is heterogeneous. For example, Blind et al. (2003) illustrates that patenting is mainly found in R&D and telecommunication services. In general, the highest use of patents can be observed among providers of technical services, who mainly support companies in the manufacturing sector. It would seem that these organizations have a better chance of generating a patentable solution whilst performing their services. Sectors with almost no patents are the retail trade, transport and postal services, financial services and consulting and advertising.

As shown by Rubalcaba (2008), the industrial sector continues to be the activity sector requiring a higher degree of intellectual property protection measures (around 17 per cent of companies), although the percentage of services companies that resort to this type of procedures has grown over recent years reaching 11 per cent (see Figure 1.14). Evidence of this can be seen in the fact that in economic activity as a whole, business services register the highest use of copyrights (20 per cent), trade secrets (37 per cent), whereas distributive trade services use procedures such as trademarks (29 per cent) and registrations of design patterns (15 per cent) the most.

By country, companies from Sweden, France and Finland are those applying to a larger extent for intellectual property protection through patents, while in the case of Portugal and Greece the opposite occurs. Sweden has the highest amount of companies that apply for copyrights (41 per cent), while the proportion of companies seeking for protection through trade secret is higher in Finland (49 per cent) and the United Kingdom (56 per cent).

Figure 1.14 Total percentage of companies requesting measures of intellectual property protection



Source: Based on the Eurostat database, CISIII

Analysis of high-growth firms in services (service gazelles)

Gazelles can be identified in most industries (Henrekson and Johansson 2008a, Davidsson and Delmar 2006, Acs et al. 2008). Deschryvere (2008) find that in around 74 per cent of the analyzed industries at least one gazelle was discovered. Although some studies state that in nearly all industries there was the same proportion of gazelles (Birch and Medoff 1994, Storey 1994, Birch et al. 1995, Schreyer 2000), many other studies found considerable differences in the amount of gazelles identified in the different sectors – supporting the hypothesis in chapter 1.1 that a pure industry approach might distort specific, cross-industrial innovation patterns:

- Hölzl and Friesenbichler (2008) find a high share of gazelles in ‘air transport’, ‘ICT services’, ‘post and telecommunications’, ‘clothing’ and ‘land transport’, while the lowest number is in ‘mining and quarrying’, ‘electricity, gas and hot water’, ‘collection, purification and distribution of water’.
- Autio et al. (2000) do not find gazelles in ‘advertising’, ‘farming’, ‘repairs’, ‘publishing, printing and reproducing of recorded media’.

Service start-ups account for around 75% of all start-ups and this proportion was increasing over the last years (Fritsch and Weyh 2006). While gazelles seem to be overrepresented in service industries, there is no evidence that gazelles are overrepresented in high tech industries (Henrekson and Johansson 2008a, Autio et al., 2000; Halabisky et al., 2006; Gallagher and Miller, 1991; Birch et al., 1995, Acs et al. 2008 on high tech industries). Deschryvere (2008) supports the important role played by gazelles in the service sector. The five top scoring industries in his study are ‘other business services’ (e.g. ‘Architectural and engineering activities and related technical consultancy’⁴), ‘Computer and related

⁴ See also Boston and Boston (2007).

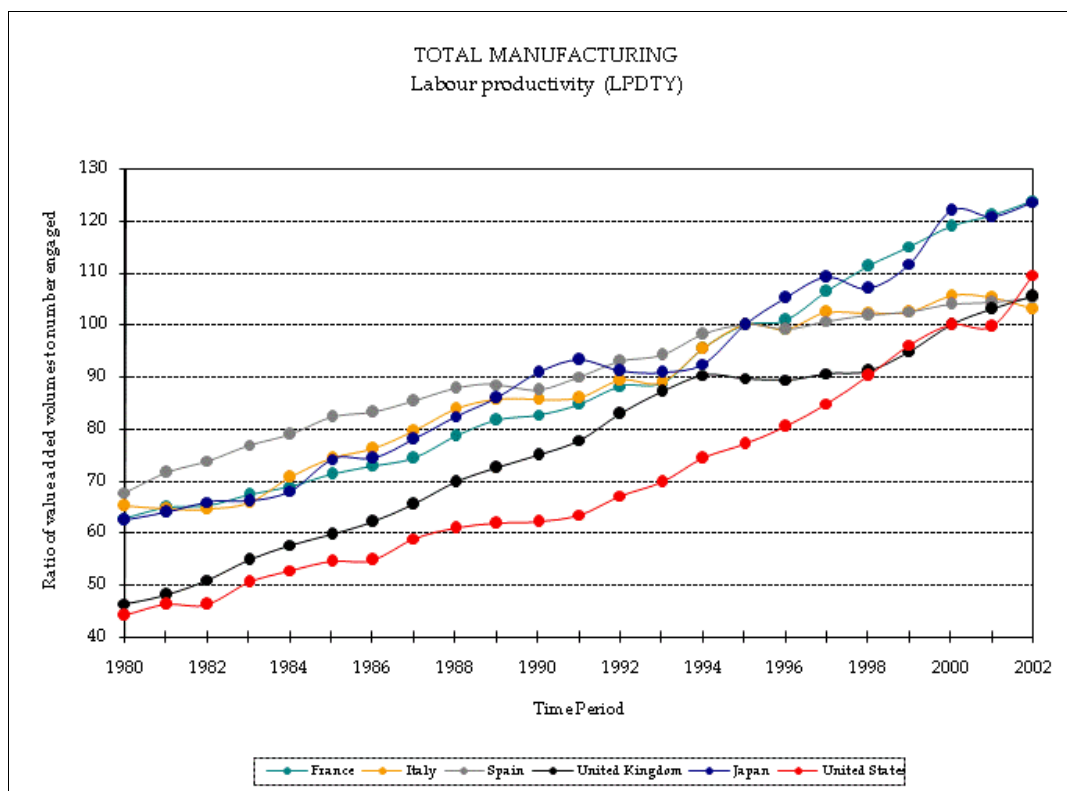
activities' (e.g. 'Software consultancy and supply'), 'Health and social work', 'Construction' and 'Retail trade, except motor vehicles and motorcycles'.

This is in contrast to the results by Fritsch and Weyh (2006). They discover that surviving start-ups in manufacturing become on average larger than those in services (median: 4 to 3, largest 5 per cent of firms have at least 37 employees compared to 22). A reason for these divergent findings can be the fact that both studies analysed different periods in time. While Fritsch and Weyh (2006) included 18 years starting in 1984, Deschryvere (2008) focused on the years 2003 to 2006. As pointed out above the business cycle as well as the general economic conditions in a nation affects the likelihood that gazelles emerge. The growth conditions in these two periods under investigation probably strongly differed with the importance of the service sector increasing in the last decade. This goes in line with the finding by Davidsson and Delmar (2006) that gazelles are over-represented in young and growing industries and underrepresented in traditional ones. The over-representation is especially pronounced in 'knowledge-intensive services' (technical and financial) and in 'education & health care', i.e., precisely those industries that grew in the most absolute and/or relative terms during the period.

Productivity in services

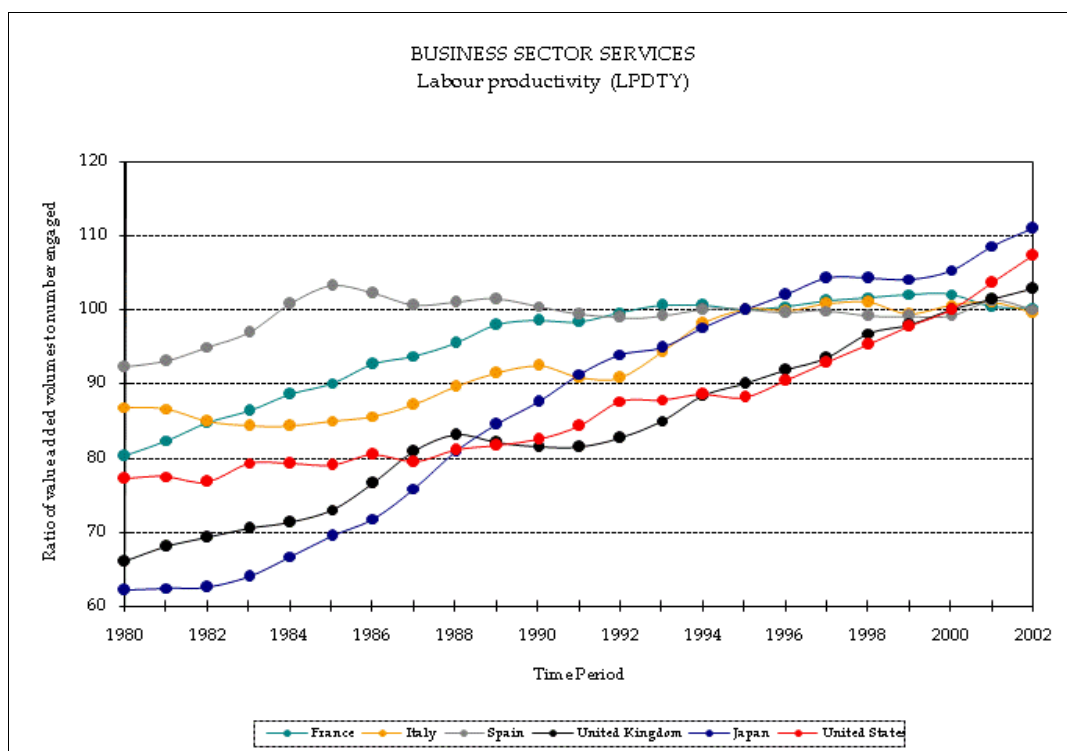
At first glance (see Figures 1.15 to 1.17) labour productivity in manufacturing and business services are continuously growing – apart from theoretically based hypothesis that productivity growth in services is not possible (e.g. Fourastié). Just social and personal services do not show a similar productivity gain. A study by Atella and Rosati (1995) finds that productivity growth in the service sector levels between different countries. However, the measurement of productivity is rather difficult for service companies (Skolka, 1986; Lee, 1991; Petit, 1991; Gordon, 1996; Postner, 1997; Wolff, 1997). That is especially true when results should be comparable internationally. Diverse measurement concepts and different regulatory frameworks, e.g. in telecommunications, still prevent a standardised analysis for each country.

Figure 1.15 Development of labour productivity in manufacturing in selected countries



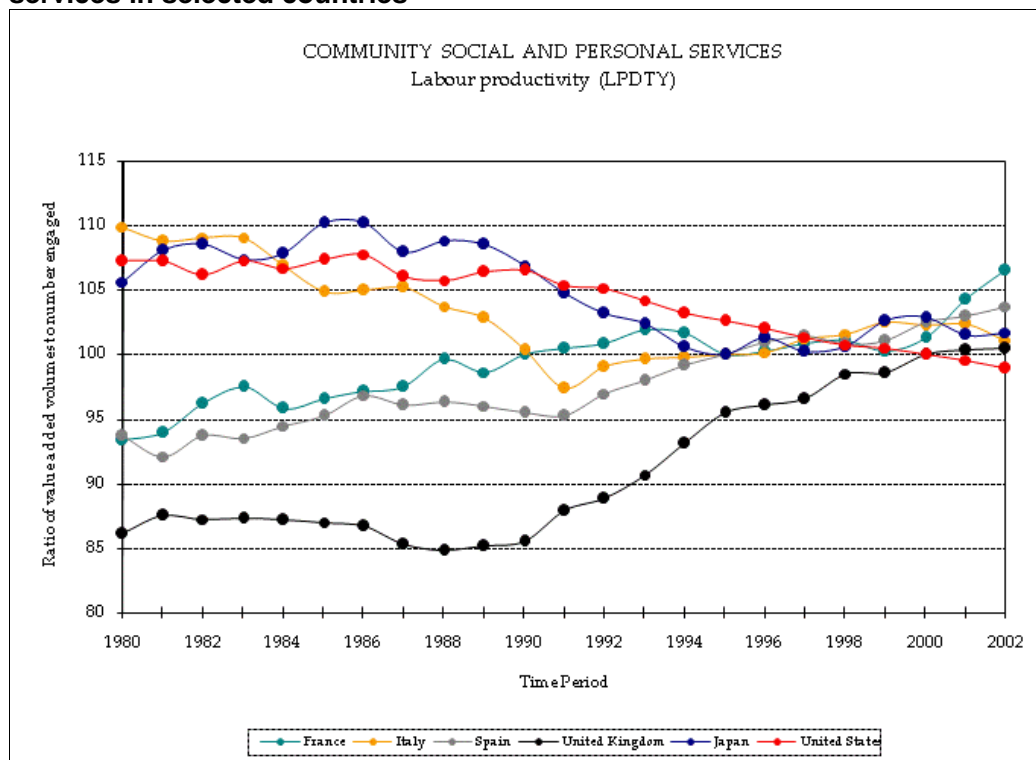
Source: Eurostat, Stan Database, 2003

Figure 1.16 Development of labour productivity in business services in selected countries



Source: Eurostat, Stan Database, 2003

Figure 1.17 Development of labour productivity in community social and personal services in selected countries



Source: Eurostat, Stan Database, 2003

Recent labour productivity in the total economy as well as for different industries has been analysed by Inklaar, Timmer and Van Ark (2007)⁵. The three authors can show that during the second half of the 1990s, labour productivity growth in Europe fell behind the United States. The assumption is that the acceleration of productivity – especially in the US – depends on the intensity of their utilisation of (information and communication) technologies. While business services in the US seem to have strongly benefited from the investment in information and communication technologies – European service companies were not able to use and adopt technologies with the same effect on productivity growth. However, the reasons for the limited impact of new technology, innovation and structural reforms on economic growth in Europe are still poorly understood. McGuckin et al. (2005) analyse labour productivity growth in different service industries in European and United States. They find that diffusion and adoption of technologies in Europe lags behind the United States by several years.

Although services follow their own trajectories, there are close ties to the technological-economic paradigm of the manufacturing sector that go beyond a pure diffusion relation between a technology provider and the service company (as the recipient of technology); this relationship opposes the entirely supplier dominated view (e.g. Pavitt 1984). Moolaert et al. (1991) even claim that especially "high-tech" consultants play a central role in the development of new technological paradigms. The authors base their allegation on a supplier-independent location strategy of these consultants as they act independently and on their own initiative. Therefore a one-sided relationship of dependence cannot be determined.

⁵ Mind the Gap! International Comparisons of Productivity in Services and Goods Production. Robert Inklaar, Marcel P. Timmer and Bart van Ark. German Economic Review 8(2): 281–307, 2007.

Klodt et al. (1997) studied the supply relations between the various sectors on the macro level. The authors demonstrate that between 1987 and 1990 companies in the producing sector increasingly started to concentrate on their core business and to purchase additional skills from external suppliers. Input-output tables and further regression analyses can show that the volume of purchases of services from other enterprises is growing; however, there is no decline in internally provided services. This is further evidence for existing outsourcing in the producing and manufacturing sector. At the same time, however, demand for specialised KIS has risen which demonstrates their growing importance for companies in other sectors.

1.4 Economic impact of service innovation

The trend towards a knowledge-intensive economy supports structures in which human capital, knowledge-intensive service companies, and technology-intensive service companies play an especially important role as both technology and non-technology knowledge brokers and intermediaries. However, the analysis of knowledge-intensive and technology-intensive service companies can highlight that the number of companies and employees involved, as well as the amount of technology- or knowledge-intensive innovations only reflects a minority compared to the overall economic activities.

Economic impacts of KIS sectors

EUROSTAT (2008) can show that in 2006 in the EU27, 70 million people were employed in knowledge intensive services (KIS) and 7 million in high-tech KIS. In chapter 1.1 the importance of the service sector in terms of its share in value added and employment has already been discussed on the European level. However, some additional data might help to get a more differentiated picture on the economic impact of service innovation.

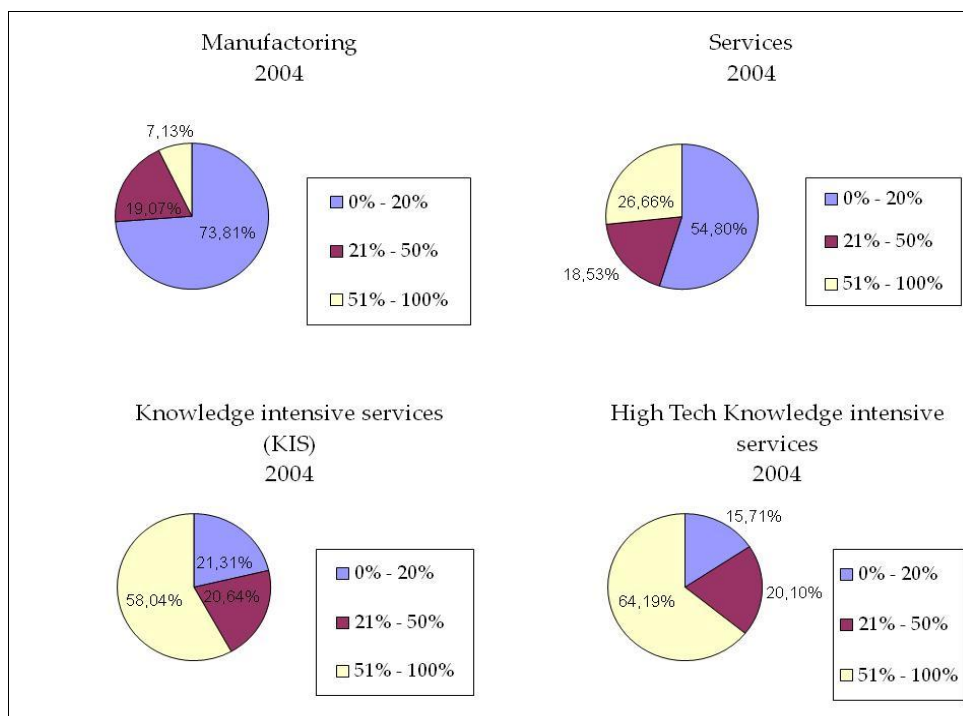
With regard to the macroeconomic impacts in the economy, employment in knowledge intensive services has more than tripled in OECD countries since the 1970s. These activities currently account for more than 30 per cent of total employment and added value generated in the European Union (EU25). The growth of KIS has been supported by the increasing participation of knowledge in most economic production processes, the pace of technological change, a major inclusion of skilled workers, the introduction of new information and communication technologies (ICT), and the key role provided to intangible inputs in the generation of weightless output. This growth opened up new avenues for dissemination of knowledge and experience, what to a certain extent has affected the way clients manage change, and therefore, their competitiveness and innovativeness (Wood, 2002).

Figure 1.18 shows for Germany that within manufacturing just 7 per cent of the companies have a proportion of highly qualified people above 50 per cent; compared to 58 per cent of KIS companies and 64 per cent for High-Tech KIS. The results can be supported by Meri (2008) on the European level. He showed that in 2006, half of the employees in the EU high-tech KIS sector were highly qualified employees. Sweden ranked first, with a share of highly qualified employment of almost 70 per cent, followed by Norway with above 60 per cent. At the other end of the scale follow Lithuania, the United Kingdom, Greece and Ireland. They did not reach 40 per cent.

The academic literature provides some explanation for this notable development on the basis of a changing demand perspective. On the one hand, the increasing complexity of organizational processes and the major global competitiveness among enterprises have lead to growing levels of KIS requirement, both by the manufacturing and by other service activities. Services related to knowledge management are considered as a means to enhance companies' dynamism and adaptation to change. On the other hand, different knowledge intensive functions previously carried out in-house by manufacturing and

service organizations are presently externalized and outsourced to knowledge intensive service companies.

Figure 1.18 Shares of highly qualified employees within different industries



Source: CIS IV, German data, ZEW Mannheim, 2005

Furthermore, KIS play a significant role as contributors to output growth and productivity. Early as 1966, Greenfield argued that business services may have an effect on output that could be comparable to the effect of physical production inputs. More recently, Tomlinson (2000) looked at the impact of externalisation of business and communication services by comparing their impact on output for 1979 and 1990 in Japan and the United Kingdom. In the same vein, Drejer (2002) provided a sectoral perspective by estimating the effect of business services on gross output for 52 industries in Denmark from 1970 to 1995. All these studies found significant and positive effects of KIS on output. In a slightly different vein, services have been acknowledged to make very strong contributions to the expansion of the economic base of local economic areas, such as Beyers (2002) has emphasised in the case of the United States

As far as the effects on productivity are concerned, Van Ark, Broersma and Den Hertog (*op cit*, 2003) have found a strong positive elasticity of KIS purchases on productivity. Needless to say, KIS are not the only service activities positively affecting productivity, but their distinctive role is associated spillover effects on the whole productive system. In this sense, Van Ark, Inklaar and McGuckin (2003) demonstrate that the introduction of ICT has unleashed important productivity enhancing effects in many service industries (i.e. ICT-using service industries). Therefore they actively contribute to enhance productivity in the whole economy by improving their own productivity figures.

In this context, the institutional system of innovation is the mechanism regulating, in last instance, the characteristics of the impacts that are produced. This occurs because the institutional systems of innovation mirror endogenous features such as the particular industrial structure, institutional set up, the way industries are regulated, the barriers encountered, the industry-science relationships, the importance of formal as opposed to tacit knowledge or the mechanisms available to diffuse knowledge. Understanding impacts

of innovation necessarily requires taking into account the role of these systems, their interactions and interdependencies (Tether and Melcalfe, 2002).

Geographical concentration at EU at sector, country an regional level

A particular reason for the increasing interest in knowledge services is the distinctive localization pattern of the sector, which is highly concentrated in large urban areas, and its implications for regional economic growth. Grounds for this phenomenon are not evident as an important number of factors are involved and influence it. Significant previous works that dealt with this services location issue are those by Daniels (1985; 1993; and Moulaert 1991), Marshall et al (1987), Illeris (1991; and Phillipe ,1993), Bailly et al (1987; 1992), Senn (1993), Moulaert and Gallouj (1993) among others. More recent contributions are those by Bryson et al (2004), Beyers (2005), Bryson and Rusten (2005) and Harrington and Daniels (2006). On the basis of the different outcomes extracted from these and other analogous works, we can provide new empirical evidence for the EU case.

Knowledge intensive services present an unbalanced geographical distribution among European regions. This section shows, by means of a descriptive analysis, the relative weight of these activities in the European territory at NUTS0, NUTS1 and NUTS2 levels.⁶ In this respect, northern countries such as Sweden, Denmark, the United Kingdom, the Netherlands and Finland present the highest levels of specialization in KIS, where the employment rates for these activities are above 40 per cent of total employment (see Table 1.2). In turn, countries from the east (such as Slovakia, Poland and Latvia) and the south of Europe (such as Greece and Portugal) show a lower presence of KIS within their economies registering levels below 25 per cent. In this respect, the percentage of employment in KIS in Sweden (47.5 per cent) is more than double the volume that those services represent in the economy of Portugal (22.7 per cent).

⁶ The term NUTS (Nomenclatura Unité Territoriale Statistique) refers to the official classification of regions adopted by the European Union.

Table 1.2 Relative weight of KIS in EU25, 2006 (%)

Ranking	NUTSO	Total KIS	Techno-logical KIS	Market KIS	Financial KIS	Other KIS
1	Sweden	47.5	5.1	10.9	1.9	29.6
2	Denmark	43.8	4.2	8.7	3.4	27.6
3	United	43.0	4.2	9.6	4.3	24.9
4	Netherlands	42.3	4.1	10.4	3.4	24.4
5	Luxembourg	42.0	3.3	8.9	11.3	18.4
6	Finland	41.1	4.6	9.8	2.0	24.7
7	Belgium	38.6	4.0	7.9	3.5	23.3
8	France	36.4	3.7	8.8	3.1	20.8
9	Ireland	34.9	3.9	7.6	4.3	19.1
10	Germany	34.3	3.5	8.5	3.5	18.9
11	Malta	31.2	2.5	6.1	3.9	18.7
12	Austria	30.4	2.9	7.8	3.3	16.5
13	Italy	30.1	3.0	9.2	2.9	15.1
14	Hungary	28.5	3.4	5.9	2.0	17.2
15	Cyprus	28.3	1.9	7.5	5.3	13.5
16	Spain	27.0	2.7	8.4	2.4	13.6
17	Estonia	26.8	2.8	6.2	1.2	16.7
18	Slovenia	26.3	2.9	5.6	2.2	15.7
19	Lithuania	25.0	2.2	4.9	1.1	16.9
20	Czech	25.0	3.0	5.5	1.9	14.6
21	Slovakia	24.9	2.5	4.6	2.2	15.6
22	Greece	24.9	2.0	6.4	2.6	14.0
23	Poland	24.6	2.4	4.9	2.2	15.2
24	Latvia	24.5	2.3	5.5	2.5	14.1
25	Portugal	22.7	1.9	5.5	1.8	13.6
	<i>Average</i>	<i>32.2</i>	<i>3.2</i>	<i>7.4</i>	<i>3.1</i>	<i>18.5</i>

Note: The value of the Specialization Index for a *region i* in a *sector s* is defined as $SI(s)_i = x_{i,s} / X_i$, where X_i measures the total employment in a *region i*.

Source: Based on the EUROSTAT database.

When analysing KIS as a whole, it should be noted the superior influence of *other KIS*, which represent more than double the relative weight of *total KIS* in the economy. Thus, differences among the different KIS sector desegregations should be taken into consideration. *Technological KIS* and *financial KIS* denote (on average) similar shares of employment in the European economy of about 3 per cent. In turn, *market KIS* account for around 7.5 per cent (on average) of the total employment in Europe, while in Sweden and in Netherlands these rates are above 10 per cent.

Sweden, Denmark, the United Kingdom, the Netherlands and Finland present some of the highest shares of employment in *high-tech*, *market* and *other KIS* such as education and health. Luxembourg stands over the rest of regions considering the exceptional participation of financial services within its economy, whereas in some eastern countries from the former Soviet Union (such as Lithuania and Estonia) that participation is rather low. Differences among regions point out the somewhat dissimilar presence of KIS in various geographical areas, thus presuming the idea of a national component to explain KIS activity concentration. In this sense, it should be possible to distinguish between those northern regions characterized by a significant participation of KIS within their economies, and those countries from the south and east of Europe, where the mentioned participation is notably more reduced.

In addition, the share of KIS in the above-mentioned northern countries is larger than in other important European economies, such as those from Germany or Austria. This fact may have an explanation in the industrial structure of these two latter countries. Industrial firms localized in northern regions tend to carry out superior externalization processes of their knowledge intensive activities, which in turn leads to a major development of KIS organizations. In contrast, the industrial structure from Germany and Austria place greater stress on the integration and development of those knowledge intensive activities in-house (Preissl, 2000), thus reducing the potential formation and growth capacity of advanced service firms.

Table 1.3 Most specialized regions in KIS with respect to EU25 average, 2006, NUTS1, (%)

<i>Ranking</i>	<i>NUTS1</i>	<i>Country</i>	<i>Total KIS</i>	<i>Techno-logical KIS</i>	<i>Market KIS</i>	<i>Financial KIS</i>	<i>Other KIS</i>
1	London	UK	161.1	166.6	189.0	216.8	138.5
2	Bruxelles-Capitale	BE	153.6	175.1	205.3	141.0	129.2
3	Berlin	DE	142.7	135.6	178.1	82.3	137.7
4	Sverige	SE	142.5	159.9	135.8	61.7	154.2
5	Île de France	FR	138.5	217.7	179.5	170.6	102.1
6	Hamburg	DE	137.3	129.3	200.2	148.6	109.5
7	South East	UK	136.9	188.0	135.6	159.7	124.4
8	West-	NE	136.7	148.2	153.6	130.5	127.8
9	Denmark	DK	131.5	133.4	107.6	110.2	143.7
10	Scotland	UK	130.5	112.2	101.2	167.6	139.0
...
72	Noroeste	ES	72.4	61.9	85.2	61.7	69.9
73	Poludniowo-	PL	72.1	45.2	69.9	69.2	77.5
74	Północno-	PL	69.0	68.3	67.1	42.3	73.6
75	Centro	ES	68.2	53.1	70.4	63.0	70.2
76	Continente	PT	68.2	59.7	68.7	59.0	70.3
77	Dunántúl	HU	68.1	60.0	45.7	48.2	81.5
78	Voreia	GR	67.2	37.0	64.7	57.1	74.4
79	Wschodni	PL	62.6	39.2	38.1	58.7	76.9
80	Nisia	GR	59.0	33.2	56.3	49.9	65.5
81	Kentriki	GR	58.2	34.4	59.1	52.5	62.2
<i>Cf. Variation</i>			<i>0.24</i>	<i>0.39</i>	<i>0.34</i>	<i>0.48</i>	<i>0.24</i>

Note: EU25 average = 100.

Source: Based on the EUROSTAT database.

At NUTS1 level, the region of London presents the highest share of employment in *total KIS* in Europe, followed by Région Bruxelles-Capitale, Berlin, Sverige and Île de France (see Table 1.3). These particular areas are characterized by including some of the most relevant European capital-cities (London, Brussels, Berlin, Stockholm and Paris). In addition, Île de France, Région Bruxelles-Capitale, and London, together with other capital-

regions such as Comunidad de Madrid and Közép-Magyarország, show the greatest levels of specialization on *technological KIS* within the whole European economy.

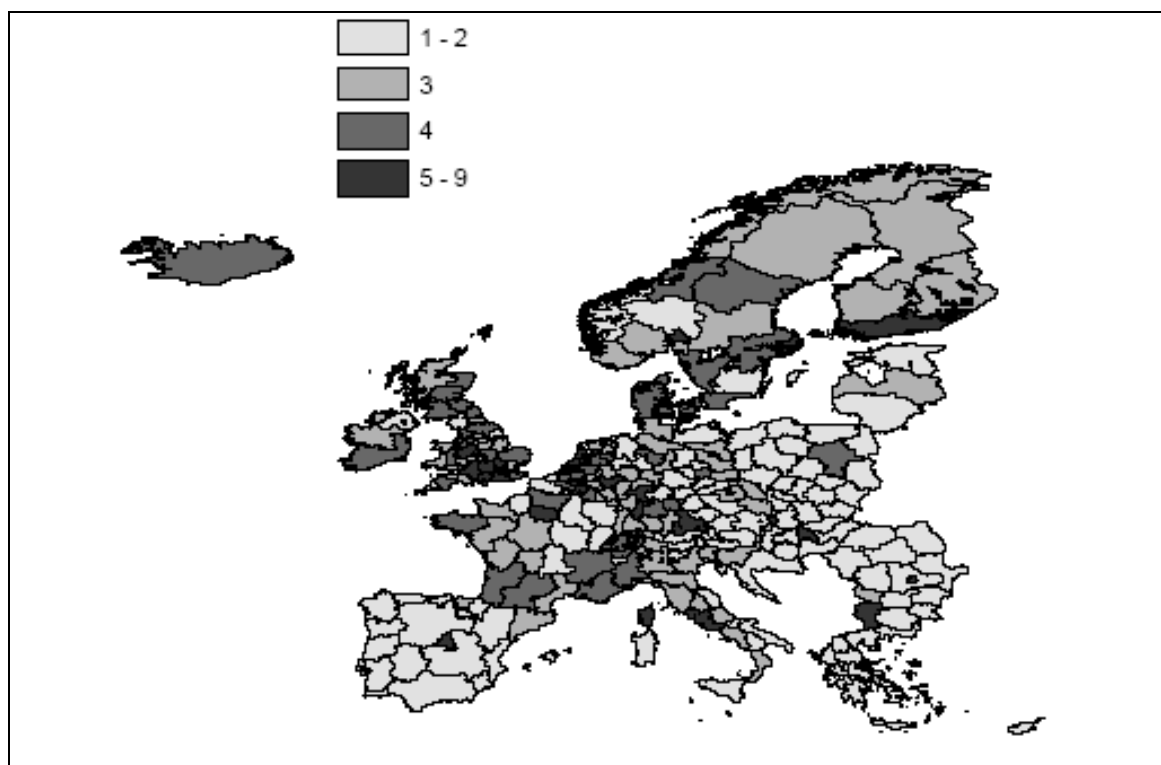
Business concentration is particularly relevant with regard to *financial KIS*. Luxembourg and London present the largest specialization indexes (more than doubling the European employment average in this sector), followed to a lesser extent by the regions of Hessen, Cyprus, Eastern and Île de France. This large specialization pattern is also denoted by the relatively high value of the distribution variation coefficient (0.48). In reference to *other KIS*, the Scandinavian regions of Sverige and Denmark present the highest specialization levels in Europe, followed by other northern areas such as Noord-Nederland, Wales and Scotland. The high-standard levels of welfare reached in these regions may explain this fact. Also remarkable, with regard to Table 1.3, is the relative low value of the coefficient of variation for *other KIS*, which may be understood as a relative high diffusion of those more public-oriented services within the European territory.

Regions located in countries of southern Europe (Portugal, Greece and Spain) and eastern Europe (Poland, Latvia, Slovakia, Czech Republic and Lithuania among others) present a minor number of knowledge intensive activities within the economy. Thus, differences observed in regions at NUTS1 level do not only mean the result of the fundamental role played by capital-regions, but also the effect of a national component as indicated beforehand. In this respect, nine regions from the United Kingdom (London, South East, Scotland, Eastern, North West, South West, West Midlands, Wales, and Yorkshire and the Humber) are included among the twenty leading areas regarding the proportion of KIS comprised within their productive structures.

Firstly, those particular areas largely specialized in knowledge intensive services within their respective countries refer primarily to capital-regions. Furthermore, the superior level of activity concentration in countries in eastern Europe (Czech Republic and Slovakia) and in southern Europe (Portugal and Spain) is remarkable. Thus, KIS location does not seem to rely solely on the prominent position of particular advanced European economies (such as Sweden, Denmark or United Kingdom), but also on the role played by principal urban centres in their respective countries, as it may be observed in Figure 1.19. Secondly, as suggested by Feldman (1994), the more knowledge intensive an economic activity is, the more this activity tends to concentrate geographically. Thus, *technological KIS* (those more related to information driving processes) present a higher trend to geographical agglomeration, particularly within international-profile cities, than the KIS average (Wood, 2006).

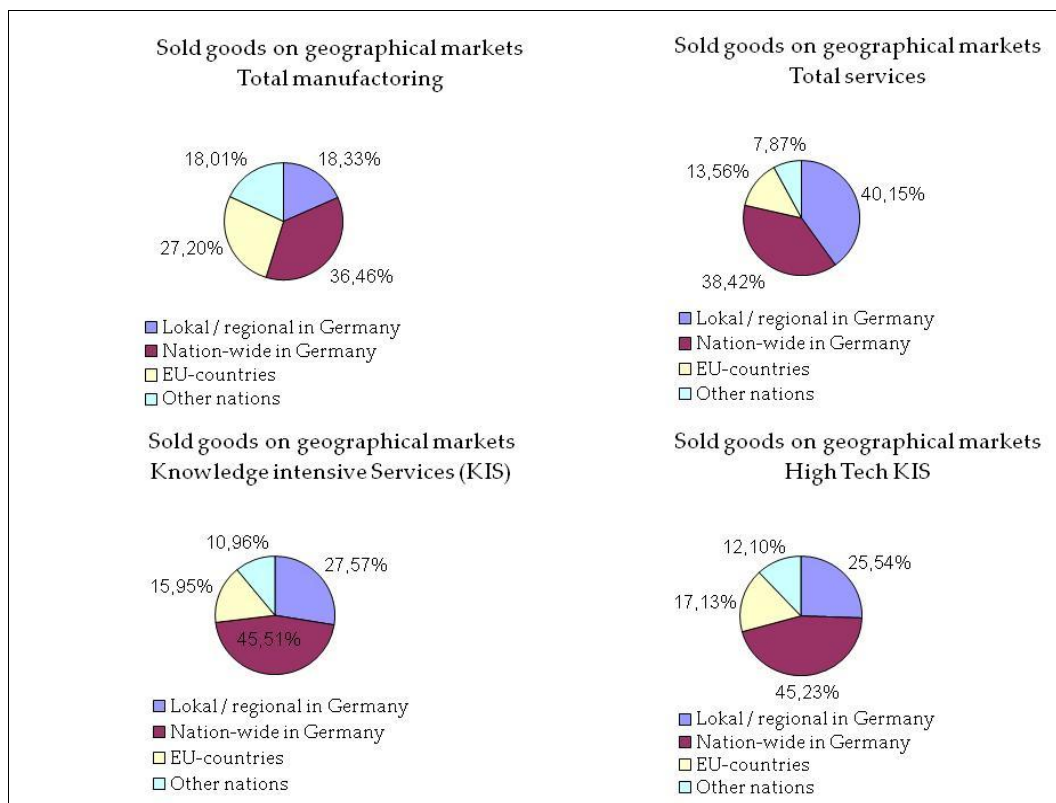
However, the reasons for cluster building are various including knowledge sourcing, customers, and access to labour market. Brenner and Fornahl (2008) are analysing spillovers and interdependencies between industries. Answers to these questions are important for understanding the path dependence of the industrial structure in regions and countries. For example, many R&D services consist largely of technology providing and demanding companies, contract research organizations, and early-stage technology firms. In this respect, California and Massachusetts are accounting for more than 40% of R&D services in the biotechnology sector and the service companies maintain strong ties to the academic sector and often are located near large research universities.

Figure 1.19 Employment in knowledge-intensive business services as a % of total employment, 2004, NUTS2 regions



Also Kuusisto (2008) highlights the regional perspective saying that traditional services need to be delivered locally because of the close interaction with customers and the un-actu principle. The analysis of the CIS IV data for Germany can support these findings to a certain extent (see Figure 1.20). While 18 per cent of the manufacturing goods are sold on the regional market 40 per cent of the service goods are supplied regionally. However, KIS and High-Tech KIS are less depended on regional markets and customers and customers. In addition, the recent development is that even locally delivered services are becoming increasingly global as a result of the increased labour mobility and technological advances. Especially information and communication technologies support the creation of global markets for services. Importantly such services represent very high value added and they tap into competitive knowledge pools across the world, as the rapid increase in offshoring of services, such as call centres and software development, illustrates. However, the importance of international and global markets will remain less important for all services (KIS and High-Tech KIS included) for many more years compared to manufacturing.

Figure 1.20 Shares of sold goods in different geographical markets and industries



Source: CIS IV, German data, ZEW Mannheim, 2005

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2 Foresight – the potential of innovation in services⁷

The European policy makers are increasingly concerned with the process of catching up with US which Europe is supposed to foster in order to close the 'innovation gap' (Aho, 2008). The number of contributions which have recently aimed to design a sort of 'innovation policy Decalogue' has flourished. Most of them increasingly focus on the policy needs specifically targeted on service industries (among others, Van Cruysen, 2008; Van Ark et al., 2003; Aho, 2008; Abreu et al., 2008).

As noted in Abreu et al. (2008, foreword): *'Services have not yet been properly incorporated into our mechanisms for stimulating and supporting innovation. Even our current methods of measuring innovation often under-represent innovation in services. This is one aspect of what we call 'hidden innovation'. This is beginning to change: policymakers are recognising that services should be more central to innovation policy. There is a growing awareness that innovation in services often differs fundamentally from innovation in advanced manufacturing, but no agreement about which forms of innovation matters most in services or how policy should support them.'*

There is a common background in such most recent policy contributions – yet coming from different institutional bodies and based on different sources (Van Ark et al., 2003; Aho, 2008; Abreu et al., 2008) – on how to identify the sources and patterns of innovation in services and how to design appropriate innovation policy strategies.

First of all, they all largely draw on a consolidated stream of academic literature which has pioneered the analysis of innovation in services and highlighted the risks of underestimating specific forms of innovation in services by exclusively focusing on technological innovation (for a recent reassessment, see Gallouj and Savona, 2008). The recent tendency is in fact to embrace a much richer set of innovation behaviours and indicators to account for the multifaceted nature of innovation in services. We further develop this issue by highlighting the fundamental drivers of innovation in services in what follows.

Secondly, they tend to refine the traditional policy tools implemented for the manufacturing sector and based on the R&D linear model, by providing a much richer set of policy recommendations. In what follow we briefly summarise these latter, as provided in Abreu et al. (2008), for the UK and Aho (2008) for Europe. In the next section we deal with the main drivers of innovation in services as emerging from the most recent positive and normative literature – as a background to update the innovation policy recommendation for services presented in the rest of the present report.

The main policy recommendations can be summarised – as in Abreu et al. (2008) – as follows:

- Support should be targeted to innovative people and talents and not just to firms. This implies targeting tax credit on learning and training not only of basic skills but also of management and high-level skills;
- Service firms integrate rather than inventing technology; consulting and advice should be targeted on process of integration rather than creation of technological innovation;
- Links with Universities should be enlarged to Arts and humanities, rather than focusing on Engineering and hard sciences;

⁷ Section 2.1 of this chapter has been drafted by Maria Savona (University of Lille 1), and section 2.2 and 2.3 by Faiz Gallouj (University of Lille 1).

- Support should be provided not only to emerging firms and sectors; rather, incumbent firms and traditional sectors should be the new, intelligent target of innovation policy intervention.

These recommendations are in line with Van Ark et al. (2003) have highlighted in their Synthesis report on Structural Information Provision on Innovation in Services (SIID) which covers many of the crucial analytical and policy issues linked to service innovation specificity. Van Ark et al. (2003) argue the need of *deepening, broadening innovation policies for services*, that is paying attention to the specificities of services as well as complementing these policies by taking into account the inter-linkages between services and the rest of the economy. Also, policies should be *horizontal* insofar they benefit the whole economy, such as those related to human capital and R&D.

In Aho (2008) the policy recommendations are more generally devoted to 'creating an Innovative Europe' and less of targeted on the service economy, rather, enlarged to the 'strategic sectors' like e-Health, Pharmaceuticals, Energy, Environment, Transport and Logistics, Security and Digital content. In Aho (2008) the policy framework suggested is largely more traditional with respect to the service sectors. The report focuses on market regulatory issues and tax credit to R&D. Further, it suggests concentrating on 'excellent scientists' and 'centre of excellence' (Aho, 2008, p. 24) and on 'hard science' and industry links. Interestingly, with respect to the conclusions which Abreu et al. (2008) highlights on the role of human capital and the crucial role of enhancing learning and training, Aho argues that the crucial variable is 'mobility' of research workforce and high-level skills – across the 'science/industry/government boundaries' (p. 25).

Policy recommendations should be based on in-depth analysis of the idiosyncratic characteristics of innovation in services. The aim of this report is precisely to provide a synthetic yet thoroughly completed picture of the characteristics of innovation in services, based on the most recent as well as the more consolidated contributions.

2.1 The potential of innovation in services

2.1.1 Innovation in services

This section illustrates the major drivers and characteristics of innovation in services and particularly where the potential of innovation in services lies – which is idiosyncratic with respect to other sectors of the economy. The section refers to the most recent and exhaustive contributions on innovation in services – among which Van Ark et al. (2003); Tether et al. (2001); Gallouj, 2002; Cainelli et al. (2006); Castellacci (2006 and 2007); Gallouj and Savona (2008).

The potential drivers of innovation are linked to the major contributors to technological innovation (ICTs), organisational innovation, internationalisation and foreign competition issues.

These determinants can also be reinterpreted along the lines proposed in a widely cited re-classification of the literature on innovation in services, proposed by Gallouj in the early 1990s and reprised in Gallouj and Savona (2008). This reclassification is three-fold and contains:

1. A *technologist* or *assimilation* approach that equates or reduces innovation in services to the adoption and use of technology (for instance, information and communication technologies - ICTs). Contributions in line with this approach attempt to assimilate services within the consolidated framework used for manufacturing sectors and manufactured

products. We might consider this approach as mainly referring to supply-side determinants of innovation in services.

2. A *service-oriented* or *differentiation* approach that seeks to identify any possible particularities in the nature and organization of innovation in services. This stream of literature attempts to develop a specific framework for service innovation, while attempting to highlight all the specificities in service product and production processes. This approach contains as well supply-side determinants yet less exclusively 'technology-informed'. Further, it also refers to demand-side or consumer-specific determinants of innovation, which have to do with the uniqueness of some of the innovative solutions provided by specific service sectors.

3. An *integrative* or *synthesizing* approach, which, taking as a starting point the trend towards convergence between manufactured goods and services, attempts to develop a common conceptual framework, able to account for an enlarged view of innovation which is applicable to any tangible or intangible product. This approach contains all the contributions which aim to embrace both supply – technological and non-technological determinants of innovation – and demand – consumer competences and preferences – determinants of innovation. These are detailed in the following sections.

All in all, the literature on innovation in services is therefore quite fragmented. One of the possible ways of identifying the main determinants of innovation in services, as well as the high degree of sectoral variety in innovation profiles is to recall the most consolidated taxonomies of innovation in services – based on a set of determinants. Taxonomies have the advantage of providing a thoroughly picture of sectors and suggesting the dominant source of innovation for each cluster of services. In what follows we propose the most significant ones.

2.1.2 The drivers of innovation in sectoral taxonomies of services

One of the integrative approaches and exhaustive model of innovation in services is the 4-dimensional (4D) model of innovation proposed by van Ark et al. (2003). The 4-D model accounts for a technological dimension of innovation and a non-technological three-fold dimension. The technological one (**Dimension 4 in the 4-D model**) is related to the introduction of ICT mainly, though other technologies might be included, and translates into the introduction of a new hardware or customised software package. The three non-technological dimensions refer to:

- the introduction of a new service concept (**Dimension 1**);
- a new distribution channel or ways to interact with clients (**Dimension 2**);
- a new delivery system (**Dimension 3**).

All of them are influenced and influence the introduction of ICT and the technological dimension of innovation (see Figure 2.1 in van Ark et al. (2003)).

The interlinks amongst the 4 different dimensions are also of paramount importance too.

On the basis of this 4-D model of innovation, the authors propose a sectoral taxonomy of service innovation which draws upon the most traditional ones, those of Evangelista (2000), Evangelista and Savona (2003), Miozzo and Soete (2001).

Innovation in services can be:

1. Supplier dominated (Pattern 1); the adopting firms and sectors benefit from the productivity increases allowed by the adoption of ICTs though they do not substantially contribute to the creation of novelty. The dominant source of innovation in supplier dominated sectors like *retailing and telecommunications* is the adoption of technology. Yet, even in these sectors the pure adoption is accompanied by other complementary sources

of change, mostly linked to organisational changes and a combination of other forms of the 4D model.

2. Within services (Pattern 2); in this case, autonomous innovation carried out in services is also linked to ICTs, to the creation rather than adoption of it. Organisational changes support the presence of new technology even in these sectors, like technical engineering firms, IT and private research firms.

3. Client-led (Pattern 3); innovation is here tightly linked to the clients' explicit or latent requests. This issue is dealt more in depth in next section.

4. Through services (Pattern 4); this is a very interesting pattern, and mostly refers to the role of KIBS in the innovation degrees of their clients. Innovative performance of firms in other sectors of the economy is linked to the use of KIBS. This is a specific model of co-innovation which includes the active presence of clients.

5. The authors also include a Pattern 5 which is labelled **Paradigmatic innovation**. These are the exception rather than the rule in services, as Van Ark et al. argue. Paradigmatic innovation would involve the presence of all the 4 models of innovation detailed above along the entire value chain.

The four patterns of innovation recalled here allow identifying the main determinants of innovation in services according to their 'dominance'.

It is worth noting that both in Pattern 1 the rationalisation and productivity gains allowed by the adoption and use of ICTs are always jointly supported by organisational changes, which makes innovation in services quite unique with respect to the traditional 'industrialisation' of production and delivery processes linked to ICTs.

In line with these results – and still within the attempts to provide integrative approaches to innovation in services – also the taxonomy provided by Tether et al. (2001) shed light on the main drivers of innovation in services in terms of its effect on the **standardised vs. customised** features of the services.

Tether et al. reprise in turn previous attempts to integrate technological and non-technological – namely the type of market services serve – sectoral characteristics (Sundbo and Gallouj, 2000). These attempts provide a sound contribution to the identification of the impact of ICT on the type of production and delivery process of services.

'Scale-intensive' services – trade, transport and communication – are able to fully exploit the use of ICTs to **standardise** their service. 'Specialised suppliers' are what Tether et al. (2001) label as **partially customised** and **bespoke** and include business and financial services.

The findings related to the degree of standardisation vs. customisation provide a sound picture of the sources of innovation in the wide variety of service sectors. Size of firms is related to the characteristics of the service provision as well as to the main source of innovation. They can be summarised as follows:

1. **Trade:** Wholly standardised, average low skilled employees;
2. **Transport and communication:** Largely standardised, few Wholly standardised, few Bespoke;
3. **Banking and Insurance:** Largely standardised, large size and average high skilled employees;
4. **Other financial services:** smaller size than banks and insurance, tendency to Bespoke with few Customised;
5. **Software:** small-medium firms are Bespoke and Customised, increasing size leads to Largely standardised profiles;

6. **Technical services:** small and micro enterprises with majority of Bespoke and Customised;

7. **Other Business Services:** coexisting profiles of Largely standardised and Customised services, related to size.

A taxonomic approach is also provided in Castellacci (2006 and 2007) who enlarge the technological and market drivers - among which internationalisation of destination markets - of innovation in a sectoral taxonomy which includes both manufacturing and service sectors. Castellacci enlarges the innovation perspective to factors such as international competitiveness, international and national outsourcing of service activities, position along the value chain and increased income elasticity.

The number of studies devoted to international competitiveness of services is very limited, despite the fact that in recent years this issue has become more relevant, due to the increasing competition from developing countries. International trade in services accounts now for more than 30% of the total trade. Around 60% of FDI are directed towards service activities (Grunfeld and Moxnes, 2003; Guerrieri and Meliciani, 2005). However, the analysis of international competitiveness of services still presents some conceptual complexity which explains the scarcity of contributions in this domain.

As also argued by Castellacci, service provision is characterised by:

- Co-terminality between production and consumption;
- Highly customised production and delivery processes;
- Relevance of non-technological and organisational factors.

All these characteristics often require a close proximity between service provider and consumer and tend to represent an obstacle to the development of international trade, to the point that services have been long considered non-tradable.

Despite these methodological and conceptual issue still arise, ICTs seem to have overcome all of the difficulties and idiosyncratic features of service delivery and allowed increased international tradability. ICTs have created a digital network of infrastructure (Miozzo and Soete, 2001); further, the creation of novelty in services allows the exploitation of new foreign markets.

A second important factor which links innovation and international competitiveness is the nature and intensity of inter-sectoral linkages (see also Savona and Lorentz, 2005). These illustrate the effect that innovation in services has on the manufacturing user sectors which have higher trade performance (Guerrieri and Meliciani, 2005).

Castellacci (2006) proposes a new taxonomy which combines innovation and international competitiveness. It can be summarised as follows.

Scale intensive infrastructural services: the physical and information networks infrastructure of the economy. As mentioned before, innovation in these sectors depends on the acquisition of capital and ICTs equipments and ICT. Standardisation allowed by the adoption of ICTs might enable division of labour and outsourcing of activities. Financial sectors – belonging to this profile - internationalise through FDI. Cross border trade is instead typical of telecommunication sectors.

Knowledge intensive business services (KIBS) innovate – as mentioned earlier – in a customised way and being supported by high skilled and knowledge intensive employees. Also for these sectors, increasing patterns of globalisation of production and technology

have led to increased international competition, which they fron by increased FDI and cross-border trade as well.

Supplier dominated services include – as mentioned earlier – also personal services and, in general, consumer ones. Co-terminality hampers therefore the development of full patterns of internationalisation, except for those services which require movement of consumers or the establishment of production abroad (FDI). International competitiveness of these sectors relies on the exploitation of ICTs adopted from manufacturing services.

2.1.3 Synthesis

All in all, identifying the main ingredients of sectoral taxonomies of innovation – the major ones have been recalled above – allows seeking the main drivers of innovation in services. The growth of services depends on its innovative performance and its international competitiveness.

In turn, innovation in services has high degrees of sectoral heterogeneity and various dominant sources. We have seen that innovation performance depends on the degree of adoption of ICTs, the type and nature of organisational changes related to this latter, on the crucial interaction with clients and customers and on the size of the firms, which make the innovative profile more or less standardised/customised.

International competitiveness is a relatively new area of research which requires more analytical and empirical effort. The taxonomy proposed by Castellacci (2006) is a starting point to take into account this crucial determinant of innovative and economic performance in services.

2.2 From drivers to megatrends in innovation in services

2.2.1 Drivers, trends and megatrends

- In the previous section, we addressed separately the main **drivers** of innovation in services. Considered individually these drivers may lead to incremental as well as to radical innovations, even if the focus is often on the most spectacular innovations.

- In reality, it is seldom that any of these different drivers comes into play in isolation. They interact with each other in different ways, either strengthening or competing with each other. This combination of several drivers is a source of different **trends**. The combinations of drivers in question can be described in various ways:

- The number of drivers involved, which can be more or less numerous;
- The distribution of these drivers according to the three main groups, namely supply side, demand side and institutional side drivers;
- The nature of time relationship between these drivers (simultaneity, causality relationship, substitution...);
- The relative weight of each of these drivers, some of which can be more important than others;
- The level of complementarity or of competition between these drivers (ex industrialisation vs. customisation).

- **Megatrends** are different from « normal » trends by the intensity of their socioeconomic impact and by their time and spatial scope. Indeed, according to Naisbitt's definition (1982), megatrends are socioeconomic transformations, which exist in the *long term* (several decades). They are characterised by the *geographical scope* of their sphere of activity (all

regions and countries), the *scope of the socioeconomic and political subsystems* transformed, the *intensity of these transformations*, whoever is the actor concerned (political institutions, firms and their strategies, individuals and their consumption patterns).

Therefore, megatrends are radical socio-economic changes. They cover or determine, of course, radical innovation but also incremental ones. In the remainder of this section we will first examine in a general way a certain number of megatrends, focusing on the identification of main drivers of innovation involved. Secondly, we will provide some more precise and concrete examples of (either incremental or radical) innovations, which fall within the scope of these megatrends.

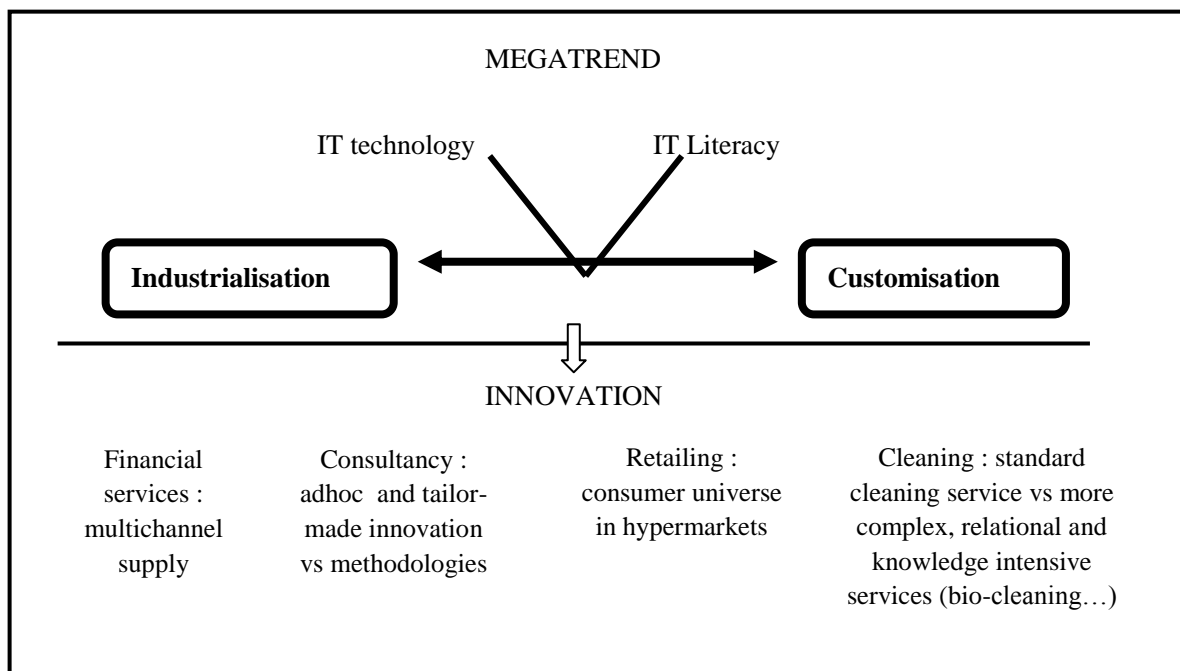
2.2.2 General megatrends

We examine here, in a general way, a certain number of megatrends, which seem to be important in the field of services and innovation in services. Some of them are not new, but they are far from exhausted. This applies, for example, in numerous services activities, to the dialectic relationship between industrialisation and customisation (case n°1). This is also the case with the megatrend based on service regression (case n°4) or on product-related (or industrial) services (case n°5). Other cases are more recent and not yet recognised, as they should be. This is, for example, the case of the megatrends based on population ageing (case n°2) or on sustainable development (case n°3).

Case n°1: the dialectic between industrialisation and customisation associated with IT-technology and IT-literacy

The first interesting megatrend, in services, has been at work since several decades, but its potential for evolution is still considerable, particularly under the influence of two other drivers: technology and particularly IT, on the one hand, and IT literacy, on the other hand. It concerns the dialectic relationship between industrialisation (productification) and customisation (servicisation). Considered independently one of each other, industrialisation and customisation are two important drivers of innovation in services. Nevertheless, their combination (in space or time), in the same firm or sector provides the basis for an important megatrend, which is also based on two other drivers: IT technology and IT literacy (Figure 2.1).

Figure 2.1 Megatrend: Case 1: Industrialisation vs customisation dialectic



Firms can simultaneously adopt opposing industrialisation and customisation strategies. This is what we denote here by the term synthesis or integration strategies (Gallouj, 2002). Such strategies are particularly common in large companies in the banking, insurance, retail and distribution, tourism and transport sectors, for example. Strategies which, at certain times (today in particular), have been described as integration strategies are in reality frequently part of an historical process that has unfolded in two successive phases, the first dominated by industrialisation strategies and the second by customisation strategies, reflecting the rise to prominence of the service dimension. Computerisation in its decentralised, networked form can also be seen as a fundamental factor in integrationist strategies, serving as a basis both for 'servicisation' processes assisted by decentralised computer systems and for more standard industrialisation processes associated with back-office computer systems.

The dialectic between industrialisation and servicisation is particularly evident in financial services. Large banks and insurance companies today combine standardised quasi-products and automated self-service, on the one hand, with 'high value-added' and tailor-made services, on the other, these latter developed in the context of highly interactive service relationships in which customers play an active role. The first alternative reflects a strategy based on industrial rationalisation, the second one a strategy based on professional rationalisation, in which standardisation is rejected in favour of the development of problem-solving methods (in the style of consultants' methodologies).

Another example is retailing. Examination of the long-term evolution of the retail and distribution sector shows that, from the 1940s and 50s in the USA and from the 1970s in European countries (especially France), supermarkets followed a natural technological trajectory of increasing mechanisation and economies of scale based on two fundamental innovations: self-service and the establishment of chains of stores. For a long time, the innovation model at work focused essentially on the materials logistics function (introduction of Fordist logistical systems) and on strengthening the self-service relationship and then, in a second phase, on the information logistics function. For some years in the USA, and more recently in France, change in the retail and distribution sector has taken two new directions, which do not exclude the previous one, both of which fall within the scope of a servicisation dynamic: 1) the addition of 'new services' or new service

relationships, such as information terminals for customers, bagging at the checkouts, crèches, home deliveries, the development of financial and insurance services, the opening of travel agencies and petrol stations and the introduction of individualised counter services ; 2) the improvement of service relationships through the introduction of loyalty and credit cards and other benefits for loyal customers.

Case n°2 : Ageing and its consequences on innovation in services

The second interesting megatrend is heavily based on the demographic variable, but it also involves a large number of other drivers. However, the demographic driver is not homogeneous. In EU countries, it has different features, which can impact innovation: population ageing, population decrease, migrations. Eurostat's projections⁸ forecast a decrease of working population by 52 millions in 2050, even if migratory flows are taken into account. The same source indicates that the share of elderly (more than 65 years old people) will reach 29,9%, whereas it was 16,4% in 2004.

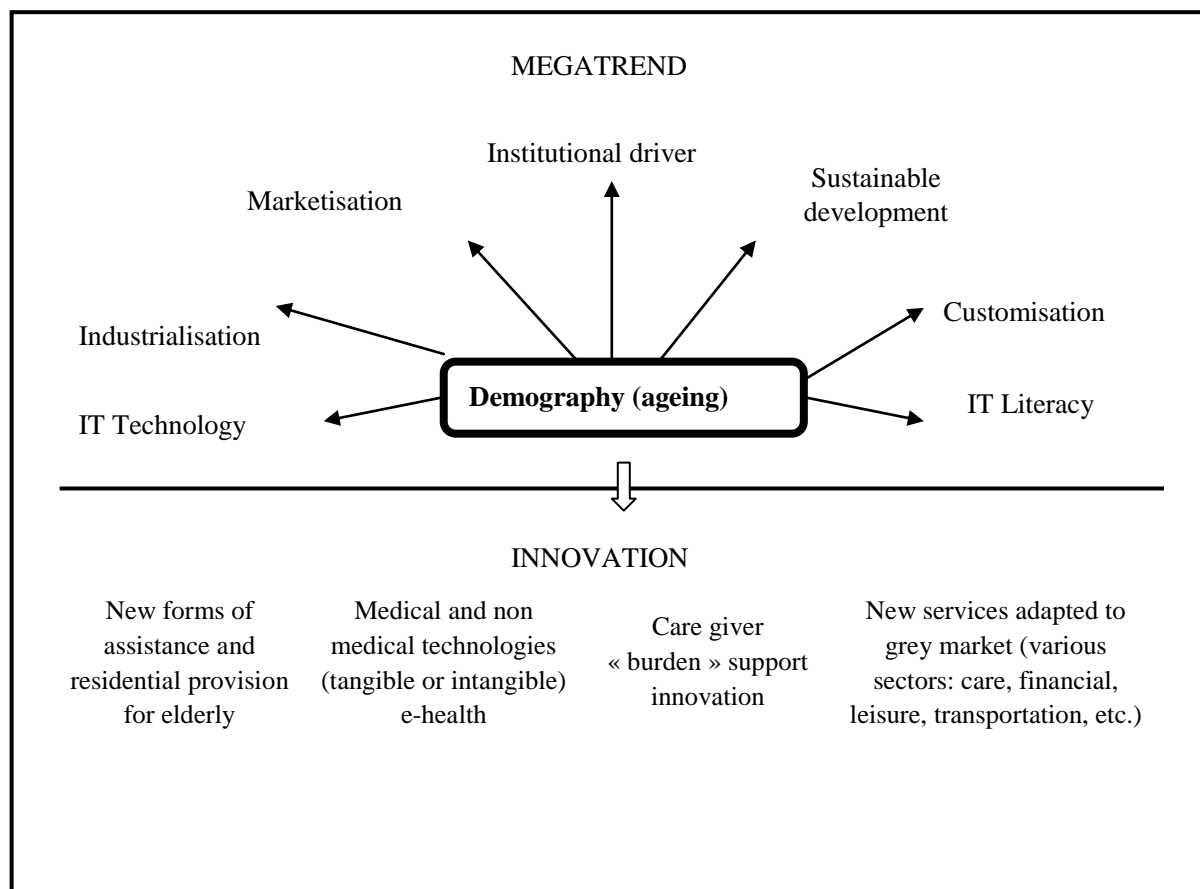
We will confine ourselves here to the ageing variable. This variable impinges more or less on numerous other innovation drivers. It is linked by a causal relationship to most of the other drivers (cf. Figure 2.2). Thus, ageing associated to the reduction of the whole population induces new and increased needs for productivity gains in the whole economy (and not only in services). These needs mobilise the "Industrialisation" and "Technology" drivers. The goal is to rationalise production processes and to mobilise technical equipments in order to offset the gap of human resources thanks to robotisation and automation...

However, population ageing also means the increase of the number of wealthy people with incomes beyond the average. These people constitute an interesting market (which is sometimes labelled grey or senior market), provided supply is able to fit their particularities. In this case, innovation may be based on following drivers: customisation, marketisation (which means the market replacing traditional household production), technology adaptation associated with IT literacy. Indeed, population ageing leads to the implementation of new services and new technologies in order to meet elderly needs.

Ageing also means the increase of dependency, which is also a major source of innovations based on the same drivers (customisation, marketisation, technology adaptation associated with IT literacy). However two other drivers of innovation play an important role in dependency: sustainable development in its social dimension and the institutional driver (cf. Figure 2.2).

⁸ Eurostat new release 48/2005-8 April 2005

Figure 2.2 Megatrend Case 2: Ageing



The major targets of innovation in care services for the elderly are the following ones (Djellal and Gallouj, 2006):

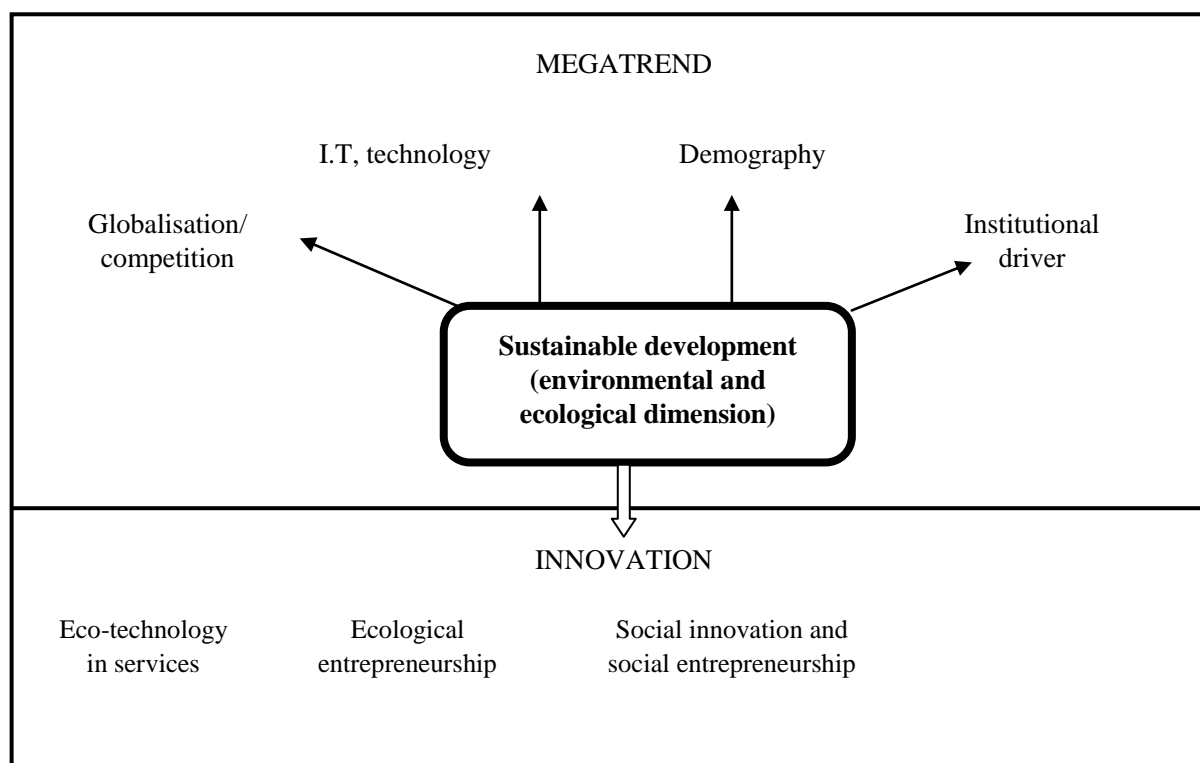
- 1) The structures or, more generally, the forms of assistance and residential provision (institutions, domiciliary services, networks, etc.).
- 2) The technologies. These are a set of tangible or intangible artefacts (technical systems, architecture and ergonomics, methods, etc.). In the interest of simplicity, and despite the fact that there are certain areas of overlap, a distinction is made here between those technologies that have a medical purpose (in the strict sense of the term) and those that have a non-medical purpose.
- 3) Another target for innovation has become increasingly important in recent years and is likely to become more and more important in the future. This is the human environment of the elderly, whether that be family carers or care personnel. After all, carers, whether lay or professional, are subject to a particularly destructive form of stress – the so-called care giver burden – that is psychological, social and financial in origin. This burden is the driving force behind various innovation trajectories, which seek either to assess the burden or to cope with it (cf. § 2.2.3 example 4).
- 4) The services provided to the elderly, which vary depending on the service medium in question (the various characteristics of the elderly individuals themselves, the goods they possess or use etc.). There is considerable potential for innovation linked to this target. Virtually any existing service can be adapted to the elderly population in order to extend the range of services on offer (domestic services, care services, financial and insurance services, leisure services, transportation, etc.).

Case n°3: Sustainable development and the future of the service economy

A powerful megatrend, which is still at its initial step, is the megatrend based on the sustainable development question in its environmental dimension. Indeed, until recently, the service economy has developed independently of the sustainable development question, with the implicit hypothesis that (except for some of them such as transportation) services are environment friendly because of their intangible nature.

Because of its importance, this megatrend is likely to mobilise directly or indirectly (and with various relationships) anyone of the individual drivers of innovation. Nevertheless, certain drivers are prominent. The globalisation driver is one of them. Indeed the sustainable development question is basically raised at the global level. It doesn't respect geographical boundaries (cf. pollution). Another one is the demographic driver, as far as sustainable development is not only concerned with environmental issues but also with social ones. The institutional driver is also important as far as sustainable development issues need national and international policies and rules. One can also mention the technology, R-D driver, as far as the source but also the solution of numerous environmental sustainability issues involve in this technological variable (cf. Figure 2.3).

Figure 2.3 Megatrend Case 3: Sustainable development



The notion of sustainable development is characterised by four interdependent biases (Djellal, Gallouj, 2008): it is industrialist, technologist, environmentalist and defensive. As an instrument of militant protest and then as a major theoretical category, it was born and grew to maturity in an environment dominated by an all-powerful manufacturing industry reliant on continuous technological innovation that impacted on the environment. Before it acquired its social or socio-economic dimensions, sustainable development was (and continues to be to some extent) primarily ecological and environmental; its main concern was manufacturing industry's devastating effects on non-renewable resources and the environment. However (and this is a consequence of the four interdependent biases), this

notion of sustainable development is also 'defensive', that is it is fundamentally concerned with the repair of damage (essentially to the environment).

These four biases persist in economies in which services are the main sources of wealth and jobs. However, services alter the terms of the sustainable development problematic. They play (and will increasingly be led to play) an important role in sustainable development, both statically and dynamically, that is through the innovations they produce or induce. It is necessary to argue in favour of a service-based approach to sustainable development, which involves a loosening of the various biases in question.

Thus it is in the dominant service sector that the future of the sustainable development question will be played out, whether positively or negatively. At the moment, a large proportion of service activities have a fairly small environmental footprint compared with manufacturing industries, while at the same time producing essential socio-economic effects: it is services that generate most jobs in contemporary economies. They are also the main users of information and communications technologies, which are regarded as having a relatively low MIPS (Material Intensity Per Service Unit)⁹.

Furthermore, non-technological (particularly social) innovation occupies an essential place in a sustainable service society (cf. § 2.2.3). Many new services, which may possibly be delivered through new forms of entrepreneurship (and this has been recognised by public policy), are sources not only of jobs (economic solutions) but also of solidarity (services to individuals living in hardship).

Finally, whether the innovation is technological or non-technological, environmental or socio-economic, services play an active role in the production of innovations, not only those that cure or repair damage inflicted on the environment or on individuals' socio-economic well-being but also those that are preventive and proactive (education of populations, training related to environmental norms or labels, etc.).

Overall, as stated by Gadrey (forthcoming), the future of the service economy is also played in the environmental arena. The service relationship, which is considered one of the specificities of services likely to raise environmental problems, as far as it is based on displacements of consumers towards providers or vice-versa. An important issue at stake here is the measurement of the environmental impacts of services. Gadrey carried out a very interesting prospective work on the future of service sectors at the 2050 horizon. He revised his previous optimistic hypotheses as regards the future of the service economy, in the light of sustainability and equity issues. Indeed, taken into account sustainability constraints, he concludes that one shouldn't expect an increase in the share of services in the long term. He forecasts the decline and disappearance of whole parts of the service economy. Thus, he distinguishes winner services and loser services. According to him, loser services include: road and air transport, hostelry, catering, tourism... Winning services include repairs, recycling, maintenance services, local government, services for young children and the elderly.

Gadrey's forecasting is very interesting and should be considered with care. The overall conclusion which can be drawn from his analysis is that the future of the service economy is tightly linked to sustainable development and to the innovation it can or cannot generate.

Case n° 4: The service regression dynamics

It may seem paradoxical to link the terms innovation and regression. It is nonetheless the case that innovation processes in many service activities follow a service reduction

⁹ The MIPS indicator (Material Intensity Per Service Unit) measures the degree of utilisation of natural non renewable resources to produce a good or a service.

trajectory. That is what Djellal and Gallouj (2005, 2008) call a regressive model of innovation. This megatrend manifests itself in various service sectors: in air transport with low cost companies, in hostelry with budget hotel chains such as Formule 1 or Travelodge, in large scale retailing with hard discount, and in catering with fast food industry. Health sector also provides examples of innovations following this regressive megatrend. Indeed there are also hospitals hyper-specialised in very specific types of patients.

The success factor of this megatrend is the reduction of the cost and price structure by seeking minimum service. The main drivers underlying this megatrend are the following ones: service industrialisation, customisation, ICTs and technology, globalisation/competition and the institutional driver (Figure 2.4).

Service industrialisation seeks for cost reduction. It basically takes two complementary forms: the use of labour saving technical systems and the implementation of production modes based on standardisation. This is particularly obvious in the case of Mc Donald's, and of Accor Formule 1 hotels.

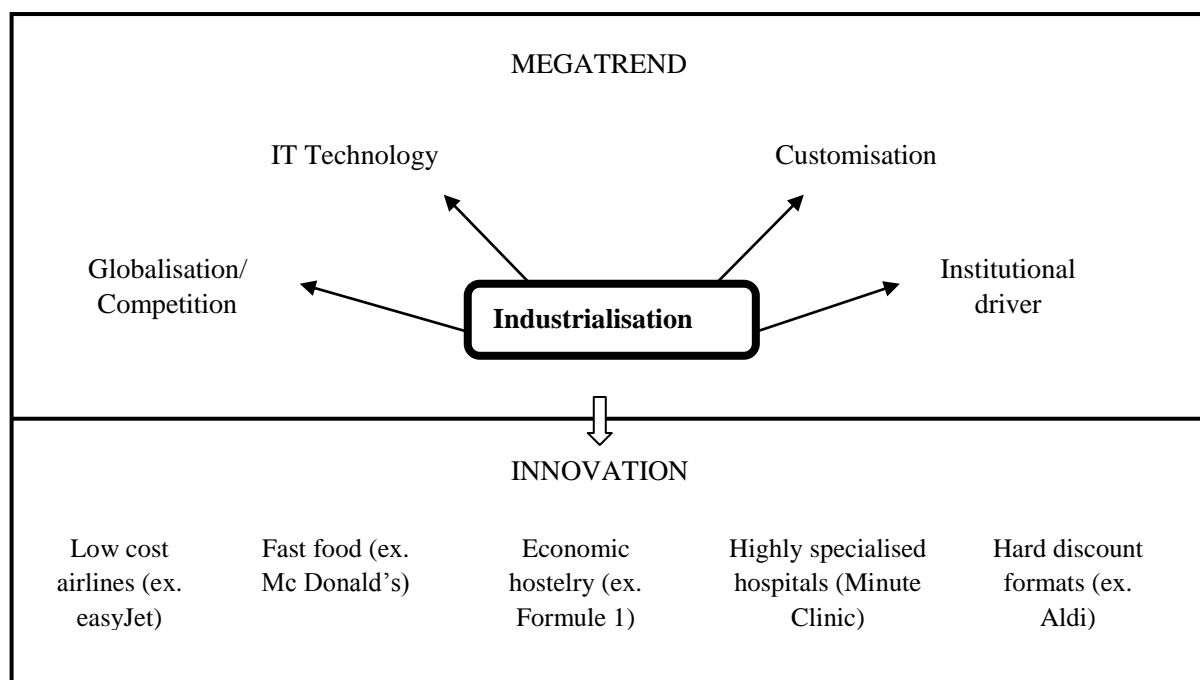
ICTs play here an essential role, especially in activities where booking is necessary. They play an important role in the success of low cost airline companies, which abandoned physical point of sales and replaced them with reservation technical systems: e-reservation, e-ticketing, ticket-less travel. In hostelry, the French group Accor was the pioneer of the centralised reservation system, initially by phone, and now increasingly online.

The institutional driver is, in certain activities, a sine qua non driver of innovation. Thus, it is deregulation policies that are the source of the creation of low cost companies in air transportation. In large scale retailing, regulation in the field of geographical location, opening hours play also an extremely important role.

As regards the competition/globalisation driver, one can often observe that these low cost or service regressive formats are implemented in a context of high national or international competition. The services light formats make it possible to enter international markets and to fight against international competition in domestic markets.

One of the characteristics of the low cost business models, whatever the sector of activity, is that it shouldn't only be considered in terms of competition with traditional models. Indeed, it also creates new markets. Thus, the Formule 1 hotel accomodates customers who wouldn't otherwise take a hotel (for example, lorry drivers...). Similarly, low cost airline companies exploit certain niches where major companies are absent. Therefore they provide a traffic induction. They also catch customers who where not taking planes or who were preferring trains.

Figure 2.4 Service regression



Case N° 5: Product-related services

Another interesting megatrend is the rise of what is called product-related services or industrial services. These are the whole range of services provided during the production or the selling of an industrial product: pre-sales, at-sales, after-sales services and independent from sales services¹⁰ (Mathieu, 2001; Vanderwe and Rada, 1988; Davies, 2004)

The principal drivers underlying this megatrend are globalisation and competition, on the one hand, and the process of customisation, on the other hand.

Indeed, in the field of manufacturing products, high competition and globalisation have stimulated productivity efforts and cost reduction, as well as differentiation strategies. This differentiation of the product can be achieved by service addition. Therefore the source of value added is located in the peripheral service related to the product rather than in the product sold itself. There are numerous old or new examples of such a situation. The major part of the profits of printers or photocopiers manufacturers lies in maintenance and delivery of related products and services. Some years ago, the profits generated by after-sales services were the major part of the gross margins of car manufacturers. The success of Sony Playstation 2 is primarily associated with the selling of games rather than the selling of consoles.

One can widen the scope of this megatrend by integrating the dynamics of externalisation and outsourcing. Transportation and IT outsourcing is not new, either for industrial or service firms. What is new is the scope and the nature of what is contracted out to external providers. Thus, in US very small pharmaceutical laboratories are able to compete with the biggest firms by outsourcing marketing and sales to specialised service firms. We will

¹⁰ These are services that are independent of the product and the production process, for example, child care, sporting and recreational services,...

develop further in the following section the Toshiba case which consists in outsourcing the repairing of Toshiba computers to a transportation firm (UPS).

2.2.3 Mega-trends: some concrete examples

We provide in this paragraph a certain number of concrete innovation examples, belonging to the megatrends described above, ie supported by different innovation drivers. We will provide a brief description of each of them and try to identify the main drivers involved.

1) Toshiba cooperation with Fedex to provide repair services on Toshiba computers

The Japanese electronics company Toshiba and the US delivery and logistics firm UPS signed, a few years ago, a cooperation agreement which led to an innovative service, concerning the repairing of Toshiba broken computers and warrant services. However the logistics firm UPS is not commissioned, as one could expect, to transport computers towards Toshiba facilities, but towards its own facilities where its own technicians (certified by Toshiba) carry out the repairing. Therefore UPS is broadening its range of services and is extending it beyond mere logistics towards repairing services, and Toshiba is outsourcing one of its activities.

The benefit of this outsourcing is to reduce by half the turnaround time for a repair (4 days instead of 8) and to reduce costs. Toshiba also takes advantage of the dense network of UPS stores (3300 in US), where customers can directly drop their computers, which improve the service to the customer (proximity). For Toshiba, this service innovation strategy is la way to compete with the other IT giants (Dell, Hewlett-Packard, IBM). For UPS as well, this new activity is linked to the competition with the other firms of its sector. Indeed, the logistics and transportation sector is characterised by an important tendency towards innovative diversification of supply (beyond the traditional activity) under customer's pressure. This diversification is combined with the digitization of logistics activity, which cannot anymore be reduced to a physical transportation activity.

The main drivers involved in this example of innovation (which belong to megatrend 5) are the following ones: Globalisation/competition/outsourcing; IT/technology; and customisation (package of services) and demand driven service specialisation.

2) Customised airline service: the case of easyJet

This is an illustration of case n° 4: the so-called service regression or minimum service megatrend. One can say that easyJet founded in 1995 has been an innovation in the European context, which was inspired by older American cases, such as Southwest established in 1971. Air transportation deregulation is the main driver of the creation of easyJet as well as of all low cost airline companies. 1992 and 1997 are two important dates in the European process of air transportation deregulation. However two other drivers played an important role in its success (OECD, 2005): 1) the exclusive use of ICT for reservation: telephone (call centers), e-reservation, e-ticketing, ticket-less travel; 2) the outsourcing of most activities including pilots work.

Technology and technological innovation (particularly reservation systems) played an essential role in the success the innovation easyJet. However this innovation (like the other innovations in that field) is compounded of a certain number of non-technological innovations, which involve, as we emphasised previously, to the service regression principle. These non-technological innovations can be divided in two groups:

1) Services innovations (or service regression innovations). They consist in the focus on the basic service i.e. transportation and the elimination of most of peripheral services generally provided (meal on board, seats attributed by names and class differentiation, taking into account correspondences, newspapers on board);

2) Organisational innovations. Following examples can be cited:

- The preference for short and medium distances,
- The elimination of connecting flights, the reduction of ground staff and of time on the tarmac, the elimination of airport lounge,
- The use of a single type of plane which increases maintenance efficiency,
- Densification of seats (more seats in the same plane),
- Preference for secondary airports less overloaded, rather than main airports,
- Systematic use of outsourcing.

However in this low cost « dominant design », other innovations can also be introduced. That's what JetBlue did for example, by adding « low-cost business class » or in-flight entertainment.

3) The hypermarket for the third millennium

The opening of the Auchan of Marne la Vallée (nicknamed H3M: the hypermarket for the third millennium), is an example of the integration of industrialisation and customisation in retailing (megatrend n°1). This new concept of hypermarket combines organisational innovations (world of consumption) with architectural, ergonomical, technological and service innovations in order to test the commercial relationship's new informational paradigm, which seeks to reconcile low prices with a high service levels (cf C. Gallouj, 2007).

The notion of consumption universe is an innovation which dramatically changed the traditional organisation and laying out of hypermarkets. This new concept aims at addressing the complementarity between products according to a logic of consumption rather than of production. Therefore, the organisation into universe involves the grouping of product which were spread out between several counters, often located far one from the other. The goal is to establish a « shop spirit » (which means a logic of customisation-servicisation) within the hypermarket (dominated by a logic of industrialisation).

4) Taking care of the carer: Innovation in elderly care

The targets for innovation in care services for the elderly are the elderly individuals themselves (in their various aspects) and their physical and technical environment. Another target for innovation has become increasingly important in recent years. This is the human environment of the elderly, whether that be family carers or care personnel. After all, carers, whether lay or professional, are subject to a particularly destructive form of stress – the so-called care giver burden – that is psychological, social and financial in origin. This burden is the driving force behind various innovation trajectories, which have, therefore, to be identified.

Accordingly, we propose to divide the initiatives explicitly devoted to reduction or management of the burden into two groups (Djellal, Gallouj, 2006): 1) the technologies used to reduce the burden and 2) the institutions involved in reducing the burden. The following are some examples of the technologies used in managing the burden: caregiver helplines, which provide families information and assistance by telephone; multimedia training, information and advice programme for carers. The institutional or organisational

innovations devoted to the burden management include, among others, the following initiatives:

- 1) the formation of support groups for family carers (family support groups): these are discussion groups that encourage exchanges of experience among caregivers;
- 2) the introduction of specific 'training sessions' for family caregivers;
- 3) the establishment of 'caregiver support centres': these are organisations providing various services to family caregivers in various spheres: respite care, support, legal advice, information, training, prevention, etc;
- 4) holiday respite facilities: arrangements that allow elderly people to go on holiday without any interruption in their care;
- 5) general respite arrangements for family caregivers at any time: temporary residential facilities set up explicitly to provide respite care.

5) Sustainable innovations in services

Services are victim of an innovation gap, as far as they are the source of numerous non-technological innovations which escape traditional indicators. This gap concerns and will concern more and more service innovations linked to sustainable development. Table 2.1 provides some examples of such innovations (Djellal and Gallouj, 2008).

Table 2.1 Examples of sustainable service innovations

Type of service	Examples of innovations in the various dimensions of sustainable development	
	Environmental	Socio-economic
<ul style="list-style-type: none"> • Materials processing <i>Goods transport, water, gas and electricity distribution</i> 	Car sharing, cleaning without water, materials recycling	No gas, water or electricity cut-offs, fair trade, producer outlets, community supported agriculture schemes
<ul style="list-style-type: none"> • Processing of individuals <i>Transport, personal services, health, education</i> 	Work integration enterprises, sustainable tourism (agro-tourism, cycling, industrial tourism)	Work integration enterprises, sustainable tourism (linked to local social fabrics), care of the elderly, services for individuals living in hardship, cooperative nurseries
<ul style="list-style-type: none"> • Information processing <i>Banking, insurance, family allowance offices, local authorities</i> 	Information on environmental and social situation, loans at preferential rates	Microcredit, PIMMs (points d'information et de médiation multi-services/information and multi-service mediation points, Points Services Publics/Public Service Points (PS), 'Maisons des services'/public service and advice centres
<ul style="list-style-type: none"> • Processing of organisational knowledge <i>Consultancy services</i> 	New area of expertise (environmental law, sustainable development consultancy services), ad hoc innovation, methodological innovations (MIPS, PER model)	New area of expertise (social law, sustainable development consultancy services), ad hoc innovation, methodological innovations

As far as material processing services are concerned, examples include, among others, car sharing and waterless cleaning, where in both cases the objective is an environmental one, and fair trade, the growing number of producer outlets and community supported agriculture schemes or even the maintenance of water, gas and electricity supplies to groups living in hardship, all of which are pursuing socio-economic goals.

Some forms of sustainable tourism and the many innovative initiatives in the care of the elderly or of young children are examples of non-technological innovations in services in which individuals constitute the medium to be processed or changed.

As far as information processing services are concerned, examples might include financial innovations designed to promote sustainable development, such as microloans in response to the problem of exclusion from banking services and loans at preferential rates in order to encourage firms to install environmentally-friendly machinery. Mention could also be made of the development by local authorities (possibly in partnership with private companies, particularly in areas where services to individuals are inadequate) of facilities ('one-stop shops') providing services for people in hardship: PIMMs (multi-service information and mediation points), Points Services Publics (PS/public service points) and public service and advice centres.

The innovations produced by knowledge intensive business services would seem, by definition, to be 'environmentally friendly'. They involve the provision of cognitive solutions without any particular direct adverse impact on sustainability, particularly on its environmental dimension. Thus Gallouj (1994, see also Gadrey and Gallouj, 1998) identifies three types of innovation in consultancy activities: *ad hoc innovation* (the joint development, with the client, of an original solution to a problem), *new expertise field innovation* (i.e. the identification of an emerging field of knowledge and the provision of advice in that field) and *formalisation innovations* (the implementation of methods with a view to making a service less ill-defined). This typology of innovation can readily be applied to sustainable development. After all, there are lot of examples of ad hoc solutions provided by consultants to social and environmental problems. Sustainable development, in all its various facets, is a new field of expertise that has given birth to many specialist consultancies, in environmental and social law, for example, as well as in sustainable development itself. Finally, there have been large numbers of methodological innovations in the field of sustainable development. The MIPS indicator already mentioned above can be cited by way of example.

2.3 How do innovations contribute to a single market?

Deregulation and innovation

The economic literature provides numerous examples of the link between deregulation and innovation (OECD, 2005). Certain very successful firms wouldn't even have existed without the elimination of entry barriers. This is the case, for example, of low cost airline companies such as easyJet which factors of existence and success are the deregulation of air transportation in Europe in 1992 and 1997. This is also the case, to take an older example, of Southwest Airlines which was established the USA in 1971 and which reinforced its position thanks to the 1978 Airline Deregulation Act.

This relationship between deregulation and new services (or between deregulation and the entry of innovating firms) can also be illustrated in numerous other service sectors (OECD, 2005): insurance and financial services which innovation was led by privatisation and liberalisation of pension funds (cf. the case of the French insurance company AXA) ; Television production companies such as Endemol which success and innovation are

based on measures relaxing European regulations concerning TV programmes sales ; Mobile network operators such as Vodafone which success is based on privatisation and de-regulation of telecommunications.

Large scale retailing has also benefited from different dimensions and levels of liberalisation in the field of prices and geographical area of settlement.

Regulation, re-regulation and innovation

Conversely, the establishment of certain rules (regulation or re-regulation) can also be favourable or even indispensable to innovation. For example, as far as the success of numerous activities mentioned previously (either in retailing or in air transportation or in banking and insurance) is based on IT networks (e-commerce, reservation systems, etc.), regulations warranting the security, confidentiality and reliability of exchanges are eminently necessary. In such a situation, it is regulation or re-regulation, which is likely to be a driver for innovation and success. The success of the cyber retailer Ebay is tightly linked to the regulations ensuring security on the web.

The service directive and innovation

Although services account for more than 70 % of total employment and of wealth, trade in services only makes up 20 % of the whole trade within the EU internal market. Indeed numerous barriers impede the establishment of national service firms in other EU countries, the cross-border supply of services, the cooperation of services firms from different countries. It is expected that the elimination of these barriers, which are suspected to lock certain activities in lazy monopolies, will increase competition and will be the source of innovation efforts.

Furthermore, numerous studies (including recent CIS and Aho report, 2008) emphasised how weak innovation demand and narrowness of markets for innovation raise obstacles to innovation. The service directive can be seen as an answer to this problem, as far as it aims at establishing an efficient allocation of services in the European space, by eliminating barriers to the mobility of services, investments, knowledge and labour.

Barriers to service trade are also considered as obstacles to the establishment of efficient regional clusters and to specialisation, which are viewed as factors favourable to innovation and productivity gains.

Specialisation and Europe's regional development

Continuing the works on (national, regional or sectoral) innovation systems, « innovative milieu » and « industrial districts », numerous recent works are devoted to regional clusters. Regional clusters are a set of economic actors (firms, public organisations, consumers...), which play a role in the same economic field, which are geographically concentrated and which are linked together by different types of relationships: for example knowledge spill-overs, the access to the same labour market, but also competition relationships. Clusters play an important role in the transformation of scientific and technical knowledge into innovative products and services. Recent works on clusters are dominated by two goals: on the hand to identify and map clusters, which indicate regional specialisation, and, on the other hand, to assess their performance in terms of innovation and productivity (Flash Eurobarometer, 2006).

The hypothesis, which is generally formulated, is that the existence of clusters is favourable to innovation and productivity within participating firms and organisations. It is this hypothesis which is tested, for example, by Ketels and Sölvell's report (2006) devoted to the mapping of regional clusters in the 10 new EU member states (the countries that join

EU in 2004). This report identifies weaknesses in the individual clusters and in clusters portfolios. There is for example a weakness in advanced services and knowledge-intensive cluster categories. One of the conclusion of the report is that the European competitiveness gap with other leading countries such as the USA but also with emerging Asian economies might be explained not only by traditional arguments (such as rules that introduce rigidity in various markets, higher tax rates than elsewhere), but also by the relative weakness of regional specialisation.

According to the Innobarometer 2006, 71% of KIBS firms state that they belong to a cluster. However, European service clusters suffer from short size and too large spreading. Specialisation efforts should be carried out in order to create world-class clusters in services. The service directive can contribute to this cluster specialisation strategy and to the establishment of world-class European clusters.

Therefore the public policy recommendations are to improve the regional geographic specialisation, by favouring the creation of regional clusters, i.e. the strengthening of the links between firms, public administrations and teaching and research organisations. In France, this regional specialisation policy led the government to create 71 regional poles of competitiveness (7 of them being global competitiveness clusters and 10 globally-oriented competitiveness clusters). However in order to establish world-class clusters it is also necessary to make easier trans-national cooperation.

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3 Analysis of existing framework conditions¹¹

3.1 Introduction

Quite a large number of scholars, statisticians, policy analysts and policy-makers have analysed, measured, reported and discussed services R&D and innovation. However, this has not yet resulted in a coherent vision as how to categorize, measure and facilitate these concepts in the area of services. Innovation policies seem to be increasingly aware of the key role services R&D and innovation play in driving economic growth. There is an increasing recognition of the mismatch between the sheer size and the economic role played by services and service innovations and the sort of policy initiatives taken to further services R&D and innovation. However, most innovation systems are lagging behind in adapting to an economy that is considerably service driven¹².

Although the importance of services innovation and its impacts on employment and economic growth are being recognized, policies aimed at facilitating innovation have traditionally focused on supporting R&D and technological progress mostly in manufacturing firms, where R&D means an input of major importance, even if it is only one factor among others to facilitate services innovation (Miles, 2005a). A combination of factors can explain that in most countries R&D and innovation policies are still mostly biased towards technology and R&D and innovation in manufacturing domain. Among these main factors we may include the rather slow recognition of the pivotal role played by service functions and service innovation in the economic growth process and the dominance of market failure argumentation within public authorities' criteria for justifying innovation policies. This later point is related to the hesitance to adopt the notion of systemic failures and apply these to the role of services in innovation systems.

In recent years, innovation though has started to cover services under the research scope. However, the area of market and systemic failures for these activities remains largely underexplored. A key question when discussing a policy framework for service innovation policies is whether or not there is a rationale for putting a major emphasis on this issue. Thus, this chapter pursues to present a review of previous academic background concerning macroeconomic and microeconomic argumentation – market failure and evolutionary systemic failure argumentation – to promote service innovation policies. We include empirical evidence in order to provide a more comprehensive view about how rationale for supporting innovation activities within the manufacturing industry may be also applied to the services case, particularly to those more knowledge-based activities. Finally, we argue to look beyond market failure argumentation and take into consideration systemic failures.

Therefore, this chapter pursues to discuss policy frameworks for furthering service R&D and innovation, and it is structured in three main parts. Firstly, we make a brief review on the rationale for a service policy innovation from a macroeconomic perspective. Secondly, we review the traditional arguments¹³ to justify science and technology policies launched to promote innovation in services sector. In doing so, we include a review of the literature on

¹¹ This chapter has been drafted by Luis Rubalcaba and Jorge Gallego, with comments and contributions from Faiz Gallouj, Christiane Hipp, Pim den Hertog and Joost Heijs.

¹² This situation is changing in some regions and countries where innovation policies are covering services or even addressing particular programs, like those reported in the IPPS project.

¹³ These are known as market failure, although this concept implicitly means the acceptance of the neoclassical view. The evolutionary theory considers them systemic failures since they affect the functioning of the system.

this subject and provide empirical evidence to consider how failures in the innovation systems and their broader economic, cultural and political context may be affecting to services sector dynamism. In this respect, this section suggests and deals with the hypothesis that certain hampering innovation factors affect indistinctively to manufacturing and service sectors, and in particular to those more technological- and knowledge-based activities, so that policy intervention might be also needed regarding the services domain in order to enhance competitiveness and growth in European economy. Thirdly, we follow the same methodological approach to present previous academic background and empirical evidence on the more general – non traditional – systemic failure rationale and suggests some measures to correct possible innovation system deficiencies. Finally, we include some major conclusions and final remarks.

3.2 Economic rationale behind a service innovation policy

In order to cope with the economic rationale behind a service innovation policy, three dimensions are considered:

- Macroeconomic and contextual factors
- Market failures classical argumentation
- Systemic failures rationale

3.2.1 Macroeconomic and contextual rationale for a service innovation policy

The development towards a service-driven economy is a process that has been underway for some decades now. Production and consumption have shifted away from mere physical objects towards information and services within advanced economies, turning service sector into a key driver in the creation of competitiveness, employment and economic growth. Even the production of goods is more and more related to the services economy growth, both from the inputs side (e.g., business services) and the output dimension (accompanying services around a good). In this context, service innovation may be a dimension for improving efficiency and productivity in the entire economic system.

The concomitance between role of services in modern economies and the role of innovation in economic growth has increased the interest in service innovation from different angles, from academic research to statistical developments, from new theories and typologies to a wider management specific business plan for services innovation, from the inclusion of services in existing R&D programs to the development of new policy interventions.¹⁴ An increasing number of firms are managing service innovation more explicitly and specifically. In some countries innovation policy-makers have started to explore new, more services' innovation friendly R&D and innovation policy frameworks and in a few even service innovation schemes.

Up until today there are policy-makers and scholars that advocate for not having any specific service innovation policy at all. Typical macro-economic assumptions that support such an approach include:

1. High economic and productive growth rates are localised in countries where manufacturing industry is performing well. This is due to their relative costs (China, India) or because of the higher manufacturing performance associated with a high

¹⁴ In den Hertog (2008) it is observed that the communities of researcher and statisticians, policy-makers and practitioners do interact or learn from each other. For a long time the three communities have been trapped in the same dominant view or technologist paradigm or view on innovation and to a certain extent their interaction reinforced this dominant paradigm. Changing the dominant paradigm regarding service innovation has proved an uphill battle and nothing less than a paradigm switch.

technological capability (e.g. some industrial medium-high tech sectors in Europe and United States). Therefore, innovation policies should focus on those manufacturing sectors leading high productivity growth rates.

2. ICTs have a multipurpose character making it suitable to fit into the needs of any economic activity, in such a way that the promotion of ICT and other technological programmes may be enough to achieve a horizontal policy affecting all sectors without any sector discrimination.
3. The huge heterogeneity among services makes almost impossible to address different service innovation particularities without inferring too much into the markets. The idea then is that it is better to have a horizontal policy that follows the established and tested logic of supporting technological innovation without distorting competition than to have a specific services innovation policy supporting service innovations which are seen as “too close to the market” and might be in conflict with competition policies.¹⁵

However, in our view, these assumptions are neglecting important considerations worthy to mention. In this respect, first assumption forgets that many high performance countries and sectors around the world are based on services and a high service performance. Moreover, service innovation may be at least as important as innovation in goods in explaining performance differences among countries. Second assumption ignores the complementary between tech and no-technological innovation though which has proved to be important (see e.g. Bresnahan et al., 1999; Brynjolfsson and Hitt, 2003). Finally, third assumption underestimates the complexity of modern economies, the interrelationship between economic activities and the proximity to the markets existing in many goods innovation in manufacturing industries and increasingly so in the policies supporting these.

Beyond previous considerations, different macro-economic or contextual arguments can be also provided for paying a particular attention to services innovation processes and for including more explicitly service approaches in policy-making. The following statements are mostly based on Rubalcaba (2007)¹⁶:

- Innovation has been proved to be an essential factor for economic growth (Schumpeter, 1939; Griliches, 1986; Fageberg, 1988; Freeman, 1994). Given the fact that services represent around 70% of more advanced economies, service innovation will be a key factor for economic growth.
- A sluggish productivity growth in services –behind goods productivity rates– may be consequence of a low performance of service innovation: structural change require new innovative efforts to balance specialisation changes
- Service innovation is a stimulant for innovation generally and for investment in intangibles and knowledge, factors of endogenous growth and total factor productivity. There is empirical evidence proving the important of service innovation in productivity and economic performance (e.g. Cainelli et al., 2006; Rubalcaba and Gago, 2006).
- There is relatively low productivity and performance in many service sectors (European Commission, 2003) and reduced use of ICT in some important services

¹⁵ The 2005 OECD study follows this line of argument when it is observed that there are no particular obstacles affecting service innovation that cannot be found in technological innovation in manufacturing industries, so that similar problems would lead to similar solutions. This assumption is based on the statistical indicators used by European surveys where obstacles are isolated from modes, drivers and effects. Differences between goods and services are significant in modes, drivers and effects (Rubalcaba, 2006) what may justify particular actions. For example, two companies may have similar degrees of difficulty to protect their innovation results, but the requested solutions may be different: one has difficulties to produce a patent while another is looking for a different instrument. Similar obstacles according to CIS indicators can not be a necessary condition for arguing policy horizontality.

¹⁶ All these factors are based on a twofold view: macroeconomic and political, unlike market and systemic failures focusing more on micro and meso angles. Even if there are interrelations among the different types it is possible the identification of challenges derived from structural change, for example, leading to new evolutions in service productivity influenced by the use or non-use of service innovation.

branches in Europe, as detected for ICT-service users in O'Mahony and van Ark (2003).

- The relatively low participation of services companies –with some exceptions– in R&D programmes. This raises in an EU-context the question whether the Lisbon strategy and the aim to achieve the 3 per cent of GDP in R&D investments in Europe can be attained without including services R&D and innovation more explicitly properly. Raising the R&D level in services would contribute considerably in accomplishing this goal.
- The recent deregulation and liberalization in many service sectors, which means that businesses forsaking their protected market niches need to find new strategies to boost competitive levels. Innovation driven growth in these once sheltered markets will need to rise.
- The current phenomenon of relocating services to lower-cost countries or countries with a higher specialization demands that businesses in advanced countries should find new competitive strategies based on innovation.
- The lack of formalisation and organization of service innovation, which requires the promotion of new instruments of business support. Beyond R&D, other inputs and drivers should be promoted and followed.
- Service innovation is particularly important in the case of some regions, where service capabilities are rather poor, partly explained by the high concentration of KIBS in more developed regions and few endowments are located in less developed regions. In these regions market and asymmetric failures apply even with a higher degree of intensity than in other regions.

3.2.2 Market failure rationale for innovation in services

Macro-economic arguments for not paying attention to service innovation in innovation policies are mirrored in more micro-economic arguments focussing typically on the notion of market failure. In this respect, the sort of arguments to question the acceptability of R&D and innovation schemes have been summarised as follows:¹⁷

- Service firms are less focused on technological innovation compared to manufacturing firms. The result is that all too often it is concluded that no specific attention to R&D and innovation in services need to be paid. This is at least remarkable as there are numerous service firms that do invest in technological R&D and innovation and these need at least be treated in a similar vein as their peers in manufacturing.
- Innovation in services typically takes place close to the market. This would imply that the case for intervention aimed at facilitating innovation is less obvious. Put differently, service innovation is not sufficiently fundamental to be supported and policy-makers fear that intervention might distort competition.
- There is little scope for spillovers across firms as services innovation involves so much organizationally specific development.
- Externalities from investments in non-technological R&D and innovation are less obvious than externalities from investments in technological R&D and innovation.¹⁸

Den Hertog (2008) continues to argue that it can be questioned whether the line of argument above is based on the right assumptions. Firstly, service firms and service industries are more active in technological R&D than is mostly anticipated. R&D and innovation in business related services, and in particular knowledge-intensive business services, are performing substantial technological R&D, even to a higher extent when

¹⁷ These arguments and the following survey are based on den Hertog (2008).

¹⁸ The classical argument for supporting private and collaborative (technological) R&D in firms is that through these externalities, social returns to investments made in R&D are higher compared to private returns for the firms making these investments. The resulting underinvestment in technological R&D and innovation is a market failure which could be corrected through supporting private R&D efforts.

compared to the average for manufacturing firms (RENESER, 2006). These services are more likely to engage in R&D than other service industries and than most firms in manufacturing industries. Standard market failure argumentation¹⁹ is as relevant for these industries as it is to manufacturing firms and industries. Secondly, it seems to be forgotten that investing in technological R&D is just one of the ways through which firms become more innovative (and eventually more productive and competitive). There are simply innovations that do not require relatively more investments in non-technological innovations such as new organizational or marketing concepts, new client interfaces, new type of delivery organisations or new smart combinations of service and product elements. These investments are more difficult to pinpoint and to assess, but they are as real as investments made in technological R&D.

Further, as these intangible investments trigger innovations that eventually lead to economic growth, there is no fundamental reason to not facilitate these. However, a prerequisite is still that there should be externalities involved and these softer types of innovations do come at a cost and require serious investments i.e. social benefits are higher than private benefits and the individual entrepreneur would have to invest substantially. Thirdly, it can be seriously questioned whether technological R&D and innovation and non-technological R&D and innovation can be treated separately. These two are in economic reality increasingly difficult to disentangle and treat separately as most innovations today are multidimensional i.e. smart combinations of new or advanced technology in combination with new service elements or smart services enabled by innovative use of technology.²⁰

Typically, the market failure argumentation used in standing R&D and innovation policy and its applicability towards services R&D and innovation needs to be reviewed. Do market failures inhibit new innovations in services R&D and innovation? We also need empirical research to see if these alleged market failures can be found in practice. According to Gustafsson and Autio (2006), market failure in knowledge production relates to underinvestment in knowledge creation (notably R&D) due to (i) uncertainties and risks in innovation (R&D) efforts, (ii) insufficient appropriability (leading to failure to appropriate return from innovation and new knowledge), (iii) information asymmetries, (iv) failure of markets to assign values to externalities (impacting knowledge diffusion) and (v) undervaluation of public good technologies in firms strategies.

Considering a more services-related perspective, van Dijk (2002) studied three different types of market failures in service innovations: externalities, market power and asymmetric information. Rubalcaba (2006) has, in a somewhat different vein, also reviewed the applicability of the market failure argument to services innovation and linked this more directly to policy options. He makes a similar differentiation between: uncertainty and risk; externalities, scale economies; and market power. Van Cruysen and Hollanders (2008) use a different set of market failures in services innovation and link these to possible policy intervention, namely: (1) market power; (2) externalities; (3) nature of certain goods or the nature of their exchange; (4) resource immobility and (5) market failures associated with property rights.

For research purposes, we assume and mostly follow criteria based on the above mentioned approaches to analyse specifically the concept of market failure applying to

¹⁹ For an introduction into market failure argumentation and its applicability to service innovation see van Dijk (2002), van Ark et al. (2003), RENESER (2006) and Cruysen en Hollanders (2008).

²⁰ At the level of firms and industries, the artificiality can be observed as well by manufacturing firms developing into hybrid firms realising a considerable part of their turnover in service activities and service industries developing into firms with a sometimes impressive technological capability.

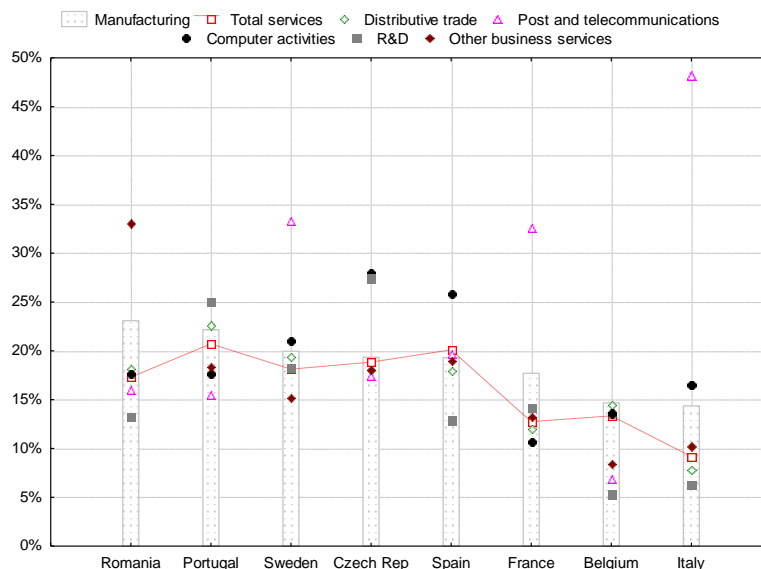
services innovation performance. Further, we provide empirical evidence based on proxy indicators to test the possible specificities of services in this area. This may support the idea of significant market imperfections that may be leading not only to under-investment in knowledge generation within the manufacturing industry, but also within the different service activities.

A. Market power failure

Market power failure refers to a lack of adequate competition in markets, and to products and services pricing as result of the sole influence of a few market players with limited regard to customers or competitors. Thus, marginal costs of production are not affected by competitive pressure, what may be determinant to refuse developing an innovation approach. This may be the result of high sunk costs, natural monopoly, low transparency or high switching costs what mainly refer to industry market structure.

As indicated by van Cruyssen and Hollanders (2008), today's markets have seen a wave of mergers and acquisitions, resulting in an increasing number of larger firms in many industries. Firms with market power may use their market position to hamper competition, restricting production, manipulating offers (which may lead to shortages) and setting higher prices. Since competition forces firms to constantly enhance and innovate, offering better quality and lower prices, the lack of competition may lead to inertia in terms of innovation activity, and therefore, to a diminution of potential business investments on this subject.

Figure 3.1 Markets dominated by established enterprises as high important factor of hampering innovation activities, % of innovative enterprises



Source: Based on Eurostat database, CIS4.

The dominance position of particular established enterprises within the markets is reported to be a relevant factor for hampering innovation activity both in manufacturing and service sectors, although services industry as a whole reports somewhat lower levels of importance to this factor (Figure 3.1). This trend is detected for any of the member states included in the study, with the only exception of Spain, where service firms suggest more difficulties than their counterparts in the manufacturing sector to develop innovation activities as result of the concentration of this sector in the hands of a few predominant large organizations. Differences also arise depending on the country and the sector analyzed. Thus, some knowledge service sectors, such as telecommunication and computer activities, present larger obstacles to trigger their innovation processes than manufacturing enterprises. The case of post and telecommunication companies in Italy is particularly remarkable in this

respect since almost 50 per cent of firms consider that market dominance is a highly important factor for not to engage in innovation activities. This pattern is also to notice, though to a lesser extent, in other European regions such as Sweden and France.

As regards of the market structure in manufacturing and service sectors at European level, Table 3.1 shows information on the market position of large firms with respect to the position of small and medium enterprises (SMEs). Data included in the table provides criteria to somewhat check market power and monopolistic competition in different activity sub-sectors by comparing turnover and value added market share of large enterprises with respect to SMEs. According to Kox and Rubalcaba (2007), in most branches for standardized service products, a small number of large and often international firms together account for a sizable market share, often in the range of 20 to 50 per cent of the market. The table shows that in some cases market shares for large firms in more product-standardized service sectors represent more than 80 per cent of total turnover and value added. This would be the situation for air transport and post and telecommunication activities, whereas in the case of large manufacturing enterprises as a whole this proportion reaches around 60 per cent. Thus, market power of large firms seems to be superior for transport and communication services and manufacturing activities than for the rest of economic activities. On the other hand, markets may be also segmented and may lack for transparency, which may result in localized monopolies on the basis of specific knowledge-based inputs. This would be the case of some service markets that provide client-specific activities, which are characterized by including smaller firms with smaller combined market shares when compared to manufacturing or to more standardized services. This fact can be also observed in Table 3.1, as the average market share, in turnover and value added terms, for an individual large firm is of major relevance when considering more client-related activities such as R&D and renting activities (0.25 and 0.12 per cent respectively).

Within “other business services” there are KIBS and non-KIBS activities. Some KIBS like management consultancy cover firms with high market shares while many other small firms play in a different scale. Although no official data exist at EU level, previous evidence (Rubalcaba, 1999) shows how dual market establish a fringe in which pseudo-oligopolistic structure oriented to large clients coexist with a SME-client oriented supply for which many firms operate with some quota of monopolistic power as well, based on reputation, market niche, product differentiation, regional location, etc. This duality is also present in KIBS markets such as advertising and market research or personnel services. In terms of industrial organisation theory this duality could be specificity as competitive fringe markets with dominant firms, what was already verified for the case of European business services (Rubalcaba, 1999). In other KIBS markets like legal services and engineering services market structures are much more fragmented and the market influence on large multinational companies is much more limited.

Table 3.1 Market structure by service industry

Service branches	Number of firms			Turnover share				Value added share			
	Total (x1,000)	Large firms (x 1,000)	(%) of large firms	Large firms share (%)	Averag e share per large firm	SMEs share (%)	Averag e share per SME firm	Large firms share (%)	Averag e share per large firm	SMEs share (%)	Averag e share per SME firm
Manufacturing	2,322.2 3	18.46	0.79	60.29	0.0032 7	39.71	0.0000 2	54.69	0.0029 6	45.31	0.0000 2
Hotels and restaurants	1,644.4 6	1.26	0.08	22.46	0.0177 8	77.54	0.0000 5	23.84	0.0188 7	76.16	0.0000 5
Transport, storage and communication	1,199.7 8	3.45	0.29	60.97	0.0176 7	39.03	0.0000 3	65.88	0.0191 0	34.12	0.0000 3
Land transport; transport via pipelines	926.00	1.35	0.15	34.69	0.0257 0	65.31	0.0000 7	40.12	0.0297 2	59.88	0.0000 6
Water transport	18.50	0.12	0.67	:	:	:	:	:	:	:	:
Air transport	3.50	:	:	85.61	:	14.39	:	81.19	:	18.81	:
Supporting and auxiliary transport activities	181.79	1.24	0.68	42.82	0.0345 9	57.18	0.0003 2	53.98	0.0436 0	46.02	0.0002 5
Post and telecommunications	69.42	0.62	0.90	87.23	0.1400 2	12.77	0.0001 9	91.70	0.1471 9	8.30	0.0001 2
Real estate, renting and business activities	5,378.8 8	8.27	0.15	25.41	0.0030 7	74.59	0.0000 1	27.89	0.0033 7	72.11	0.0000 1
Real estate activities	1,009.9 5	0.57	0.06	10.69	0.0188 2	89.31	0.0000 9	11.13	0.0196 0	88.87	0.0000 9
Renting of machinery and equipment	145.50	0.20	0.14	24.34	0.1216 9	75.66	0.0005 2	24.64	0.1232 0	75.36	0.0005 2
Computer and related activities	520.00	0.96	0.18	41.66	0.0434 8	58.34	0.0001 1	42.67	0.0445 4	57.33	0.0001 1
Research and development	39.07	0.22	0.55	52.44	0.2427	47.56	0.0012	54.53	0.2524	45.47	0.0011

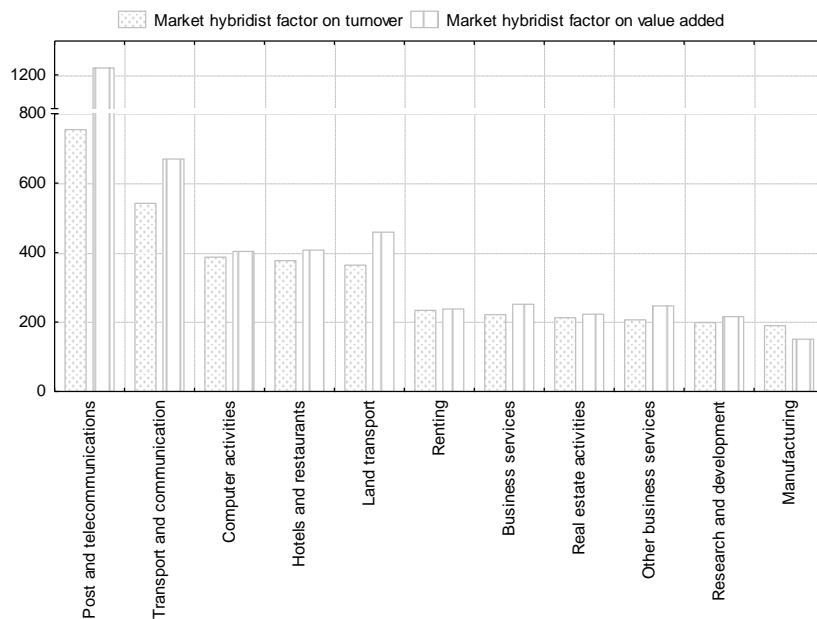
					9		2		7		7
Other business activities	3,660.4	6.33	0.17	26.34	0.0041	73.66	0.0000	29.92	0.0047	70.08	0.0000
	1				6		2		3		2

Source: Based on Eurostat database.

Note: Large firms are considered those above 250 employees.

Figure 3.2 shows the market hybridist factor for manufacturing sector and a range of services activities. This measures the market share gap between the average large firm and the average SME firm, and it is mostly relevant for some specific services such as transport and communication activities, particularly to those post and telecommunication services. Data on the plot below mean, for instance, that market share for a large firm within post and telecommunication sector is 754 and 1220 points above market share for a SME in turnover and value added respectively, what may be suggesting the influence of scale economies on more standardized activities. As observed in the figure, concentration of market share in the different service sectors analysed seem to be superior than in manufacturing industry, so that competition deficiencies among enterprises may apply to service sectors to a larger extent.

Figure 3.2 Market hybridist factor by industry sector



Note: Hybridist factor is a ratio calculated as the average market share of large firms divided by the market share of small and medium firms.

Market power has a particular interest for services, where the lack of competition can act as a disincentive aspect for generating innovation. As many services operate in very segmented markets with a high monopolistic power, this market failure may affect services in a particularly significant way. Thus, public intervention may be required to remove market barriers and to control for entry barriers, mergers regulations, competitive tendering, and monopolistic or strategic oligopolistic behaviours. However, in specific circumstances the market power could assure the appropriation of certain innovations and create the necessary critical mass and scale advantage for large R&D projects, which means that in those situations the lack of competition would incentive innovations, especially if the monopolistic power is based on reputation. However, in general terms, competition has proved to be highly positive to innovation and competitive gains, as observed in liberalised service markets, in achievements generated by the internal market of services and in KIBS international markets, when large firms and SME compete and coexist in pro-innovative contexts.

B. Scale economies and resource immobility

Market power is related to another economic reality often explained to justify policy intervention: scale economies. Fragmented markets are often related to limited margins to develop scale economies while large multinational companies often show a wide scale

development. However, scale economics are not only related to market power. Scale economies occur when innovation activities may require larger efforts and resources than competitive markets alone may generate or sustain. Further, they are related to the indivisibility of technological activities requiring a minimum critical mass. The problem of indivisibility in the world of services is probably more reduced than in the case of goods, where R&D processes are better structured and require a higher quantity of inputs. As innovation processes are more diffused in production processes as in the case of services, it seems to be easier to reach a critical mass.

Table 3.2 Percentage of innovative enterprises

	<i>Small firms</i>		<i>Medium firms</i>		<i>Large firms</i>	
	<i>Manufacturing</i>	<i>Total services</i>	<i>Manufacturing</i>	<i>Total services</i>	<i>Manufacturing</i>	<i>Total services</i>
Belgium	52.3	31.5	72.8	50.5	87.0	63.8
Bulgaria	14.7	12.0	25.2	15.8	36.2	35.1
Czech Rep.	33.8	23.4	53.5	36.6	73.1	49.5
Denmark	52.0	45.5	71.1	44.4	84.9	60.7
Spain	33.6	29.4	50.3	27.6	78.0	33.9
France	28.6	19.8	58.1	34.8	79.9	52.0
Italy	34.1	26.4	57.4	33.7	74.3	47.8
Cyprus	48.9	35.0	80.8	45.8	90.9	73.3
Lithuania	23.3	16.2	43.0	37.4	68.1	50.6
Luxembourg	39.1	48.8	59.9	64.3	83.7	76.4
Hungary	15.9	18.8	32.3	29.3	53.1	55.6
Malta	21.8	10.3	38.5	11.2	61.1	47.1
Netherlands	33.6	27.1	61.7	35.8	78.2	62.6
Poland	18.0	19.2	42.1	36.8	67.9	56.6
Portugal	32.6	41.7	60.1	53.7	71.7	56.9
Romania	17.1	14.7	25.7	24.7	42.8	42.8
Slovakia	18.8	13.8	34.9	36.3	63.2	44.0
Sweden	48.8	41.6	69.9	59.3	84.9	66.6
	31.5	26.4	52.1	37.7	71.1	54.2

Source: Based on Eurostat database, CIS4.

As observed in Table 3.2, the share of service firms reporting to be innovative is more reduced when comparing to the manufacturing sector. This fact could be reflecting the influence of business size in developing innovation scale processes. Since services operate in SME markets to a larger extent than in the case of goods, critical mass obstacle may be higher than in manufacturing industry. It might be also consequence of a limitation in the formalization and conceptualization of services innovation indeed, and a lack of services-friendly policies that promote innovation within this industry and fulfil service firms' requirements in terms of resources and critical mass for innovation. Thus, when innovation effort concerning inputs is put, for instance, into qualified human capital, as in the case of advanced services, an active policy is justified in the field of education and training. This reinforces the traditional justification of SME-oriented policies, where reaching a critical mass and sufficient human capital is more difficult.

Nevertheless, a lack of resources or critical mass is not the only factor that may be conducting to a limitation of the innovation activity within certain industries. The so-called

resource immobility market failure, which is mostly related to an inefficient allocation of production resources, also may hamper it. Efficient allocation of resources requires that the factors of production are free to move to wherever returns are the highest, but this fact does not apply in all cases. As stated by van Cruysen and Hollanders (2008), when resources can not move freely across borders, innovation activity is restricted to national borders, not being able to tap knowledge and skills developed elsewhere. The limited size of the national markets also makes more difficult to reduce the average unit cost of production of ideas. The limited mobility of the outcome commercialisation of R&D activities impedes the advantages of scale effects and led to under-investments in innovation activities.

The opening of markets would create more competition, forcing firms to compete in terms of better quality and novel offerings, and consequently, they would have more incentives to innovate. Access to larger markets implies that EU firms would be able to make use of economies of scale, and recuperate investments in innovation activities in a shorter period of time. In this respect, this market deficiency may be applying to services sector to a higher extent than to manufacturing organizations, since European market for services is still ill-conditioned by strict regulations at member state level.

C. Externalities and the public nature of knowledge

Externalities occur when enterprises are involved in transactions where they cannot assume the full cost of their innovation processes or achieve the expected profits from their innovation actions. Then, when societal returns to innovations exceed the private returns, firms may innovate too little, because innovations may 'leak' to competitors due to imitation or employees switching jobs. This is related to appropriability, but also to entry and exit conditions for firms and individuals.

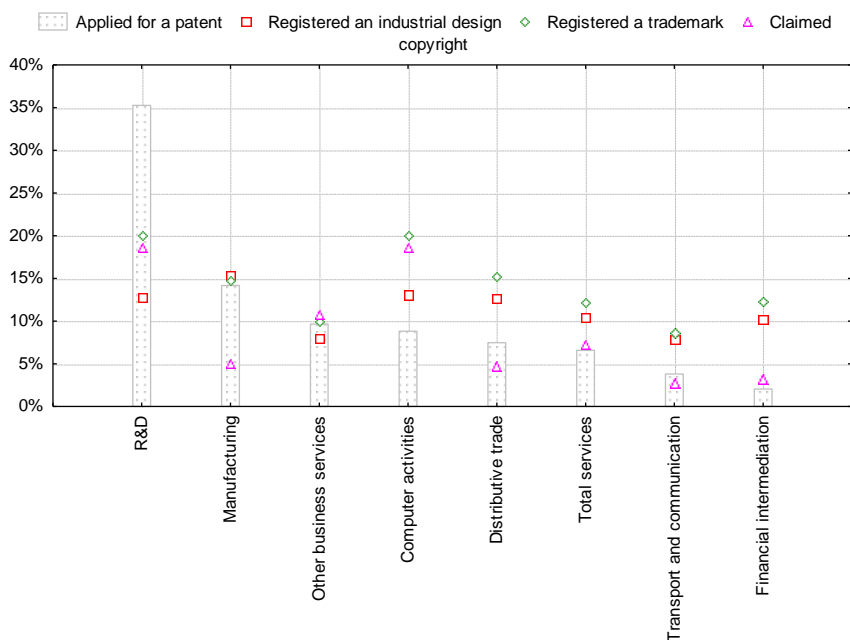
Externalities are derived from the public nature of knowledge and its spillovers, which generate problems of appropriability and use of innovation without the need to pay their market value (free-riding). This market failure justifies the intellectual property protection policies (intellectual property rights), on the one hand, and direct government intervention, on the other hand, although the latter is only justifiable in the case that the intervention implies the maximization of net social welfare. Market failures theories advocate for policy actions to cope with externalities only when they clearly produce higher social benefits and can not be appropriated by private enterprises.

A popular economic argument within the science and technology system practitioners deals with the concept of knowledge as a public good, so that the bases on which neo-classical claims for efficiency depend are absent in the market for knowledge. As stated by Kane (2001), the provision of goods in markets depends on the responses of firms to the private benefits/cost ratio they face, and not on a social benefits/cost calculus, competitive markets in principle would appear to provide sub-optimal level of knowledge goods. Knowledge goods may exhibit greater or lesser degrees of publicness in that private firms may act, and institutions may evolve, in response to the appropriability problem in particular. Thus, firms may seek to protect knowledge through industrial secrecy and the enforcement of intellectual property rights.

Given the fact that information is a good hardly to be appropriated (Arrow, 1962), economic activities very intensive in knowledge face a higher problem. As far as services are concerned, appropriability problems seem to be even greater than in the case of goods, due to the limited use of patents, the insufficient protection offered by copyright systems and the intensive role of information in KIBS. Further, as suggested by Malerba (1997), an adequate IPR system is of major relevance since a too stringent appropriability regime may

greatly limit the diffusion of advanced technological knowledge and eventually block the development of differentiated technological capabilities within and industry.

Figure 3.3 Protection methods applied by different industries, % of innovative enterprises



Source: Based on the Eurostat database, CIS4.

Manufacturing firms apply for intellectual property rights protection at a higher extent than services sector as a whole (Figure 3.3). This statement holds true for patents, industrial design copyrights and trademarks methods. However, the share of service organizations that claims for copyright protection is superior than in the case of manufacturing firms. Transport and communication activities and financial intermediation seem to be those sectors applying for IPR to a lesser extent. Nevertheless, some specific service industries are major users of these systems to protect their results from innovation activities. This for instance the case of computer and R&D activities which present IPR registration levels of industrial design and trademarks above those reached by manufacturing enterprises. Particular attention is to be paid to the proportion of R&D service firms that applies for a patent (35 per cent) which is more than double the one registered as regards of manufacturing enterprises.

Furthermore, as stated by van Cruysen and Hollanders (2008) growth in business services has proved to create positive externalities in the economy throughout technological and non-technological innovation contributions in client industries. As intermediary inputs-organizations for the rest of economic agents, a business services limited economic performance in terms of productivity may lead to a reduction of the competitiveness and the innovation in other sectors. In this respect, policy intervention for promoting this type of activities may be also, in certain cases, desirable in order to enhance the general economic performance of the whole productive agents.

Intellectual property rights may result particularly important in the case of service organizations, since the intangible nature of services is one of the basic difficulties in defining the application of innovation results (Sirilli and Evangelista, 1998), being the methods of appropriation different in services – for example copyright – than in goods (Howells, 2001). The results of service innovation, due to the intangible nature of services, are less visible than the results arising from goods innovation (Gallego and Rubalcaba,

2008), and therefore the former have less market scope for potential clients (Green et al., 2001). Therefore, externalities arguments may support services innovation policies even more than goods innovation ones. From a policy perspective, a reinforcement of the appropriability system in services should consider the potential negative impacts that may have over potential innovation growth or over market competition. This leads to think about service innovation policies beyond IPR issues.

D. Asymmetric information and uncertainty

Information asymmetry occurs when economic agents interacting within a particular market are not well informed or when information is not equally distributed among participants. The particular case of asymmetric information limits the demand for new services and requires public performance affecting demand and market transparency and information; not only action directed towards the supply side is requested. Lack of information or over-information in service markets may act in a similar way. In this respect, as argued by Kane (2001), in knowledge production, we have access neither to the value of the outcomes (e.g., the nature of new knowledge or innovative products/process) nor to their probability distributions *ex ante*, and so no reason to suppose that competitive markets will appropriately price such risks and allocate resources for knowledge production efficiently. Therefore, information asymmetry has a negative impact on innovation activity as less-informed parties tend to avoid risk by reducing exposure.

Uncertainty is developed around innovation since this is produced in a context where expectations and information are distributed in a very asymmetric way (Dosi, 1988, Stiglitz, 1991). Since innovation requires different means and levels of interaction between seller and purchaser, the problems of asymmetric information could hamper innovation, as one party might be distrustful about unknown features of the other party (e.g. attitude, skills). As considered by van Cruysen and Hollanders (2008), due to certain characteristics of the services sector, including less tradability (services tend to be locally produced and consumed), intangibility (making it difficult to consumers to evaluate services quality before purchase and consumption), and the fact that SMEs are particular predominant in the sector, firms operating in services and their consumers are less informed about alternatives and choices than their counterparts in the manufacturing industry. However, this fact would not apply to all service sub-sectors indistinctively since differences arise among those more standardised- and those more client-related services.

Data included in Table 3.3 points out some results from the producer perspective.²¹ Thus, a lack of information on technological capital and on markets may be affecting innovation potential of manufacturing enterprises to a more negative extent than in the case of services industry as a whole. The same applies when considering the influence of an uncertain demand for innovative products. However, differences arise as regards of a more activity-disaggregated level. In this sense, the share of transport and communication services and distributive trade organizations that consider the lack of information on technology as a relevant aspect that hinder their innovation processes is higher than in the case of manufacturing firms. Further, 16.50 per cent of innovative business service organizations reports that uncertain demand for innovative services is a negative factor that hamper its innovation activity levels, whereas this proportion only reaches to 14.64 per cent of manufacturing enterprises.

²¹ Data from the client or customer perspective are not available.

Table 3.3 Lack of information as high important factor of hampering innovation activities, % of innovative enterprises

	<i>Total manufacturing</i>	<i>Total services</i>	<i>Distributive trade</i>	<i>Transport and communication</i>	<i>Financial intermediation</i>	<i>Business services</i>
Lack of information on technology	7.01	6.17	7.04	7.58	6.48	6.25
Lack of information on markets	7.39	6.20	6.38	5.71	5.81	7.02
Uncertain demand for innovative goods or services	14.64	11.40	9.55	11.35	7.00	16.50

Source: Based on Eurostat database, CIS4.

Note: Data refer to the average value for Belgium, Czech Republic, Spain, France, Italy, Cyprus, Lithuania, Luxembourg, Hungary, Netherlands, Poland, Portugal, Romania and Sweden.

Perceived risk and uncertainty of market players may justify public investment, some financing facilities or attempts to either boost demand for new services or to increase transparency of markets. Thus, the problem of uncertainty does not only justify public investment – to take risks derived from a potential failure – but also financing intermediation – soft credits, grants. In this respect, an example of misinformation is the one given by the banking system when credits and loans are negotiated. The lack of tangible assets is used as a justification to under-funding service innovation. Accurate information about intangible assets may solve part of the problem. Further, the substitution for failure of private capital markets to appropriately finance long-term investments in might be considered as a possible solution in pulling up this market failure of uncertainty.

Additionally, this market failure may lead to another type of failure in which lack of coordination between business accountancy, financial practices and legal environment reveal a more systemic failure, as it will be analyzed in the next sub-section. A similar asymmetric information problem is revealed when public administrations are in a better position to assess the potential growth of strategic technologies or sector (Krugman and Obsfeld, 1994) or the reverse, when their position is worse due to the distance to the real world. This has important policy implications, for example, when trying to promote high dynamisms in service sector like KIBS that may offer strategic growth areas for innovation. For this purpose statistics and analyses are needed to base decisions upon.

3.2.3 Systemic failure rationale

The technological bias in innovation policy is partly due to the persistency of the linear innovation model that perceives technology as the key aspect between the use of R&D inputs and the resulting innovative products or processes. A different interactive innovation model was developed since the 80s, for which the innovation process design, management, implementation and diffusion of results require continuous interactions and learning by doing among different actors. This has been used mostly to better understand technological innovation in manufacturing. However, services innovation has to a much lesser degree framed in such an interactive and systemic context, whereas in our view we need to look beyond market failure argument and adopt a broader perspective on service

innovation and the possible need of rationale for service innovation policies i.e. possible systemic failures.

There has been a growing body of thought that market failure argumentation is insufficient to deal with innovation dynamics and the rationale for R&D and innovation policies. In this subsection we look beyond market failure argumentation at another type of failure i.e. systemic failure. The argumentation used here is mostly based on evolutionary rather than neoclassical approaches to innovation (key references here are e.g. Edquist, 1994, 1997, 2001; Metcalfe, 1998, 2002; Smith, 1992; Metcalfe and Miles, 2000), which argues that an evolving system in a dynamically changing environment will never actually achieve an optimal equilibrium state.

Observing the need to correct the systemic failures in wider innovation systems, the evolutionist theory suggests some innovation models or systems without simple one-way relationships between knowledge generation and absorption (Arnold and Kuhlman, 2001). Therefore, a systemic approach is necessary to understand the relationships between science, technology and innovation, as well as an evolutionist approach, indicating that there is a specific situation for each case according to the cumulative processes generating changes in the systems. In words from the European Commission, "rationale for policy intervention shifts from one simply addressing market failures that lead to underinvestment in R&D towards one which focuses on ensuring the agents and links in the innovation system to work effectively as a whole, and removes blockages in the innovation system that hinder the effective networking of its components" (European Commission, 2002). Therefore, it will be very difficult to cope with service-innovation if innovation systems are not suited to facilitate and benefit from service innovation.

To introduce rationale for possible policy intervention on this issue we will use a typology of four types of systemic failures as regards of previous academic background (Malerba, 1997; Carlsson and Jacobsson, 1997; Smith, 2000; and O'Doherty and Arnold, 2003, among others). For each of the four non-market types of failure, we tentatively provide a number of examples to illustrate that there is quite some room to improve the way in which services, services R&D and service innovation may be facilitated. This implies making use of 'non-innovation policies' i.e. policies originally not designed to facilitate innovation which can be beneficial in furthering service innovation. Cruysen and Hollanders (2008) define systemic failures as structural, institutional and regulatory deficiencies which lead to sub-optimal investment in knowledge creation and other innovative activity, as result of poor interactions among economic agents (mostly firms, universities and government). In this approach, they choose not to differentiate between different categories of systemic failure as they find many linkages between the different types of systemic failures. However, we present four systemic failures separately (namely: capability, network, institutional and infrastructural failures) as we find these are inter-related, but nevertheless inherently different.

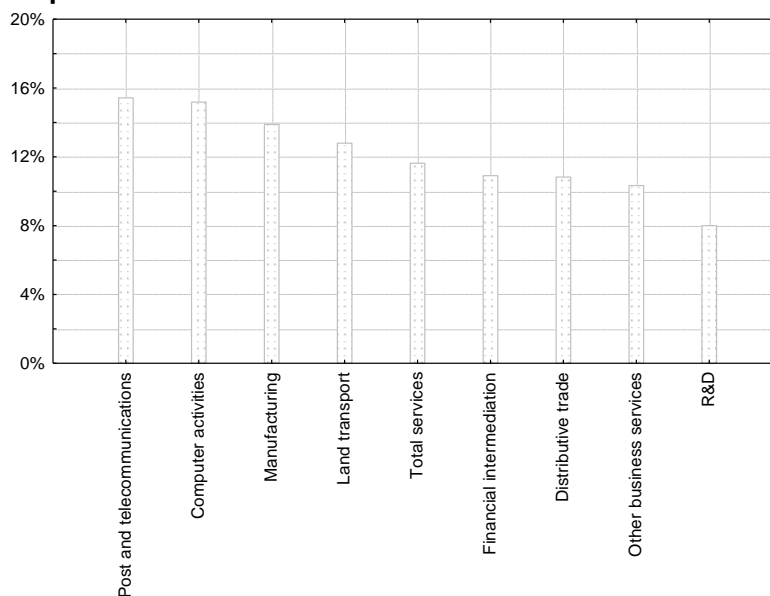
E. Capability failure

This type of systemic failure refers to the inability for firms to move from an old paradigm to changes in markets, technological capacities or new organizational concepts²². This is defined by O'Doherty and Arnold (2003) as inadequacies in potential innovators' ability to act in their own best interests. This implies firms' lack of resources, flexibility, competences and learning capacities to adapt to new technological and non-technological advances within the industry sector they operate. According to Smith (2000), there is considerable evidence to suggest that relatively minor shifts can provide serious problems for firms who

²² Although most of authors include this failure as a systemic one, it is to consider that firms competences and capacities rely to an important extent on the own firms strategy developed in the past.

have no background in the new developments, while there can be also major shifts in technological regimes or paradigms that can be particularly difficult to adapt since they often imply development of or adaptation to completely new generic technologies, where the relevant capabilities (which are usually not technical but organizational) lie quite outside the existing structure of capabilities.

Figure 3.4 Lack of qualified personnel for firms to develop innovation activities, % of innovative enterprises



Source: Based on the Eurostat database, CIS4.

Note: Data refer to the average value for Belgium, Czech Republic, Spain, France, Italy, Hungary, Poland, Portugal, Romania and Sweden.

If one would translate this to the case of services (or rather service functions within innovation systems) one can think, for instance, of service firms and their employees that might lack the right knowledge, skills, information and contacts to accomplish technological and non-technological innovations. In this respect, and as shown in Figure 3.4, a significant share of European organizations reports the lack of qualified personnel, with appropriate knowledge and capacities, to be an important factor hindering innovation activities (15 per cent in manufacturing industry and 12.5 per cent in the services domain). This proportion is even superior when considering some particular knowledge intensive services, such as telecommunication and computer-related activities, which are more technological-based.

Capability failures are more or less generic and may not be services specific, though different firms' lacks to approach and to manage innovation processes depends mostly on the sector analysed. When technological changes are taking place, systems tend to avoid taking the necessary measures to adapt to new circumstances, so that government intervention is required to support structural adaptation of innovation systems (Gustafsson and Autio, 2006). As the individual development potential of a firm is a crucial point at this stage, service organizations may be more limited with respect to the manufacturing industry as regards of their innovation horizon, since small enterprises are more predominant in the services domain. The smaller size of those firms is another effect of the protection of national markets which impedes in many occasions the growth of firms. In most service markets do exist a high number of SMEs surprisingly together with a high level of concentration. In this respect, the wider system should be designed in such a way as to reduce these typical capability failures, and policy actions launched from public

administration to promote innovation activities within the different economic agents should take into consideration the services industry, in particular those more technological-related activities.

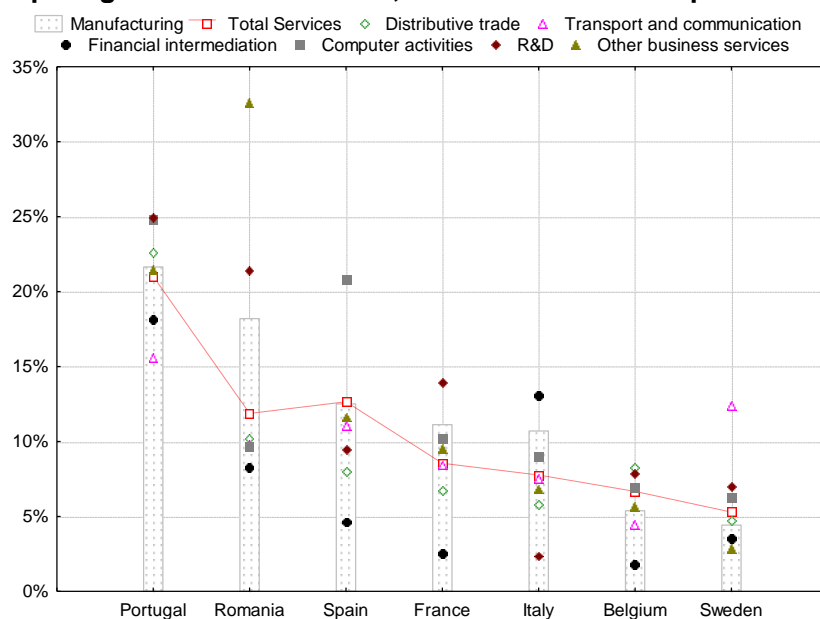
F. Network failures

Market interactions persist through time and involve inter-firm cooperation in the development and design of products (Smith, 2000). Formal and informal networks are important routes for the transfer of knowledge and the resulting interactions from a particular innovation system, including firms, research centres, public institutions and specialized knowledge-based organizations, is a key aspect for the successful performance of the innovation processes. Technological accumulation and non-technological advances are increasingly more experience-based, since communication as well as technology transfer takes place primarily via inter-personal relationships (Carlsson and Jacobsson, 2007). This fact is particularly significant for service innovation processes where tacit knowledge and intangible developments are even more relevant than in the industry sector.

Thus, network failures relate to the interactions among actors in the innovation system (O'Doherty and Arnold, 2003) and illustrate how the innovation system as a whole might not have adapted well enough to the increased role played by service firms in general and their (potential) role in R&D and innovation developments. According to Porter (1990) a well-functioning innovation system rests on strongly positive and reciprocal external economies which tie together users, suppliers, competitors and related firms, but networks may face up different obstacles hampering the formation of resulting successful interactions that leads to the emergence of potential system failures. Such failures may be either 'weak' – firms are not well connected to other firms with an overlapping technological base – or 'strong', when individual firms are guided by other network actors in the wrong direction and/or fail to supply each other with the required knowledge (Carlsson and Jacobsson, 2007). As regards of Woolthius et al. (2005), these strong network failures may be divided in: i) Myopia due to internal orientation: parties mainly focus on themselves and on what they do well, so that insufficient attention is paid to developments outside; ii) Lack of weak ties: there exist a too strong internal orientation among the network members, so that linkages with external parties are rare; and iii) Dependence on dominant partners: referring to the inability of network partners to switch to alternative partners or ways of doing things.

As regards of the weak network failure, Figure 3.5 shows that this may not be only applying to manufacturing sector, but also to services industry, particularly to those more knowledge-based activities such as computer and research and development services. Differences occur depending on the European country analysed. Thus, whereas in Portugal more than 20 per cent of both manufacturing and service firms suggest problems to find cooperation partners for innovation, this share is reduced to about 5 per cent in the case of Swedish organizations. This could reflect simultaneously different problems: On one side, a cultural problem of lack of trust and the "overconfidence" or an "I do not need others" culture; On the other side, probably the Swedish R&D structure is more flexible and incorporate more rapidly new technological trends in its public R&D system which converts them in good potential cooperation partners.

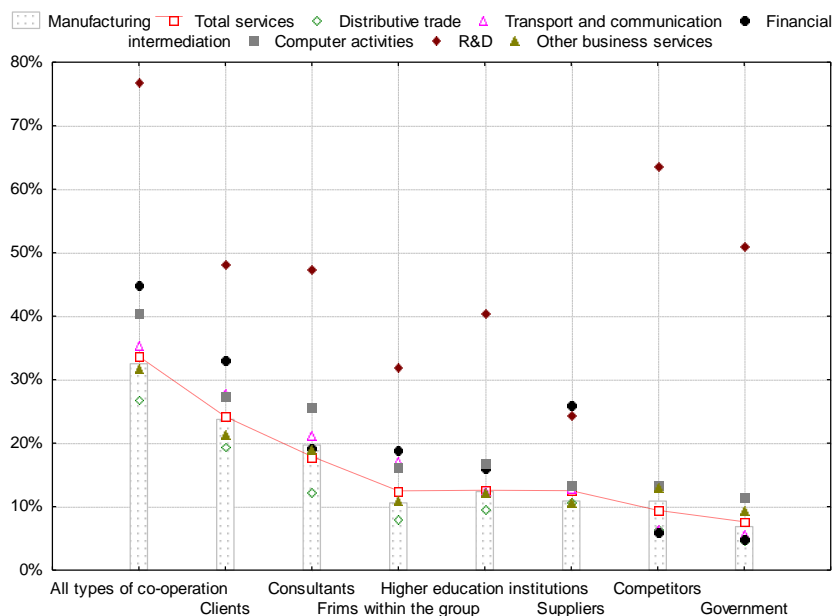
Figure 3.5 Difficulty in finding cooperation partners for innovation as high important factor of hampering innovation activities, % of innovative enterprises



Source: Based on the Eurostat database, CIS4.

National differences are also to be considered between manufacturing and services enterprises. In this respect, in countries such as Romania, France and Italy, difficulty in finding cooperation partners for innovation in manufacturing sector is considered to be more relevant than in service activities as a whole. On the other hand, service firms from Spain, Belgium and Sweden put a superior emphasis on this issue as an important factor hampering innovation, in comparison to results obtained from manufacturing enterprises. Particular cooperation difficulties for firms to innovate are found in Romania for R&D and other business services, in Spain for computer related activities, in Italy for financial intermediation, and in Sweden for distributive trade services, what leads to consider differences on legal, regulatory and institutional aspects among different industries at a national extent which may be influencing such patterns.

In general, manufacturing and services activities make use of cooperation partnership for innovation approximately at a same extent. However, as observed in Figure 3.6, service firms make a superior use of firms within the group and competitors in order to increase their innovation performance and potential, whereas manufacturing enterprises tend to collaborate to a larger extent with clients, private consultants and higher education institutions. In this respect, some particular knowledge intensive service activities show higher levels of cooperation with different economic agents to pursue their innovation objectives than those reported by the manufacturing industry. This is particularly the case of the research and development activities (and to a lower extent of computer-related services) where more than 75 per cent of firms within this sector apply for some type of cooperation for innovation, more than doubling the respective share in the manufacturing industry. Differences between R&D services and manufacturing are particularly relevant when considering cooperation levels for innovation with higher education institutions and other public research institutes depending on the respective national governments.

Figure 3.6 Types of cooperation for innovation, % of innovative enterprises

Source: Based on the Eurostat database, CIS4.

Note: Data refer to the average value for Belgium, Czech Republic, Spain, France, Italy, Lithuania, Hungary, Poland, Portugal, Romania, Slovakia and Sweden.

Therefore, if any policy action is considered by the different public authorities to support and to favour major cooperation relationships among manufacturing activities to promote their innovation potentials, the same arguments should apply to services sector, particularly to those more technological-related, since empirical evidence also denotes a significant share of service organizations developing cooperation actions for innovation.

G. Institutional failures

Institutional failures relate to the fact that effective innovation depends partly upon regulatory frameworks, health and safety rules, and so on, as well as other background conditions, such as the sophistication of consumer demand, wider culture and social values (O'Doherty and Arnold, 2003). Therefore, under this label various failures are hidden that are real for quite a few innovative service firms and industries such as: All sorts of regulations that do not provide the right incentives for innovation in services (trade policies, spatial planning, environmental regulation, market regulation, etc.); Consumers who are not prepared to pay for innovative services; Particular failures and legal and financial obstacles hampering entrepreneurship and dynamism, mainly affecting SME.

As regards of the above examples, institutional failures may be divided, following Carlsson and Jacobsson (2007) criteria, into hard- and soft-ones. Those considered hard institutional failures refer mostly to labour laws, regulatory framework, health and management rules, legal contractual system, and intellectual property rights (IPR), among others. Figure 3.7 shows an example of the way in which the regulatory framework of the different European countries may be influencing the innovative performance of firms. The plot below suggests that a higher level of product market regulation conditions for firms leads to a lower proportion on innovative enterprises within the economy. The variables are significantly correlated, both for services and manufacturing industry, which may be pointing out that a certain trend in this sense may occur. However, the correlations do not lead to obvious statements, since these are affected by outlier cases as in the case of Poland. Further, an important number of factors may be influencing the share of innovative firms included in the different countries. These facts prevent us to conclude in any sense, although rigid

regulatory frameworks may lead to a reduction of the level of organizations engaging in innovation processes, particularly in the services case as observed in the figures, which would generate adverse conditions for the respective national innovation systems.

Figure 3.7 Product market regulation²³ affecting innovation standards in Europe

Source: Based on CIS4 and Nicoletti et al. (2000).

Source: Based on CIS4 and

Nicoletti et al. (2000).

Note: Correlation factor: $r = -0.5182$; $p = 0.0276$. Note: Correlation factor: $r = -0.4906$; $p = 0.0387$.

On the other hand, by soft institutional failures we may understand social and cultural values, implicit business interaction patterns or political, cultural and institutional non-written conducts which have evolved spontaneously along with the system dynamic. These could be defined as failures to (re)configure institutions so that they work effectively within the innovation system. In relation deficiencies applied to services innovation we could mention: Government purchasing policies that do not challenge service firms (innovation is quite often not rewarded) or tax credit schemes that discriminate against service innovation.

The lack of finance from sources outside the enterprise is considered here as a *proxy* indicator, since this is particularly relevant in the case of service firms as for instance the credit system does not always value the intangible innovation assets of service companies. As regards of Figure 3.8, services sector as a whole reports lower levels of hampered innovation activity as result of a lack of finance from sources outside the enterprise in comparison to manufacturing industry. However, some knowledge intensive services, mostly R&D and computer-related sectors, regard the lack of finance as a relevant hampering innovation factor to a higher extent than manufacturing enterprises.

²³ Data on product market regulation refer to an overall indicator that includes information on: state control; barriers to entrepreneurship; barriers to trade and investment; economic regulation; and administrative regulation (Nicoletti et al, 2000).

Figure 3.8 Lack of finance outside the enterprise for innovation, % of innovative enterprises

Source: Based on the Eurostat database, CIS4.

This, as previously stated, may be the result of a lack of valuation of intangible assets on innovation activity in service firms. Such assets are quite often not registered in the businesses' accountancy (Green et al., 2001). Despite the present efforts (Zambon et al., 2003) towards the accounting acknowledgement of intangible assets, the current credit system penalizes those activities of uncertain risk based on intangible assets, which are often considered as expenses and not as investments. Therefore, the institutional set-up of an innovation system might lag considerably behind economic reality. Swift institutional adaptation can help considerably in laying the foundations for and facilitating much better services and hence services R&D and innovation. Policy actions developed for solving detected institutional failures within the innovation system should take into consideration a services approach.

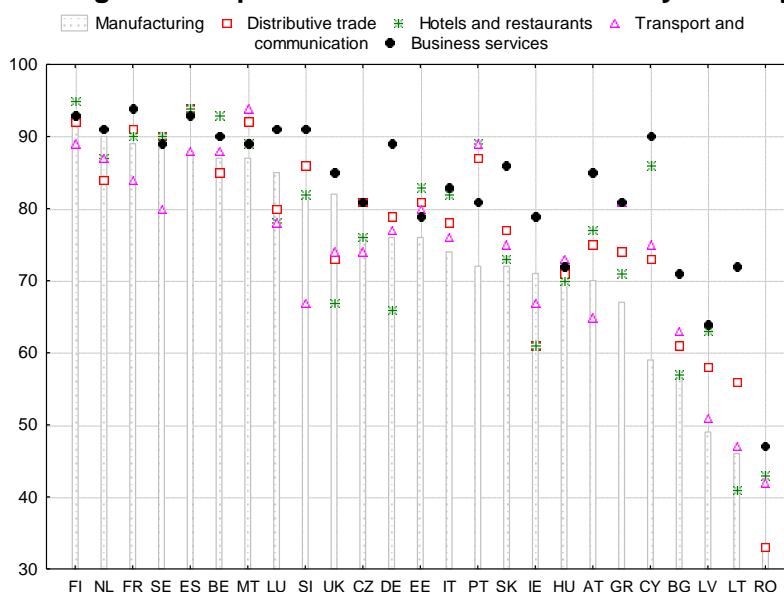
H. Infrastructural failures

The successful performance of innovation processes within an economy also relies to a certain extent on its infrastructural facilities. These are characterized by including very large scale, indivisibilities, and very long time horizons of operation, so they may lead to major problems for private firms to invest in them, since they are very unlikely to produce adequate returns within the context of standard ROI investment appraisal techniques (Smith, 2000). In this respect, and according to previous literature, we divide these infrastructural failures into science-technology- and physical- infrastructural failures.

On the one hand, the former refer to failures comprising deficient attributes to the generation and diffusion of knowledge by universities, publicly-supported technical institutes, regulatory agencies, libraries and databanks, or even government ministries (Smith, 2000). Systemic failures that may be applying most clearly to the services case could include: public knowledge infrastructure that primarily caters for the needs of manufacturing firms; lack of an appropriate system for knowledge management and structural capital the lack of innovation; management courses that are biased towards manufacturing and statistics that do not record services and service innovations properly; or an industry-science relations (ISR) debate that is strongly biased towards high tech industries, but pays hardly any attention to the role of ISRs between the science base and services.

On the other hand, with the term physical infrastructures we are referring to means of energy and knowledge communication, such as broadband or ICT resources, and transport aspects such as adequate railways, roads and air facilities. As suggested by Woolthius et al. (2005) knowledge and high-quality ICT infrastructures are of great importance in the field of innovation, since for companies to succeed, they need a reliable infrastructure to enable their everyday operations and support their long-term developments. Previous literature has already emphasized on the relevance of information and communication technologies as key means in the development of innovation processes in service sector (i.e. Gago and Rubalcaba, 2007).

Figure 3.9 Percentage of enterprises with broadband access by industry sector



Source: Based on the Eurostat database, Information society statistics.

Empirical evidence on this issue has been approached through firms' penetration rate of internet broadband²⁴. As observed in Figure 3.9, this is superior on average for service enterprises in comparison to manufacturing organizations in Europe. This higher service firms' broadband access is mostly remarkable in the case of business service enterprises, since this sector includes some of the major user sectors of ICT in the economy, as computer-related and research and development activities. Policy actors in the respective European regions should take this factor into consideration since a low level of broadband penetration may lead to productive lacks and comparative economic disadvantages among the different member states. In this respect, there are a number of European countries whose innovation potential may be reduced as a consequence of their relative firms' lower level of broadband access. This is particularly the case of some eastern regions such as Bulgaria, Latvia, Lithuania and Romania.

3.3 Policies and policy intervention in Member States

From a contextual perspective, since services represent around 70% of more advanced economies, innovation in this sector will be a key factor for economic growth. Services innovation is a stimulant for innovation generally and for investment in intangibles and knowledge, and the promotion of new instruments of business support beyond the R&D-input approach seems to be required. Services sector innovation may be also negatively

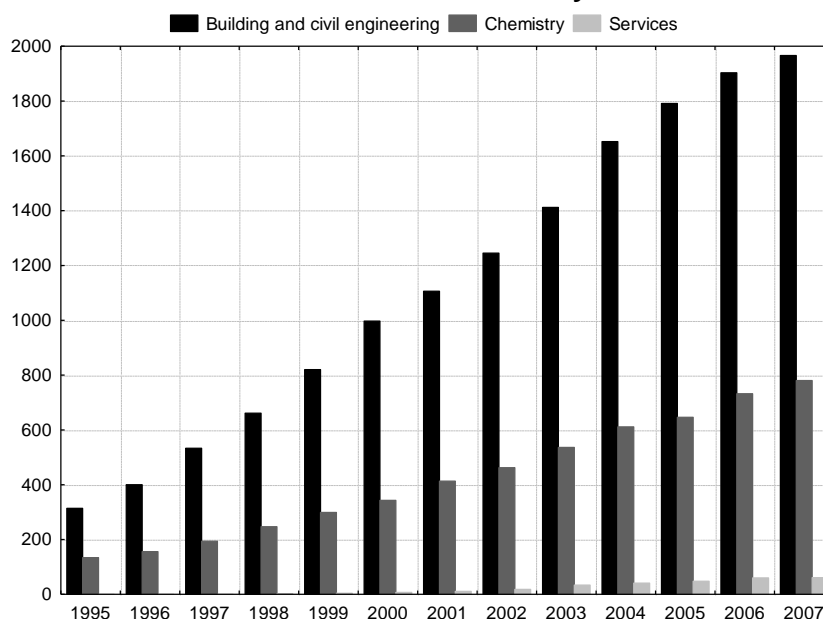
²⁴ Although we refer to this indicator due to accurate data availability on this issue, this is just one of the infrastructure factors to take into consideration, and major attention should be paid to technology centres, universities and other R&D facilities.

affected by its under-representation in public funding R&D programmes, which mostly focus on technological developments. Moreover, the recent trends to deregulate and liberalize many service sectors and to relocate services to lower-cost countries require that many businesses in advanced countries try to find new competitive strategies based on innovation.

The still rather slow recognition of the pivotal role played by service functions and service innovation in the economic growth process, the dominance of market failure argumentation in the development of innovation policies, and the hesitance to adopt the notion of systemic failures and apply these to the role of services in innovation systems, are some key factors that may be hampering the recognition and inclusion of service activities within the different member states and European policies aimed at facilitating innovation. Nevertheless, this section has included a range of theoretical and empirical evidence that proves that the rationale behind service innovation policies should be at least as strong as the one for goods-manufacturing innovation policies. Services deserve to be covered within the national science and technological systems as a key approach that may enhance competitiveness and growth in Europe. Possible policy areas for action in this respect will be discussed through the following paragraphs.

3.3.1 Standardization in services industry

Standardisation aims at contributing in support of innovation, competitiveness and growth in the economy, and attempts to favour competition on the basis of economic agents' agreements mainly on quality test methods and on requirements for safety, health, organisational and environmental performance. This trend for standardisation is mostly developed within the manufacturing industry where products are more likely to specify as result of their more physical nature. In this respect, the Forum on business-related services states that the number of voluntary European standards available for services is extremely low compared to the sector's huge contribution to the Union's economy. The intangible nature of services and the high level of heterogeneity among the different service activities have resulted in a still limited number of standards within the services sector. This fact may be observed in Figure 3.10, since the number of normative documents – including Commission mandates, EU Directives and other documents related to the work of the different technical and project committees – for approaching standardisation to production agents is very reduced regarding the services sector when compared to other main industries in the economy. The predominant presence of SMEs in the services domain leads to major obstacles for firms to reach a determined range of required standards. Further, in their large majority these service firms refer to small enterprises that do not belong to representative organisations in their country and this is also reflected at European level where the category is not well represented in any European organisations.

Figure 3.10 Available normative documents²⁵ sorted by sector²⁶

Source: Based on CEN quarterly statistics.

As regards of the market failures argumentation, standardisation of products and processes leads to a reduction of asymmetric information, for the benefit of both provider and user, in a market that lacks transparency, which as already mentioned may favour innovation activities since more-informed parties tend to be more trustful to possible economic interactions. Standards have the advantage of providing a higher understanding between suppliers and customers, thus avoiding misunderstandings, can act as a guarantee of the quality being supplied, reduce the time spent explaining what is on offer, strengthen negotiating positions, and increase competition between suppliers, while allowing an augment comparison of prices and services (Rubalcaba and Kox, 2007). Standards can also encourage innovation if they are set at a demanding level of functionality without specifying which solution must be followed, hence opening the door for innovation (Georghiou, 2006). Therefore, as recently recognised by the European Economic and Social Committee (2008), the market for services stands to gain immensely from clear standards in this area, and the development of standards can be useful to: i) Supplement or even substitute regulation; ii) Improve quality and stimulate competition; iii) Ensure comparability when a user is faced by, and needs to decide on, different offers; iv) Bring to a wider consensus the fruits of R&D and innovation programmes, thus encouraging innovation to upgrade service quality; v) Reduce the number of disputes and social conflicts by clarification of rights and obligations between service providers, users and workers in the sector; vi) Facilitation of some scale economies by small companies providing similar services in different EU member states thus leading the way to reduce obstacles for market integration; and vii) Develop a healthy export sector and assisting in public service tenders and sub-contracting of services.

In words of the European Commission (2008), standardization, usually bringing predictability and a level playing field, may be intuitively perceived as conflicting with innovation, which strives for change and exclusivity. However, as confirmed by the

²⁵ Normative documents excluding amendments.

²⁶ We refer to services as considered by the European Committee for Standardisation (CEN), although other service sub-sectors such as transport and packaging and health care present on their own a significant number of published documents.

stakeholder consultation, dynamic standardization is an important enabler of innovation. This occurs in different ways:

- Standards that express the state of the art give innovators a level playing field facilitating interoperability and competition between new and already existing products, services and processes. Standards provide customers with trust in the safety and performance of new products and allow differentiation of products through reference to standardized methods;
- The development of new standards is also necessary to accompany the emergence of new markets and the introduction of complex systems, such as the expansion of the Internet;
- The use of standards contributes to diffusing knowledge and facilitating the application of technology; this may then trigger innovation, in particular non-technological innovation in the service sector.

The Directive on Services (2006/123) recognises the role of standardization in the creation of an Internal Market for services, and points out the relevance of information on the meaning of quality labels and other distinctive marks relating to these services to be easily accessible as a way to increase transparency and promote assessments based on comparable criteria with regard to the quality of the services offered and supplied to recipients. The European Commission has issued formal mandates to the European standards organizations to identify priority areas where standardisation of services would be most useful. In this respect, it supports service standardization by requesting to the European Committee for Standardisation (CEN) to develop specific standards or to propose a standardization programme. As suggested by the CEN, standardization within services activities is increasingly being used to promote best practices, to spread knowledge throughout the market, and to set benchmarks against which businesses can measure the quality and performance of their own services or the services they are purchasing, thus improving competitiveness and increasing efficiency. Standardization developments in the services sector domain have included postal services, tourism, translation services, real estate services, business support services, management consultancy, and facility management, among others. Further, the initiatives at the European level are focused on banking and transport services, like requirements on multimodal tracking and tracing systems, and issues around data exchange and protection, like evaluation criteria for IT security (Blind, 2003).

Additionally, the Final Report on 'Standardisation and the Service Sectors – An explorative study' conducted by Knut Blind for the European Commission identifies five different general categories of service standards, on the basis of previous academic contributions²⁷ and results from observed evidence. Here, we include some main conclusions extracted from such approach and consider key policy recommendations and instruments on services standardisation (see Table 3.4), which may increase the competitiveness of the whole European service sector:

- Most used categories of European and international standards are related to quality management, whereas standards for environmental management and those related to data flow and security are also significantly applied by service firms.
- Further standardisation efforts should be focused on data security, environmental and health and safety management; although in many areas the service companies still apply company-specific solutions.
- The direct impact of formal standards on the success of service companies is rather moderate in comparison to other factors such as the service quality or the customer relationship.

²⁷ For an approach to a services standardisation classification, see Appendix I based on by de Vries (2001).

- The application of formal standards in service firms are of major importance, since they have a very positive influence on the service quality.
- Influence on standardisation seems to be necessary for service firms, although the lack of human and financial resources is an important factor that hampers standardisation processes.

Table 3.4 Policy recommendations from standardisation rationale in services sector

<i>Service firms dimensions</i>	<i>Specifications</i>	<i>Policy targets</i>	<i>Possible policy instruments under debate</i>
Large vs. Small and medium-sized companies	<ul style="list-style-type: none"> - Larger firms are more involved in the fight of standard setting while smaller firms are users of those standards - SMEs are significantly less involved in standardisation activities due to a lack of financial and human resources - Predominance of SMEs in services sector 	<ul style="list-style-type: none"> - Support for the involvement of SMEs in standardisation and increase of use of standards 	<ul style="list-style-type: none"> - Improvement of financial and human resources, enabling them to join standardisation processes - Establishment of forums in order to gather their preferences - Subsidies for the purchase of standards especially for SMEs
Innovative vs. Non-innovative companies	<ul style="list-style-type: none"> - Innovative service firms place a higher importance on most of standardisation-related service aspects - Innovative service firms assess the relationship between standards and innovative capability as more positively related 	<ul style="list-style-type: none"> - Support for the involvement of innovative enterprises in standardisation in order to foster their input into on-going standardisation processes - Support for the initiation of new standardisation processes in areas of importance for innovative companies, because this supports the wide diffusion of new ideas and best practices 	<ul style="list-style-type: none"> - Improvement of financial and human resources, enabling them to join standardisation processes - Establishment of forums in order to gather their preferences - Creation of additional incentives (e.g. licensing schemes) to attract innovative companies and to integrate their original ideas in new service standards
Exporting vs. Non-exporting companies	<ul style="list-style-type: none"> - Exporting companies in general place a higher value on most standards categories related to service and thus make more use of European and international standards 	<ul style="list-style-type: none"> - Stabilisation of the involvement of exporting enterprises in national standardisation processes – often the prerequisite for an involvement at the European or international level – in order to integrate their preferences related to the requirements in foreign markets - Initiation of European and international standardisation activities in service areas with a high export potential, which 	<ul style="list-style-type: none"> - Improvement of financial and human resources enabling them to join standardisation processes - Establishment of forums in order to gather the requirements of the relevant export markets.

supports the completion of the Single
Market

Source: Based on Blind (2003).

3.3.2 Services firms in innovation programs

Existing policy approaches and rationales for policy intervention are mostly less well developed and attuned to service industries and service innovation. Here, based on existing statistical evidence, we analyze to what extent this may be translated in a bias against service firms in government support to innovative firms in the EU. The European community innovation surveys (CIS) allow us to analyse the importance of public funding in innovative firms at sectoral level²⁸. Horizontal criteria for supporting innovation would lead to similar rates of public funding in different economic sectors. However, recent evidence shows clear biases for funding towards manufacturing companies. Both according to CIS3 and CIS4²⁹, funding reaches a higher percentage of innovative companies in manufacturing compared to service industries.³⁰

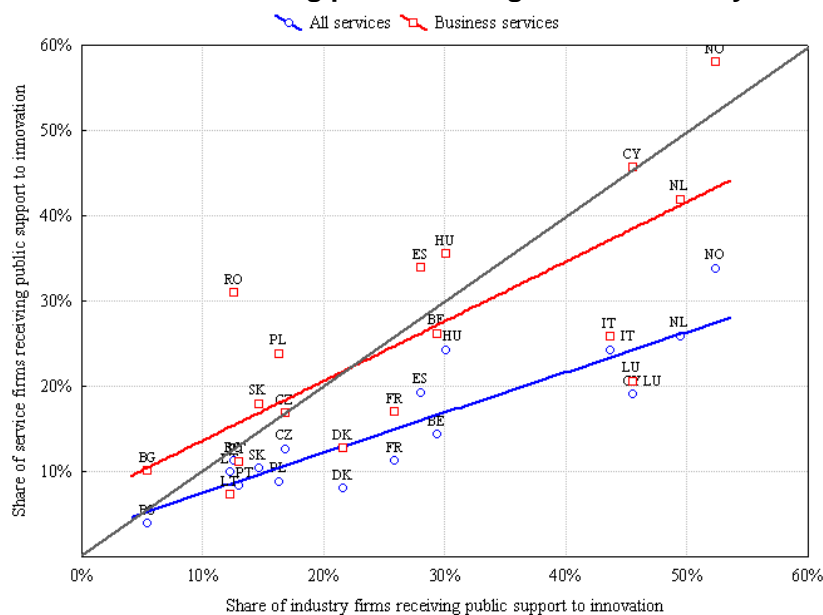
On average 28 per cent of innovative manufacturing companies versus 16 per cent of service companies receive public funding. This funding bias against services can be observed at all different levels at which innovation policies are being used: funding of manufacturing firms is almost twice as high as for services firms (in terms of shares of innovative companies receiving public support). The public funding bias against services is a preliminary conclusion which does not apply to the same extent to all cases, all countries and all subsectors. Some countries, some Eastern European countries in particular, where differences between manufacturing and services are less important than in some innovative countries such as Norway, France or Denmark, where the bias is much more remarkable. This may be explained by the role of some business services such as consultancy services or engineering in getting public funding. In a context where public funding schemes are under-developed, these services take a relative more important share of total funding budget than in countries where public funding is more robust. Put differently: where funding is very limited, consultancy and engineering firms are relatively better able to benefit from public funding for innovation. Another explanation might be that in these countries innovations systems – including innovation instruments and programmes – have been developed from scratch mostly rather recent and they suffer less from a traditional association of innovation with manufacturing.

However, business services represent a very dynamic sector that receives important funds in all countries. In some countries the share of business services firms receiving public funding is higher than for their manufacturing counterparts. Figure 3.11 shows the significant bias in public funding against the whole set of services, but this bias is not true in the case of business services. Typical service industries with lower shares of public funding for innovation are distributive trade companies, transport, and finance sectors. Regarding the type of innovation funding it is possible to observe some differences and find less unbalance shares in the EU distribution of funding as previously observed by RENESER (2006) for CIS3 and van Cruysen and Hollanders (2008) for CIS4 data. This can be mainly explained by the active role of KIBS in getting EU public funding.

²⁸ Unfortunately official statistics do hardly record service innovation within manufacturing firms, so this is a limitation of this analysis. Therefore we will have to stick for the moment to the sectoral categories in current statistics and focus on service industries.

²⁹ CIS3 and CIS 4 are not fully comparable, since for example, the definition on innovative firm is different. In CIS3 the manufacturing/technology biased criterion is very strong while in CIS4 non-technological innovation such as marketing and organisational innovation are recognised. Anyway, the variables related to public funding are quite similar and allows for some comparative analysis.

³⁰ This bias in public funding against services is more important than the differences in terms of shares of innovative firms. On the latter, differences between manufacturing and services are markedly lower, as can be noticed from table 2, which will be introduced later on. This suggests that the possible discrimination against services is not due to the fact that services companies are less innovative.

Figure 3.11 Share of firms receiving public funding to innovation by economic sector

Source: Based on Eurostat database, CIS4.

The heterogeneity of services regarding public support may be approached through the use of Table 3.5. It represents a distinctiveness coefficient, where different service branches are benchmarked with respect to the total of manufacturing industries. Figures are given for policy-related variables that are chosen among the set of possible CIS4 indicators. The percentage of innovative enterprises is interesting in order to promote policies to spread and to disseminate innovative behaviour and attitudes among the business society. In this case, business services and financial services show high shares of innovative companies, unlike distributive trade and transport services. Concerning intramural and extramural ratios, business services use more both R&D categories than other services branches, except financial services which contract quite a lot of extramural. In R&D only business and financial services offer similar or higher shares of companies than manufacturing, while other services stand lower shares, in line with previous studies about the role of R&D in services (Miles, 2005a; RENESER, 2006).

Concerning impacts, it is clear that innovation in service industries promotes less costs-related impacts compared to innovation in manufacturing industries, while the impacts related to the capacity to respond to customer needs is higher in service industries. In quality impacts the situation is more balanced among sectors. This suggests that the orientation of particular R&D and innovation funding should take account of the different expected impacts that such funding can expect from. Possible specific approaches may follow, even if overall problems for innovation are the same in goods and in services (Similar balance is obtained on the obstacles perceived for innovations). In other words, evidence on impact suggests that policies should not just take care of the volume of public spending addressed to services but on the public programs design, which may be in need of some customization to the particular features of service innovation impacts.

Differences are important in other policy-related variables such as the protection systems. As expected, patents are much more important in manufacturing than in services, while regarding the copyright system the opposite applies. IPR may be underdeveloped in services or/and services require another type of approach for protection of results. In any case, all this empirical evidence should be considered when the formulation of policy implications is envisaged. On the one hand possible biases should be identified in order to

assess explicit or implicit discrimination against services innovation in terms of total distribution of public funding and discuss rationale behind these biases. On the other hand, attention should be paid to the qualitative design of innovation policies; the problem is surely more qualitative than quantitative. The appropriate policy mix might be different for different industries i.e. innovation policies – at least to some extent – need to be customized, even within service branches.

Table 3.5 Distinctiveness coefficient in some key policy related indicators: services versus goods, Europe-16

	<i>Total goods industries</i>	<i>Manufacturing</i>	<i>Total services</i>	<i>Distributive trades</i>	<i>Transport and communications</i>	<i>Financial services</i>	<i>Business services</i>
% of innovative firms	1.00	1.004	0.773	0.699	0.625	1.204	1.070
Intramural R&D	1.00	1.060	0.791	0.601	0.627	0.815	1.213
Extramural R&D	1.00	1.017	0.964	0.932	0.873	1.142	1.112
Impacts on costs	1.00	1.005	0.677	0.656	0.841	0.888	0.576
Impacts on quality	1.00	1.010	1.033	0.907	1.063	1.118	1.170
Impacts on respond time	1.00	1.007	1.227	1.250	1.330	1.307	1.113
Patents	1.00	1.033	0.517	0.575	0.254	0.125	0.825
Copyright	1.00	1.014	1.598	1.065	0.531	0.764	3.632
Obstacles	1.00	1.005	0.901	0.878	0.799	1.004	0.989
Total public funding	1.00	1.005	0.574	0.470	0.463	0.239	0.944

Note: Europe-16 refers to Belgium, Czech Republic, Denmark, Spain, France, Italy, Cyprus, Lithuania, Luxembourg, Hungary, Netherlands, Poland, Portugal, Romania, Slovakia and Norway.

Note: In boxes those coefficient for which service stand 20% below or above the total goods average.

Source: CIS4 database, Eurostat.

The bias towards the manufacturing sector when compared to services (excluding KIBS) in receiving EU support may be related to the fact that there is already a well developed EU common market for goods, and consequently manufacturing firms have access to larger markets and can make use of economies of scale to recover investments in innovation. The lack of scale in the services sector in general, and the difficulties faced to develop a common European services market may explain the sectors' differences in support at EU level. In summary, there may be a need to re-orientate innovation support programs more towards the needs of service sector companies, paying particular attention to the non-technological nature of some innovation activities and results, which are more difficult to assess, and the general reduced size of firms in the services sector. This applies equally to EU programs which can also then influence national and regional programs, and may also play a role in fostering a common market in services.

3.3.3 Policy areas related to market and systemic failures

A previous section has dealt with the market failure argumentation which – at least formally – is still dominant in most administrations. As stated in a previous contribution (den Hertog, 2008), among innovation policy-makers, there is a received wisdom that services perform

less technological R&D. This is a main argument used for not to open up to R&D and innovation policies that are more suited to service innovators. However, there is a range of service firms, in particular knowledge-intensive business services, that do invest in technological R&D and innovation and these need at least be treated in a similar vein as their peers in manufacturing; this is to say, market failure argumentation is as relevant in the services domain as it is in manufacturing industries. Further, innovation in some services is less technological-related and more difficult to assess, but it also should be considered as real as investments in other more technological-related activities.

In this respect, and despite the existence of differences among countries, some knowledge intensive services such as post and telecommunications or computer-related activities may be at least as negatively affected to accomplish their innovation processes as result of market power failure compared to their counterparts in the manufacturing sector. As already stated, the lack of competition may lead to inertia in terms of innovation activity, and therefore, to a diminution of potential business investments on this subject. This can apply both to goods and to services. Further, we also evidenced a large market share concentration by large firms in services activities – or in parts of the service market (dual markets) – that may suggest competition issues among service firms are not too different to other industrial sector, although high differences among service activities do exist.

As regards of the externalities market failure, when societal returns to innovations exceed the private returns, we have checked out how service and manufacturing sectors make use of IPR protection methods. Services as a whole are major users in the economy of copyright registrations, although they apply to a lesser extent than manufacturing firms for patents, industrial design copyrights and trademarks methods. Although this fact may suggest a lack of adaptation of current IPR system to services needs, some knowledge intensive services, such as computer-related and R&D activities, also denote high levels of knowledge protection methods utilization even above those reached by manufacturing firms. On the other hand, information asymmetry also has a negative impact on innovation activity as less-informed parties tend to avoid risk by reducing exposure, and it is particularly important in the services case. Empirical data on this subject point out differences depending on the sort of lack of information analyzed and the number of activities included. In this respect, whereas manufacturing activities seem to be more affected by a lack of information on markets, business services, for instance, consider uncertain demand for innovative products a more significant hampering factor for innovation than the rest of activities do.

When investments in non-technological R&D and innovation are made – which are strongly associated (but not exclusively we would say) with service industries – the different categories of market failure might apply as well to all service industries and indeed manufacturing (although not in a similar fashion in). Whether or not the intervention argument for technological innovation also applies to non-technological innovations³¹ – i.e. market failure – depends according to van Ark et al. (2003) on two questions: (i) Whether or not a (long and hence expensive) learning process precedes the non-technological innovation; (ii) Whether or not other firms can easily use or copy the non-technological innovation; in other words, are there knowledge spillovers? They argue that non-technological innovations may require extensive learning processes for individual firms (hence considerable investments) while future returns are uncertain. They indicate that non-technological innovations come about as a learning (by doing) process, and are not

³¹ The discussion on the applicability of this type of argumentation for supporting non-technological innovations included here is taken from den Hertog et al. (2008) and published first in the International Journal of Services Technology and Management and reproduced here with the permission from Inderscience.

easily implemented and transferred. For example, a study by Kox (2002) showed that firms in the business service industry are quite often strongly dependent on inherent tacit skills of key employees in the firm. Such tacit skills take much time to acquire and cannot be easily transferred to other employees in the firm. As the lead-time to obtain the returns from investment in skills can be quite long and the future returns themselves are quite uncertain, firms may be supported to make such investments nevertheless.

Van Ark et al. (2003) indicate that they find it harder to assess whether knowledge spillovers are present regarding non-technological innovation. This depends for example on the type of non-technological innovations, whether these are internally focussed or not and how easily they can be observed from the outside. Put differently, how easily and at what costs can non-technological innovations be copied by other firms. Typically new marketing concepts are directly visible and can easily be copied. New organisational types of innovation also easily transfer between firms as employees move between firms, and when firms co-operate in networks or within value chains. Van Ark et al (2003) also observe that: "...However, non-technological innovations are also strongly correlated to each other. Hence when one type of non-technological innovation is easily imitated, it implies changes in other innovations as well. Still imitating firms can perhaps find a way to implement such additional changes at lower costs than the originally innovation firm, although adaptation to the specific firm-culture may still be costly. In any case the original innovating firm may refrain from engaging in non-technological innovations when the social returns of these innovations are much higher than the private returns.

On this basis, non-technological innovations may become the subject of government intervention, e.g. by assisting in the adjustment of the organisational structures when private incentives are lacking." They conclude that if long and costly learning processes are, in practice, mostly combined with relative easy imitation (at least the costs of making the 'stolen innovation' work should be considerably lower as there is also the lead-time and possibly a reputation advantage for the innovator) it would most likely result in economy-wide underinvestment in service R&D and innovation. This would make it more logical to consider a R&D and innovation policy that more explicitly pays attention to services R&D and innovation.³² At least we may conclude that - although more academic and policy research is needed on market failures in service industries - it cannot be taken for granted that market failure is perceived to exclusively apply to technological R&D and innovation and not to non-technological R&D and innovation. In practice, the two are more interlinked and hard to separate.

Additionally, in this section we have looked beyond the market failure argument and tried to approach a wider view on service innovation by analyzing possible systemic failures applying to services. In this respect, we have checked out that capability and network failures, for instance, are present in the services innovation field. These system deficiencies seem to affect to knowledge intensive services (computer-related activities, telecommunications and R&D activities) to a higher level, although differences among countries can be observed. Service firms may not be capable of articulating their knowledge needs, and show, to a certain extent, a lack of right knowledge-inputs and cooperation patterns to generate, develop and accomplish their innovation processes. Moreover, we have included evidence on how strict regulatory frameworks may be affecting negatively the level of service firms engaging in innovation processes, and how the different credit systems may be under-financing some service activities due to a limitation in the valuation of intangible innovation assets. Again, some knowledge intensive services, mostly R&D and computer-related sectors, seem to be those more significantly affected by institutional failures. Finally, it is to consider that deficiencies in communication and

³² See van Dijk (2002), Lipsey and Carlaw (2002) and Navarro (2003) for more on these issues.

science-technological facilities also apply to services sector, and that particular relevance should be paid at this stage on TIC infrastructures as key elements in the development of innovation processes within this industry.

Table 3.6 Policy intervention measures by policy area

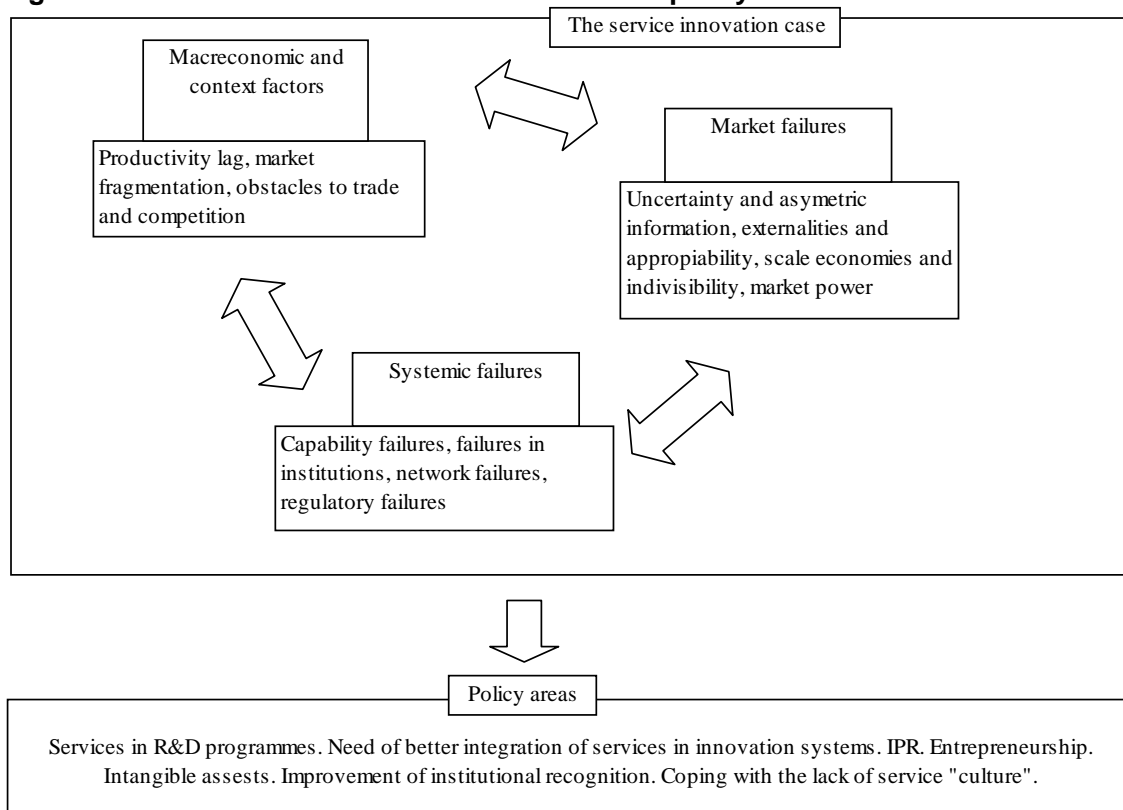
<i>Policy area</i>	<i>Policy intervention measures</i>
Intellectual property	<ul style="list-style-type: none"> - Developing strong IPR systems that take into consideration the effort realized by those service sub-sectors with an important R&D (technological) component. - Creating the necessary incentives for firms to make use of trademarks and build awareness through brand recognition and reputation.
Public procurement	<ul style="list-style-type: none"> - Building up an open, competitive and efficient public procurement mechanism, so that the development of new services may take place (e.g. e-education, e-health, etc.)
Qualified personnel	<ul style="list-style-type: none"> - Promoting new services skills, vocational training, and training on the job, with a clear mobility component - Favouring the development of more services-related competences and capacities
Access to public science	<ul style="list-style-type: none"> - Reorienting the bounds between public science and the rest of economic agents, particularly those knowledge intensive services - Supporting R&D in the public science sector that would result in intangible outputs with commercial application in the services sector - Enhancing possible interaction among economic actors
Start-ups	<ul style="list-style-type: none"> - Creating an attractive venture capita market - Increasing the access to available financing and supporting the formation of new innovative SMEs - Reducing the number of obstacles and regulations to start up a new firm - Undertaking a reduction of entry barriers for new firms with innovative offerings
Regulatory burden	<ul style="list-style-type: none"> - The creation of a European common market for services would be beneficial in terms of common regulation at sub-sector level - Limiting the range of rules that may be hampering cross border provision of services
Access to finance	<ul style="list-style-type: none"> - Ensuring an efficient and sound financial market with a certain level of homogenisation, transparency and supervisory systems in place

Source: van Cruysen and Hollanders (2008).

European Commission (2006) underlines that competitive markets should in principle, on their own, lead to the most efficient outcome in terms of R&D&I, although this may not always be the case in the field of R&D&I and government intervention might then improve the outcome. In this respect, empirical evidence indicates that public intervention to be efficient it must be accompanied by favourable framework conditions, such as adequate intellectual property right systems, a competitive environment with research and innovation friendly regulations and supportive financial markets. We have already discussed how policy actions in the fields of standardisation of service products and processes and of support for service innovation programmes may favour the development of innovation activities in services sector, and thus competitiveness and growth, in the European Union.

Additionally, we summarise other key policy areas that might be treated by public authorities in order to enhance innovation capabilities of services firms (Table 3.6).

Figure 3.12 Justification for a services innovation policy



Those most significant elements that justifies a rationale for service innovation policies, not only from the neoclassical point of view of market failures, but also from the contextual facts that reveal challenges from macro and political changes and the systemic or evolutionist approaches, are shown in Figure 3.12. Obviously, the three types of arguments are interrelated and each one cannot be understood in isolation. For example, asymmetric information creates a natural barrier explaining a share of competition deficit in many services markets with consequences in productivity and innovation; at an institutional level, these facts are not sufficiently recognised, and for this reason pro-innovative and pro-competitive actions are underdeveloped. Another example concerns the lack of recognition of intangible assets which is, at the same time, a market failure linked to the asymmetric information problem and a systemic problem linked to the functioning of financial and accounting systems. Between macroeconomic context-structural failures and the systemic failures there are obvious interrelations too. For example, regulatory framework obstacles affect both the micro and meso functions of the service innovation performance and the macro conditions hampering further service innovation development.

As already discussed innovation in services faces a range of market failures and systemic failures that are similar to those that occur in the manufacturing sector. Further, it seems that the influence of the respective market and systemic failures applies differently depending on the services sub-activity analysed; this is to say, depending on the self-nature of the activity. Both market and systemic failures that lead to under-investment in exploration and exploitation of innovation activities may be tried to be solved through the intervention of public authorities. Governments are key actors in promoting innovation activities and may adapt their policies to service activities features in order to boost their potential growth in the economy. In enhancing innovation and competitiveness,

governments should better recognize, create, and improve the current funding strategies and procedures for supporting R&D and innovation in services. Since many services are poorly integrated into the innovation system, efforts are required to stimulate universities, government laboratories, and industry associations to better understand and lease with services (Gallouj, 2002; Miles, 2005b). Developing policies to support services sector innovation may therefore require new approaches and programmes (Jaumotte and Pain, 2005; den Hertog et al., 2008). Next chapter 4 will tackle with those policy instruments that may be required to address and better conduct market and systemic failures applying to services sector as a whole and to specific types of activities in particular. Here, we just limit to present a summary of some main ideas resulted from the present analysis (Table 3.7) and some possible correction methods to address in a proper manner those both market and systemic failures occurred in services sector.

Table 3.7 Summary conclusions overview

<i>Typology</i>	<i>Description</i>	<i>Remarks</i>	<i>Empirical evidence</i>	<i>Examples of correction measures</i>
Market failures				
Market power	Lack of adequate market competition	<ul style="list-style-type: none"> - Dominant agents in highly standardized-manufacturing markets - Highly segmented service markets with specific knowledge leading firms 	<ul style="list-style-type: none"> - Failure applying to services industry at a lesser extent - Differences arise depending on the sector and country analysed - Some KIS (telecommunication and computer-related activities) face superior difficulties than manufacturing enterprises - Major market share concentration among large firms refers to manufacturing sector and some product-standardized services - At an individual level, large firms in client-specific services present large levels of market power - The market share gap between the average large firm and the average SME firm is particularly important within the services industry 	<ul style="list-style-type: none"> - Remove market barriers - Control mergers regulations, strategic firms' behaviours, competitive tendering - Supporting the formation and start-ups of new innovative SMEs - Pro-competition policies
Externalities and the public nature of knowledge	Reduced expected profits from innovation activity results	<ul style="list-style-type: none"> - Intangible nature of services innovation - Services limited use of patents and insufficient protection by copyright systems 	<ul style="list-style-type: none"> - Major utilization of IPR protection methods as a whole by manufacturing industries - Services claims for copyright protection at a higher extent - Some service innovative activities such as financial intermediation make a reduced use of protection methods - Some KIS such as R&D or computer-related activities are major users of the IPR system, even more than manufacturing firms 	<ul style="list-style-type: none"> - Facilitating resource allocation of knowledge production and diffusion - Reinforcement of the appropriability system in services

Asymmetric information and uncertainty	Information not equally distributed among economic agents	<ul style="list-style-type: none"> - The particular nature of services (intangibility, less tradability, etc.) may lead to major uncertain transactions 	<ul style="list-style-type: none"> - Manufacturing firms seem to be lightly more affected by lack of information than services sector as a whole - Uncertainty demand for innovative products affect mostly business services - Lack of information on technology is also an important factor for distributive trade and transport and communication services not to engage innovation activities 	<ul style="list-style-type: none"> - Seek for transparency in markets - Promote financing facilities by means of soft credits, grants, etc. - Public investment to reduce uncertainty problems
Scale economies	Innovation may require major efforts than competitive markets alone may generate or sustain	<ul style="list-style-type: none"> - Indivisibility of resources and larger efforts for innovation in manufacturing industry - Predominance of SMEs in services sector makes reaching a critical mass more difficult 	<ul style="list-style-type: none"> - The share of innovative manufacturing firms is larger than that of services sector as a whole 	<ul style="list-style-type: none"> - Measures launched to fulfil services specific requirements for innovation - SMEs oriented policies

Systemic failures

Typology	Description	Remarks	Empirical evidence	Examples of correction measures
Capability	Inability for firms to move from an old paradigm to new innovative approaches	<ul style="list-style-type: none"> - Predominance of SMEs may hamper adaptation to changes in markets, technological capacities or new organizational concepts 	<ul style="list-style-type: none"> - Lack of qualified personnel with the right knowledge and skills to accomplish innovation activities is of major relevance for those more technological-related services 	<ul style="list-style-type: none"> - Measures launched to fulfil services specific requirements for innovation - SMEs oriented policies
Network	Problems in the interaction	<ul style="list-style-type: none"> - Tacit knowledge and intangible 	<ul style="list-style-type: none"> - Difficulties in finding cooperation partners for innovation affect indistinctively both manufacturing and 	<ul style="list-style-type: none"> - Enabling collaborative schemes between both

	among economic agents	developments make interaction even harder to achieve	service firms - Knowledge-based services are those finding superior problems to engage in cooperation - Differences arise depending on the member state analyzed	research and industry and users and producers around emerging technological opportunities
Institutional	Effective innovation depends upon regulatory and legal aspects that may be hampering innovation efforts	- The intangible nature of services innovation may neglect its certain recognition within the institutional framework	- Rigid regulatory frameworks (hard institutional failure) may lead to a reduction in the innovation effort by service firms - Some particular KIS, mostly R&D and computer activities, may be affected by soft institutional failures to a higher extent than the manufacturing industry as a whole	- Institutional set-up of an innovation system more adapted to services sector - Public procurement incentives - Recognition of intangible innovation assets - Supporting the creation of a European common market for services - Ensuring an efficient and sound financial market
Infrastructural	Deficiencies related to physical and S&T facilities		- Services sector seems to depend on ICT infrastructures to a higher extent than manufacturing firms	- Investment in transport and communication facilities - Academic schemes more services-related - Science and technological parks - Establishment of university and research institute positions and laboratories in emerging technological fields - Creating new departments in universities or research centers

APPENDIX I. Typology of services standards

<i>Standards for: Entities or relations between entities</i>	<i>...may concern:</i>
Service organisation	Quality management, environmental management, occupational health and safety management. Solvency and other financial aspects. Crew, e.g., minimum number of staff and their educational level.
Service employee	Knowledge. Skills. Attitude. Ethical code (e.g., confidentiality).
Service delivery	Specification of activities. Trustworthiness. Privacy aspects. Safety aspects. Code of conduct.
Service result	Result specification. Trustworthiness.
Physical objects supporting service delivery	E.g., technical requirements for trains in public transport services.
Workroom	E.g., requirements for daylight access in offices.
Precautions	Emergency measures. Complaints handling. Guarantee.
Additional elements to the core service – delivery.	E. g. waiting facilities
Additional elements to the core service – results	
Communication between customer and service organisation (before, during and after providing the service)	Semantics (e.g., data elements to be used). Syntax (e.g., forms layout, syntax rules for electronic messages). Specification of Information and Communication Technology to be used. Protocols. Code of conduct. Approachability (e.g., hours of accessibility per telephone and average waiting time).
Communication within the service organisation or between this organisation and its suppliers	Semantics. Syntax. Specification of ICT to be used. Protocols. Code of conduct. Approachability.

Source: De Vries (2001).

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4 Identification of policy gaps and potential European value added³³

4.1 The double (innovation and performance) gap, the innovation-performance relationship and public policies

In a service economy, the definition and measurement of innovation, as performance, raises numerous difficulties, as we have observed in chapter 1. They are the cause, not only of an innovation gap, but also of a performance gap. We will now compare these two gaps and, at the theoretical level, examine their consequences on the fundamental relationship between innovation and performance and at the operational level, their implications in terms of public policies.

The fundamental hypothesis of the analysis is that innovation efforts in a post-industrial economy are always under-estimated. A consensus now seems to have been established on this point, as an increasing number of theoretical and empirical works bear witness but also, and particularly, the many revisions of the OECD official manuals (cf Djellal et al., 2003). The specificities of innovation in services are recognised, even if the inertia of our analytical tools and technical difficulties can prevent them from being taken into account, for example in surveys. On the other hand, a consensus on the nature, scope and challenges of the performance gap is far from being achieved. It is true that performance, considered from the viewpoint of productivity and growth, has always been at the heart of all economic theories, whatever they are, old or new, orthodox or heterodox. It is therefore subject to a major effect of cognitive irreversibility.

In view of these differences in the perceptions of gaps, it is necessary to consider several possible scenarios, to examine the consequences of these on the innovation-performance relationship, all other things being equal. The first case (the most frequent) is that in which one believes that performance is defined satisfactorily by productivity and growth. Public policies supporting innovation are based on this canonical scenario. The second case is where one assumes that the performance is badly defined (and under-estimated), in other words that there is a performance gap. We will examine these two scenarios, as well as their consequences for public policy (Djellal and Gallouj, 2008).

4.1.1 Performance is (considered to be) well defined

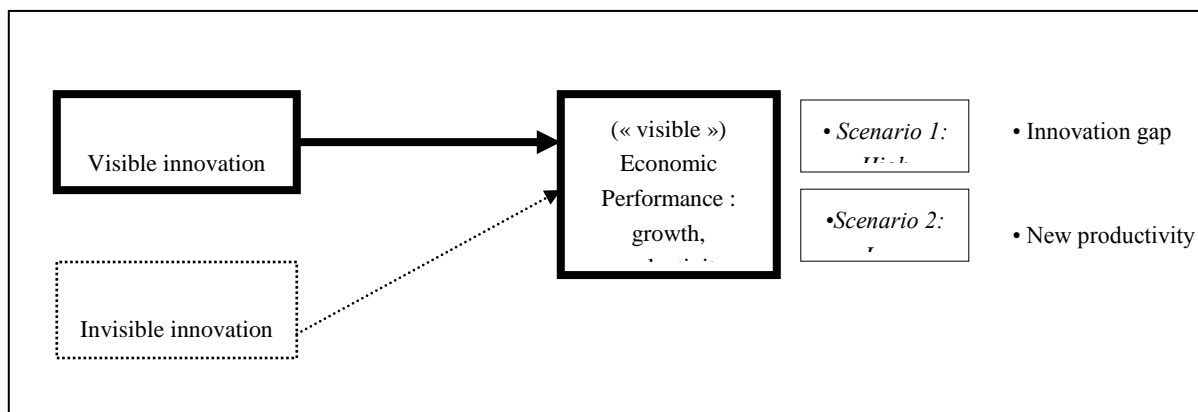
National and international policies supporting innovation (as, also, the economic theories that inspire them) are based on this hypothesis, according to which performance can be reduced to growth (and to productivity). The discussion and possible theoretical or operational problems only therefore concern the innovation variable. For a given innovation effort, this hypothesis allows one to consider two interesting scenarios, which differ depending on the levels of performance achieved.

The first scenario is that which corresponds to a high economic performance for a given (visible) innovation effort. This scenario may wrongly lead to the impression being given of a high output of a country's visible innovation effort, while in fact part of the performance is explained by invisible innovation. In the case of Great Britain, for example, NESTA (2006) observes a high economic performance in the last decade for a lower level of innovation than in other countries. For example, R&D per capita expenditure in Great Britain is two

³³ This chapter was drafted by Camal Gallouj (University of Lille) and Faridah Djellal (University of Tours).

times lower than in Sweden and in Finland. It is lower than in France or in Germany. The number of patents per inhabitant is much higher in Germany, Japan and the United States than in Great Britain. The explanation of this paradox lies in the British innovation gap. In fact, part of the performance can be explained by the invisible innovation effort carried out in particular (but not exclusively) in the services sectors.

Figure 4.1 The innovation gap and the innovation-performance relationship (Source : Djellal and Gallouj, 2009)

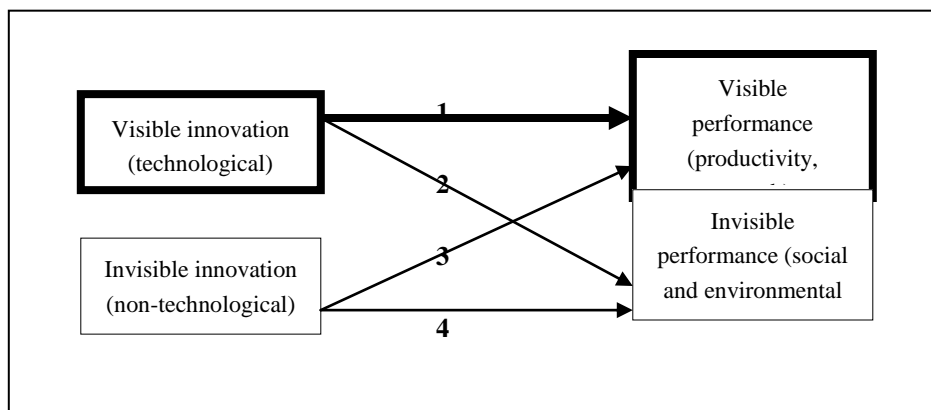


The second scenario is that which corresponds to a weak economic performance (growth) for a given innovation effort. In fact the situation is then still more unfavourable than it appears (and it will be necessary to draw conclusions in terms of public innovation policies), since the level of real innovation is higher than the measures considered indicate. Invisible innovation efforts combined with visible efforts are not effective. Therefore, to paraphrase the Solow paradox, we can here formulate a new productivity paradox: *there is innovation everywhere (including invisible innovation) except in performance statistics*. The NESTA report (2006) does not take account of this second scenario, which does not correspond to the British situation during the period covered. On the other hand, it is possible that it illustrates the French situation. This new paradox of productivity can take a particular form if one considers innovation from the restrictive viewpoint of R&D input. Indeed, the concept of R&D as defined in the Frascati Manual is not adapted to services. If we accept an improved definition of this, (such as that which proposed by Djellal et al., 2003), one can infer from this that R&D efforts in services are under-estimated, and that therefore *there is R&D everywhere (including in services) except in the statistics of productivity and growth* (Djellal and Gallouj, 2008).

4.1.2 The performance is badly defined

As we have previously emphasised, a certain number of recent studies question the dictatorship of productivity, of GDP and growth, by considering that they are neither the only, nor the best indicators of the economic performance of a country (Djellal and Gallouj, 2008). Thus, just as there is invisible innovation, so there would be invisible performance. This invisible performance mainly concerns the field of socio-economic and ecological sustainability. It expresses concerns in terms of human development, social cohesion, equality, equity, environmental protection, outcomes rather than outputs. This second hypothesis is not taken into account by the NESTA (2006) analyses, whereas it can change the economic diagnosis and lead to important consequences for public policy.

Figure 4.2 Innovation gap, performance gap and innovation-performance relationship



This question of taking into account invisible performance is at the heart of a certain number of works focused on international comparisons, which are not concerned with the question of innovation and the innovation-performance link. This is the case, for example, of works devoted to international comparisons of the levels of wellbeing and development. These works identify the sometimes dramatic differences between GDP growth and the evolution of other indicators, in particular human development and social progress indicators. These kinds of comparisons often emphasise the superiority (from this viewpoint of alternative « growth ») of the Scandinavian socio-economic models, compared to the Anglo-Saxon models. Here we are interested in the role of innovation in this performance, and notably in the (theoretical) consequences (on the analysis of the innovation-performance relationship) of taking this new gap into account.

Thus visible innovation certainly leads to visible performance (relationship 1), but it can also result in an invisible performance with regard to socio-civic and ecological sustainability (relationship 2). Technological innovation can indeed also be a source of social, civic and ecological benefits, and certain technological trajectories are more guided than others by the seek for socio-economic or ecological sustainability. The informational paradigm, for example, is often considered, not only as a source of economic growth, but also as a source of socio-economic and ecological sustainability. Insofar as the ICTs are considered to be weak MIP technologies, it may be thought that they favour sustainability and that, more generally, the information society is congruent with sustainable development. We can quote more precise examples of this relationship between ICT and sustainable performance: the substitution of the videoconference for business travel; the introduction of new ways of working (for example teleworking). The ICTs also operate in other dimensions of sustainability (in particular social). They thus allow the public authorities to be challenged and to rapidly mobilise citizens. Apart from the informational paradigm, technological innovation, whatever it is, can produce a more or less significant environmental or social benefit, beyond traditional growth. Within these material technologies, then, one can distinguish *environmental technologies* and *social technologies*. For example, technological innovations responding to the problems of the elderly (domestic robots, smart home, electronic surveillance...) represent a powerful innovation trajectory in ageing service societies (cf. chapter 2 : megatrends).

Relationship 3, which links invisible innovation to visible performance, means that the non-technological forms of innovation are also a source of growth (visible performance). It is the reason (when invisible innovation efforts are significant) for the incorrect interpretation of

the innovation-performance relationship (mentioned previously), which takes account of high growth for a relatively weak innovation effort.

Relationship 4, finally, which links invisible innovation to invisible performance, assumes a favoured relationship between non-technological innovation and invisible performance. There seems to be a strong correlation between the invisible component of innovation and the invisible component of performance. Indeed proximity services, for example, (in particular when they are implemented by non-profit-making organisations and public services, in particular local services), are the setting for significant social innovation activity, which escapes traditional indicators, whereas their role in the resolution of social problems is fundamental. More generally, if one considers performance from the viewpoint of sustainability, one notes that, although they are not dramatic, many non-technological, and particularly social, innovations, play a significant role in this. There are many examples of non-technological (invisible) innovations which contribute towards sustainable performance and which cover all kinds of services. Amongst others, we can mention certain forms of sustainable tourism, the many innovative initiatives in the field of care for the elderly, childhood, social integration, and in the financial field, micro-credits to respond to the problem of banking exclusion, government subsidised loans to encourage firms to invest in environmentally-friendly equipments. We can also mention local authorities developing services “one-stop shop” for people in difficulty. The innovations produced by knowledge intensive business services (KIBS) often come under « environment friendly » and sustainable trajectories, particularly when it concerns *ad hoc* solutions provided by consultants to environmental or social problems, investment in new areas of expertise (for example, environmental law, social law, advice on sustainable development...) or methodological innovations (for example, the MIPS indicator mentioned previously) (cf. Gallouj, 1994; Gadrey and Gallouj, 1998).

Because of the existence of hidden performance, innovation efforts can be more effective than the measures indicate. Thus, for given innovation efforts, an apparently weak (traditional) performance can be enhanced from the viewpoint of alternative performance. Conversely, an apparently high (traditional) performance can be put into perspective, insofar as growth and productivity gains are tarnished by ecological or social damage.

4.1.3 The double gap: a challenge for public policies

In view of the two gaps (on innovation and performance) identified in previous sections, one can assume that public innovation policies are, to a certain extent, inadequate. Indeed, they rely on a partly inaccurate analysis, and consequently suggest solutions that could prove to be inappropriate.

In order to carry out their diagnosis, public policies generally favour relationship 1, which links visible innovation (mainly technological innovation: that which is based on R&D and which gives rise to patents) to visible performance (growth, productivity). One of the major indicators of Lisbon agenda (i.e. 3% target for RD/GDP) perfectly reflects such a relation. Figure 4.2 illustrates well all the errors in analysis and the paradoxes that can follow from such a hypothesis. We can thus identify (all other things being equal), a weak innovation effort at the same time as a high (growth) performance. This is the diagnosis achieved by NESTA (2006) in Great Britain for the last decade. We can also identify an apparently higher innovation effort, which does not fulfil its promises on performance. This is the case for France in the same period. To establish a satisfactory analysis, it is necessary to take into account all the other relationships between innovation and performance (relationships

2, 3 and 4), which can contribute to different interpretations of innovation efforts and levels of performance achieved.

In view of the diagnosis established on the basis of relationship 1, the solutions recommended by the public authorities naturally consist of promoting technological innovation, that which is based on scientific and technical R&D activities and which can be appropriated by patents. These strategies mainly concern public research and the industrial sectors, in particular high technology. As regards training systems, policies will consist of favouring scientific and technological training. As the OECD (2005) emphasises, the innovation policy of member countries was mainly considered to be an extension of R&D policies. Thus, in economies that are, however, largely dominated by services, these technologist and industrialist policies have also been transposed to services. In the same way as economic analysis, public policies of support for innovation in services are dominated by an assimilationist perspective (Rubalcaba, 2006).

The main lesson to draw from the preceding analyses in terms of public policy is that, to take into account the double gap that has been identified, the public authorities should break with their technologist orientation and try to promote invisible innovations and performances.

It is thus necessary to emphasise innovation and R&D policies that are specific to services (perspective of differentiation), in other words, policies that are not content with supporting technological innovation and R&D, but which also favour non-technological forms of innovation and R & D. As far as the source of the gap is not confined to services, it is also necessary to support innovations in services within the manufacturing and agricultural sectors. If it happens, this recognition of invisible innovation in public policies should also redirect priorities on education policy. Indeed, one should also support the development of the necessary skills in non-technological forms of innovation, whether this is skills that produce or which absorb these innovations. These skills do not only concern an elite, they should be disseminated to all levels of the population. This is particularly obvious with regard to social innovations that can be produced and implemented in the informal and domestic sphere (voluntary work, community organisation) as in the formal sphere (or social entrepreneurship). All services of course are concerned by these innovation policies. But some sectors appear to be more concerned than others. This is the case with the KIBS, which contribute strongly to the innovation gap, both through their own internal non-technological innovation, but also by that which they produce for their customers. This is also the case for the numerous proximity services, where many social innovations are implemented.

If one considers performance in terms of sustainable development, one again notes that it is the technologist or assimilationist perspective which dominates. Most of the public policies of induction of sustainable innovation fall within such a perspective, which consists of supporting sustainable technological innovations in different ways: funding, taxation (for example, by granting tax credits for clean technologies or which save energy), public orders, the dissemination of information... In order to favour invisible performance more, it is also necessary here to implement demarcation policies which emphasise the specificities of sustainable innovation in services and in particular social innovations, examples of which we have given previously.

4.2 Mapping the policies and policy measures in EU Member States

There now exist a very large array of original typologies aiming at capturing and analysing the question of innovation in services and from there the question of the innovation policies toward services (should they already exist or should they to be developed).

In section 2.1 (chapter 2), we have put forward a widely quoted classification of the literature on innovation in services proposed by Gallouj in the early 1990s. Gallouj opposes using a (analytical) pendulum movement what he names technologist or assimilation approaches, integrative approaches and service oriented or differentiation approaches.

Gallouj (1994) refers to the picture of the pendulum (movement) to signify that none of these positions is stable and definitive. Shifting from a position to another is possible and sometimes highly desirable.

This model, even very simple, is of great utility for analysing the place and role of services in accordance with different criteria and dimensions: the innovation dimension, the spatial and locational dimension and more particularly the policy dimension...

The model is really of great interest for analysing the policies toward innovation in services. It has been largely used and sometimes extended by many scholars (Rubalcaba, 2006; Den Hertog et al. 2003...). The bulk of existing policies toward services and innovation could in fact be integrated and interpreted at the light of the three axes or approaches of the model.

The innovation policies coming under the assimilation or technologist approaches focus, as already seen, on an assimilation (of services) tradition and behaviour. Traditional policies toward manufacturing are seen as directly applicable even to service activities. This way of thinking and doing is fairly typical of the majority of the traditional innovation policies which in their present form are still focused merely on technological innovation. The technologist or assimilation approaches are reflected in four great observable orientations of the public policies toward innovation in services:

- They are reflected in the centring on technological services (KIBS, software services, Engineering...) in other words, the services which are the closest to the manufacturing sector ;
- They are reflected also in a prominent position devoted to (technological) R&D and R&D services ;
- They are reflected in a large centring on the diffusion of ICT. This give credit to the theoretical argument that services are supplier dominated and are mainly users of technologies (ICT) produced by other actors (manufacturers) of the market ;
- They are finally reflected in the clusters policies which even when they are specialized and focused on services (but this is also rare) remain basically centred on technology diffusion.

Policies coming under the integrative approaches are both recent and rare. The main examples that we can stress refer to the acknowledgment and acceptance of a broader definition of innovation (including non technological aspects) or to the development of a functional approach which is by definition cross-sectoral.

Policies coming under the differentiation or services oriented approach are also rare. They can either be general and undifferentiated (taking the whole service sector into account) or

they can be specific and address only one specific service sector. The scope for specific or targeted policies can be justified by the very high heterogeneity of the service sector. A number of specific policies targeting specific service sector (most commonly: tourism, health, transportation...) could to a certain point find their place in this approach. In reality, we prefer to classify them under the first approach (technologist and assimilation). Basically, they are still largely technological in nature and mainly focused on the diffusion of technology.

Table 4.1 Mapping the innovation policies toward services in EU MS

Type of approach	Characteristics	Examples of policies
Assimilation or technologist approaches	Type of services : KIBS, technological services, software and ICT services	<ul style="list-style-type: none"> - Czech Rep : ICT and Strategic services Programme (part of the Operational Programme entrepreneurship and Innovation for 2007-2013) aims at increasing the competitiveness of the ICT sector by encouraging innovation in information systems, ICT solutions and new software products and services - Sweden : many KIBS supporting programmes (e-services in the public sector, IT for home based care, Living labs) - Switzerland : as part of its sofnet programme, Switzerland allocated fundings to build up a software industry of international standards
	R&D	<ul style="list-style-type: none"> - Germany : innovation with services thematic R&D programme - Spain : national R&D&I plan (2004-2007) - Finland : the tourism and leisure services R&D programme (TEKES) was launched in 2006 in order to encourage R&D activities by companies producing leisure services TEKES
	Technology diffusion (mainly ICT)	<ul style="list-style-type: none"> - France : ANVAR is giving support to all private services by sustaining the development of new services founded on the use of ICT - Switzerland : CTI is promoting service innovation through the specific promotion of Enabling Science, particularly ICT (including e-government) - Iceland : the most important programme for addressing service sector innovation have been the information and environmental technology programme
	Cluster policies	<ul style="list-style-type: none"> - Belgium: « Competitiveness poles ». One out of five is dedicated to transport and logistics - France: « competitiveness clusters ». Only 3 out of 71 are oriented toward service activities (Trade Industries, Finance-innovation, and logistics) - UK : the regional development agencies (RDAs) have launched cluster policies which include services of the software, digital content and the creative industries

		- Luxembourg : the infocom cluster is devoted to information and communication technologies
Integrative or synthesis approach	broader definition of innovation, including non technological aspects	- EU : Integration of organisational innovation in the EU 2004 innovation action plan
	« functional » approaches	
Service oriented or differentiation approach	General (the service sector as a whole)	- Italy : T-LAB (Laboratory of the Innovative service sector) is a private initiative taking the form of a meeting point/exchange place for managers operating in the service sector
	Specific	- Spain : programme for promotion of innovation in the tourism sector - Switzerland: has organized a federal programme to foster innovation and co-operation in the Swiss tourism sector. The programme targets 5 key factors : new products and distribution channels, improvement of existing services, creation of new organizational structures, education and training, R&D

Globally, there is a growing awareness that services are an important subject and matter, that a considerable part of innovation is performed in the service sector and that this sector has specific needs regarding innovation support

The questions of services, innovation in services and the ways to support innovation in services are more and more at the centre of the debate in many EU Member States, even though we can think that this debate is a little bit more pronounced at the European level than at the member state level.

Nevertheless, we can observe an important gap between the awareness of the importance of services and innovation in services on the one hand and the concrete application in the field in the second hand. As it has been put by Kuusisto (2008: 35), at present, the important role of service innovation is still mainly reflected in the policy rhetoric, while the actual policy measures and their delivery remain often fairly ineffective ».

In total, the bulk of the observed practices take the form of a large array of scattered actions and experiments with no links with each others and characterised by globally deceptive results. In other words, at the member states level, the policies toward services innovation are by no mean systemic. They lack a federative framework or a global vision of services and innovation in services.

What are the main conclusions that can be drawn from the Table 4.1 and also from the growing publications and reports on service innovation policies:

- Most of EU but also national innovation policies can be characterized as falling into the assimilation or technologist approach. It follows that services are usually ignored or considered together with manufacturing under generic innovation policies
- Many EU member states (in fact the very great majority of them) claim for horizontality (they are supposed to support measures that are stated to be sector-neutral ie open to the participation of both manufacturing and services companies on an equal footing). The facts reveals that the horizontality is more theoretical than real. These so-called horizontal approaches suffer from an unavoidable bias for technological support
- As a matter of fact, when compared to manufacturing activities, services industries make a far more reduced use of innovation schemes than their manufacturing counterparts. Among services, only the closest to manufacturing activities (ICT service firms, engineering firms...) show a similar behaviour
- The very low qualification of services for existing schemes can be explained by two reasons: the first one can be found in a sort of self-limitation behaviour. Services don't apply because they think it will be in vain. The second one is because even when they are perfectly eligible, the methodology and tools for evaluation are still not adapted for their activities. Moreover, in many administrations and public bodies the personnel is still dominated by an « industrialist culture »
- As an example, public support for R&D activities is one of the most common tools used by the Member States. But the majority of them fail to acknowledge that in services activities researches in the fields of humanities and social sciences are central. Traditional R&D programmes appears generally to be excluding this dimensions ;

- Some scientist claim for the generalization of the integrative or synthesis approach as it is clear that the lines between manufacturing and services are becoming more and more blurred and that the two sectors are more and more intertwining. However, this position which is intellectually stimulating seems to be too theoretical. It can lead to the rubbing out of the specificities of services and reach to the same conclusions as the assimilation-technological approaches. Rather in a first step, we claim for an *affirmative action* toward services and innovation in services which can be reached only through services oriented approaches

4.3 European Added Value

Innovation in services is a relatively new theme both at the national and EU levels. The role of services sector performance as a key economic driver for competitiveness and innovation in Europe is increasingly recognized and as a result, the concern for services innovation policies has been increased to a certain extent at different levels.

In principle, there is no particular argument to indicate that the balance between national and EU policies could be different in service innovation than in other innovation policies. Innovation policies are presented as complementary at regional, national and international level. All three geographical levels are active promoting R&D and innovation in general and service innovation should not have a different status. Chapter 3 showed how the arguments used for justification of innovation policies, market and systemic failures, applies to services as well.

European valued added when formulating innovation policies can be based on four criteria:

- *Geographical market and system.* Market and systemic failures are reproduced at any geographical context and particular actions should apply in each case. Wherever a given institution is regulating and managing a given market, the economic rationale for innovation policies emerges.
- *Need of scale.* R&D and innovation is often very fragmented in Europe. EU policy level is justified to overcome fragmentation and to get some scale advantages. This criterion is as important in goods than in services. Moreover, since fragmentation in service market is larger, and share of SME is higher too, EU scale may be appropriate in some policy areas related to services.
- *Need of reaching a critical mass.* This is a classical argument to promote European R&D and technological projects. Without a considerable amount of resources given by different national and EU administrations some pro-innovation projects would never start. This argument is rarely applicable to services, except for some big technological projects in the areas of telecommunications and transport. In KIBS sectors critical mass for innovation does not need a very high scale; moreover, they are often developed at very small local scale within a certain country or region.
- *Political decisions.* The European society, through their governments and institutions, decides which policy areas are exclusive to the EU level, which are exclusive to national governments and which are depending on different institutional levels in a complementary way. This is the case of innovation policies.

The table below includes a number of key challenges for a range of different policy areas that European economy must face in respect to services innovation. Policy response from the various Member States to these challenges is discussed, and also the possible level of support and intervention needed from EU institutions.

Table 4.2 Challenges, policy response and policy added value from EU intervention in support of innovation in services

Policy areas	Challenges		Policy response		European Added Value advised
	Description	Assessment	Description and examples	Assessment	
Internal market for services	<ul style="list-style-type: none"> - Reduction of the barriers (complex administrative and legal requirements) to trade in services sector - Favouring the access of services to national markets to enhance competitiveness and investments in services innovation - Allowing the free movement of workforce between Member States 	***	<p>Common policy framework for services: the Service Directive</p> <ul style="list-style-type: none"> - All Member States: Transposition of EU Services Directive 	**	EU exclusive policy
EU market integration, deregulation and competitiveness	<ul style="list-style-type: none"> - Liberalisation of services markets - National and international competition - Promoting the competitiveness of services in the international market place - Improving the access to information on high quality innovative services 	***	<p>National policies at very different stage depending on the sector and regulation type</p> <ul style="list-style-type: none"> - Sweden: Deregulation of service markets - Netherlands: Competition policies and regulation that bear strong indirect influence on the scope for innovation in services (e.g. legal services and consultancy) - Slovenia: Regulation-related policies targeting the functioning of specific markets in services 	**	<p>Policy learning</p> <ul style="list-style-type: none"> - Better knowledge about the legal framework conditions of the provision of services in other Member States, as well as on the different market conditions
Use of Intellectual Property	<ul style="list-style-type: none"> - Adapting and improving the registered protection methods to services innovation outcomes for a more active use of existing IPR 	**	Only some MS have regulated by policy measures (few policies responses)	*	Policy learning

Rights (IPR)	<ul style="list-style-type: none"> - Assessing the suitability of IPR mechanism to services sector - Focusing on strategies and practical options on how to deal with the other companies' rights - Protecting new business models and technologically driven forms of organisational innovation - Including awareness on informal IP protection and promoting the use of informal protection methods which are valid in a legal sense - Identifying and disseminating good practice examples on IP strategies which successfully combine IPR and informal IP protection 		<ul style="list-style-type: none"> - Sweden: Intellectual property rights to assess risks and future investments - Belgium: Attention to legal issues (EU regulation on copyrights) - Ireland: Assessment of IPR framework conditions relevant to services 		
Public procurement	<ul style="list-style-type: none"> - Driving the demand for innovative services by government procurement conditions - Improving the level of public services innovativeness - Encouraging the supply of innovative solutions in the procurement of services - Better trans-national cooperation between regional and national procurement agencies at European level is needed in order not to result in a further fragmentation of the market 	*	<p>Only some MS have promoted policy measures in the particular area of services, but coverage exist under horizontal actions</p> <ul style="list-style-type: none"> - Estonia: e-government (e-taxation; e-voting) - Sweden: Public e-services (e-health) - Bulgaria: e-government - Finland: Programme for innovative public-sector procurements - Netherlands: Implementation of ICT in public service sectors and e-government - Czech Republic: Implementation of the EC initiative on public procurement 	**	<p>Reduced European value added possible as national policies may be sufficient. However, improvement in the EU rules for public procurement would lead to spill-over effects over national rules.</p> <ul style="list-style-type: none"> - Communication between procurers and market agents would lead to better tailored market-led services

Supply of qualified personnel	<ul style="list-style-type: none"> - Promoting the access to highly qualified personnel to develop new concepts and service innovations in-house - Developing training methods for personnel to be able to adapt innovations acquired from external sources - Need to better adapt curricula in education and training schemes to the demands of service economy - Recognising informal learning so as to increase the attractiveness of continuous training for employees - Promoting modern innovation management approaches that better support creativity and autonomy of service workers 	**	<p>Only some MS have promoted policy measures in the particular area of services, but coverage may exist under horizontal actions</p> <ul style="list-style-type: none"> - Finland: Focus on education - Ireland: Attention to education, skills and training for internationally traded services - Lithuania: Innovation skills and culture - Norway: Service needs related courses - Czech Republic: Human resources development programme 	**	<p>Policy cooperation</p> <ul style="list-style-type: none"> - Specific training channels for personnel in service firms
Promotion of R&D and innovation programmes	<ul style="list-style-type: none"> - Increasing the awareness of service companies on what constitutes R&D activities and encouraging them to more actively report on such activities - R&D and innovation programmes need to be better aligned with the specific requirements of service innovation in both services and manufacturing firms - Improving the links of service firms with the research and science base - More service-specific research schemes should be launched so that university and public agencies research results are not so far 	***	<p>Horizontal policy measures introduced in all MS, although specific actions or coverage for services is still under development</p> <ul style="list-style-type: none"> - Finland: Support for research, innovation - Ireland: Support for international traded services (financial services). Support for research in services. Support for generation of critical mass - Czech Republic: Improvement of innovation environment, including organizational and 	***	<p>Policy learning</p> <ul style="list-style-type: none"> - Good practice dissemination, incl. databases (TrendChart). Adoption up to MS to decide - Opportunity to establish efficient platforms for transnational policy design and learning - Future public R&D

	<p>from the service markets</p> <ul style="list-style-type: none"> - New forms of knowledge-transfer between research centres and service firms should be developed and experimented 		<p>marketing innovation</p> <ul style="list-style-type: none"> - Spain: Support for R&D in tourism - Lithuania: R&D intensive services. Facilitation of knowledge transfer among actors - Luxembourg: Innovation policy in financial sector - Germany: Service-related R&D activities under a wide range of themes - Netherlands: Attention to the new framework for state aid for services R&D - Norway: Deduction of R&D expenses in approved projects - Czech Republic: Tax deduction based on business R&D activities 		<p>and innovation programmes at EU level should take into consideration the specific needs of service organisations</p> <ul style="list-style-type: none"> - IPPS project and possible similar actions
Start-ups	<ul style="list-style-type: none"> - Reducing the level of firms formation barriers and favouring entrepreneurship and the creation of new firms that promote competitiveness and innovation in the services sector - Developing support mechanism for the formation and establishment of high-growth service firms 	**	<p>Only some MS have promoted policy measures in the particular area of services, but coverage may exist under horizontal actions</p> <ul style="list-style-type: none"> - Portugal: Financing and risk sharing - Croatia: Facilitation of innovation-based start-ups (innovative services companies in IT) - Greece: Entrepreneurship 	*	<p>Experiments with new policy tools & instruments</p> <ul style="list-style-type: none"> - SMEs access to financial support and counselling - Adjust existing support programmes to capture the needs of service firms (e.g. IPR and innovation)

					management)
Access to finance	<ul style="list-style-type: none"> - Facilitating the access of service companies to risk financing (e.g. venture capital) - Addressing the issue of finance for service companies, particularly for high growth KIBS firms - Lowering the communication barriers and bringing investors together with promising service firms - Better coaching service companies to make them investment ready (e.g. improving tools to identify the most promising investment projects) - Favouring the recognition of service intangible assets 	**	<p>Emerging policies, mostly at test stage</p> <ul style="list-style-type: none"> - Portugal: Improvement innovation financing services - Finland: Renewed financing criteria allowing the funding of service innovation development projects - Netherlands: Financial support for innovative SMEs - Norway: Financing support measures 	*	<p>Experiments with new policy tools and instruments</p> <ul style="list-style-type: none"> - Improving tools or exiting strategies (Completely Europeanize these measures in order to provide them as a European service (e.g. EEN) or self-sustainability) - Improving the risk assessment skills of business angels and venture capitalist - Sharing information about emerging business and technology trends in the service sector
Access and use of public science	<ul style="list-style-type: none"> - Redesigning innovation support programmes to remove any bias towards favouring industrial over service sector SMEs - Reorienting business support programmes to the different service needs (e.g. business 	***	<p>Emerging policies, mostly at test stage</p> <ul style="list-style-type: none"> - Finland: Plans to set up strategic centres of excellence in science, technology and innovation 	*	<p>Policy cooperation</p> <ul style="list-style-type: none"> - New forms of knowledge transfer between universities,

	incubation programmes)		<ul style="list-style-type: none"> - Germany: Communication platforms for close and sustained cooperation between industry and research organisations - Ireland: Innovation voucher for cooperation - Netherlands: Support for SMEs in creating linkages to knowledge institutes and target governmental bodies 		other research centres and service firms need to be developed and experimented with at EU level
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Source: Based on European Commission (2007); van Cruysen and Hollanders based on Cunningham (2007); IPPS report (2007)

Note: *** Strong challenge / Strong policy support; ** Intermediate challenge / Intermediate policy support; * Weak challenge / Weak policy support

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