



## **Are specific policies needed to stimulate innovation in services?**

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### 1. Introduction

It is well known that the services sector has gained relevance in terms of its share in GDP, and employment, increasingly contributing to employment, productivity, innovation and economic growth. The services sector has important differences with the manufacturing sector in terms of productivity, innovation activity and external markets orientation. Productivity has not been uniform across all sub sectors. KIBS (Knowledge Intensive Business Services), for example, differs from traditional services sectors, as it has shown not only productivity growth in its own, but it also has a profound impact on productivity growth in other sectors.

Innovation in the services sector has been characterized by low budgets for R&D. According to Gronroos (1990), there are a wide range of possible sources of innovation in services: not only the service concept (service as a product) innovation, but also service process innovation, service infrastructure innovation, customer process innovation, business model innovation, commercialization innovation (sales, marketing, delivery), and hybrid innovation serving several user groups in different ways simultaneously and service productivity innovation. As a result of the different types of innovation that can take place in the sector, there is a lack of indicators and methodologies to measure services innovation, which make it even more difficult to determine the need for and develop appropriate policies.

The Knowledge Information Society has benefited from the improvement of communications, removing to a certain extent the need for proximity and reducing the costs of many services activities, even though the benefits were not distributed evenly across the sector. While in certain sub sectors the use of IT has resulted in an increase in the provision of services and has driven prices down, in other sub sectors its impact has been less significant. Consequently, more needs to be done to facilitate the diffusion of services across national borders to open up foreign demand. Codification and standardization of services would improve the sector's tradability. But location is still relevant in the service sector and plays an important role in innovation activity. In many circumstances, services are provided locally, close to where industry or consumers are located.

Policy in services innovation is considered underdeveloped when compared to policy in manufacturing innovation. The development of policies to support innovation in the service sector needs to consider the sector's specificities, which may have an impact on how the sector innovates. Most relevant sector specificities relate to the *interactive nature of services* (involvement of customers in the innovation process); *fuzzy nature of services* (making it difficult to differentiate among product, process and organizational innovation

and their individual economic impact); *intangibility* (appropriation regime difficulties); *heterogeneity* (variability); *relative absence of quality standards*; and *lack of market transparency* (which creates the risk of dissatisfaction once the service is delivered) (Gallouj, 1997).

Moreover, the division between services and manufacturing is becoming increasingly blurred, as both sectors are more and more intertwined. Manufacturing firms increasingly provide services together with their products and consequently face the same type of regulatory obstacles as service sector firms when trading. Innovation policies directed to the service sector also have an impact on the manufacturing sector when performing or consuming services activities, affecting manufacturing firms' competitiveness.

A recent study by Arundel et al. (2007) on Innovation Statistics for the European Service Sector, demonstrated that relatively less firms in the services sector can be seen as technological innovators (new products and processes) than firms in the manufacturing sector. The exception were the firms in the Knowledge Intensive Business Services (KIBS) sector<sup>1</sup>, which were more likely than the firms in the manufacturing sector to introduce either a product or process innovation (cf. Annex B for a summary of the statistical findings).

As for non-technological innovations (organizational and marketing innovations), there were no differences in the percentage of all industrial and service sector firms that introduced either an organizational or marketing innovation, although KIBS firms were far more likely to introduce each type of innovation. A more detailed overview on the findings of this study is given in Annex A.

These empirical results corroborate to the idea that the services sector is highly heterogeneous and consequently cannot be treated as one sector for policy purposes. KIBS tend to be more in line with the manufacturing sector when it comes to both technological (new products and processes) and non-technological (organizational and marketing) innovations, while firms from the rest of the service sector are behind in terms of technological innovation, but have similar patterns to manufacturing firms when it comes to non-technological innovations.

Policy makers must take into account the heterogeneity and the multidimensional nature of innovation within the service sector when formulating and implementing policies. Moreover, the increasing importance of the services sector and services activities in the economy in general and KIBS in particular calls for more information and understanding at sector and sub-sector levels. This more in depth knowledge of the services markets and KIBS in particular will help defining appropriate policies, when and if required.

## **2. Market and systemic failures**

This paper examines both market failure and systemic failure rationales to justify policy intervention, although they may lead to different types of policies. Much of the literature analyses such failures as they apply to innovation based on R&D activities. Here, we examine these concepts as they might apply to innovation in services, and in particular KIBS.

The market failure approach focuses on resources allocation to knowledge production and other innovative activity. Failure is associated with risk and uncertainties. On the other hand, the systemic failure approach focuses on units' interactions in knowledge exploration and exploitation. It recognizes that actors have different motivations when engaged in

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<sup>1</sup> KIBS includes Computer and related activities (NACE K72), Research and development (NACE K73), Architectural and engineering activities and consultancy (NACE K74.2) and Technical testing and analysis (NACE K74.3).

knowledge creation and diffusion. This approach is broader in nature. Even though, the relationships between the two are not always clear, and not always mutually exclusive. In some ways they may overlap. The main goal of both approaches is to facilitate innovation activity by creating incentives to those actors that are considered to be constrained. In terms of intervention, the market failure approach leads to more specific types of intervention, while the systemic failure one leads to more generic ones.

## 2.1 Market failures - introduction

Market failures occur as firms under-invest in innovation activity (e.g. R&D), as they are not able to appropriate the full benefits of these investments. Competitors may make use of part of these benefits, without the correspondent investment. On the other hand, society benefits from these spill over (called externalities), as they have a positive impact on productivity in other sectors. Market failures can also result from the failure of price mechanisms which incorrectly reflect the benefits of new technologies and innovations.

According to Gustafsson and Autio (2006), market failure in knowledge production relates to underinvestment in knowledge creation (notably R&D) due to (1) *uncertainties and risks* in innovation (R&D) efforts, (2) *insufficient appropriability* (leading to failure to appropriate return from innovation and new knowledge), (3) *information asymmetries*, (4) failure of markets to assign values to *externalities* (impacting knowledge diffusion) and (5) undervaluation of *public good* technologies in firms strategies. The first two types of market failures involve risk aversion, hampering innovation activity. Typically, SMEs would be most affected, due to their limited sources of funds. Larger companies would also be affected but to a lesser extend, as they can make use of their market, financial and negotiation power.

According to the authors, markets would under-invest in innovation activity due to the non-proprietary nature of knowledge (potential leaks) and the uncertainty in the exploration of new knowledge. Moreover, due to the public good nature of knowledge, economic actors would take advantage of the innovation activities of other actors. This would explain the second mover advantage, where firms wait for somebody else to make the investments that lead to knowledge creation and only then invest in the market, avoiding risks and high exploration costs.

Gustafsson and Autio (2006) suggested a few actions to correct for these failures, including the implementation of appropriability regimes with IPR legislation, subsidies (tax breaks, direct funding, and loans), and setting up R&D labs to facilitate access of firms to knowledge and support for university research (a more detailed discussion on policies will follow in section 3).

## 2.2 Market failures in services innovation

Different types of market failures may have an impact on innovation activity in the services sector. We build upon the work of Kox and Rubalcaba (2007) to classify market failures in the services sector, even though the authors have concentrated on the business services sub sector.

- When an agent in a market gains **market power**, due to lack of adequate competition (imperfect competition), leading to inefficiency.

Imperfect competition can take different forms, such as monopolies, monopsonies, and cartels. In this case, intervention is necessary to control for entry barriers, monopolistic or strategic oligopolistic behaviour, which may result in sub-optimal allocation of resources

and/or high prices for consumers. Today's markets have seen a wave of mergers and acquisitions, resulting in an increasing number of larger firms in many industries. In imperfect competition markets, the consumer is denied the benefit of choice. 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. The lack of competition may lead to inertia in terms of innovation activity. Competition forces firms to constantly innovate, offering better quality, and lower prices.

Firms in the services sector that provide more standardized services (limited differentiation and relative role of price) can gain some economies of scales. These are often a reduced number of large international firms, who together have a significant market share (between 20 to 50% of the market) (Kox and Rubalcaba, 2007). The concentration of these sectors in the hands of a few large firms may lead to collusive behaviour, or oligopolistic strategies. On the other hand, firms that offer more standardized services have a certain degree of transparency, making it easier for authorities to detect collusive behaviour.

Markets for client-specific products, on the other hand, are fragmented. Firms in the services sector that provide client-specific business services are characterized by smaller firms, with smaller combined market shares when compared to the ones providing standardized services. In this case, markets are not transparent (either in terms of tariff structure or real quality of the services provided, at least before purchase and consumption), but segmented. Prices do not play a significant role in competition. Moreover, demand for client-specific business is not perfectly price-elastic; switching costs are relevant from the clients' point of view, possibly leading to market failure. Firms in fragmented markets tend to compete in terms of specific knowledge-based inputs, which may result in localized monopolies. In addition the localised nature of much services activity can mean that markets in the service sector are more geographically fragmented than for manufacturing sectors.

- Actions of agents can create economic "side effects" to an uninvolved third party, known as **externalities**.

There are two types of externalities: *negative externality* relates to a harmful side effect, which in most cases, constitutes an external cost, while *positive externality* relates to a beneficial side effect impacting an uninvolved third party. Intervention would be necessary to either correct for negative externalities or to reinforce positive ones.

*Negative externalities:* In the case of KIBS markets, intervention is based on social externalities that are "attached" to these services. For example, in the case of accountancy, the aim is to safeguard reliable financial information that leads to trust in capital and financial markets. A possible negative externality would be fraud that could be reduced by an independent, reliable and accountable control and reporting system.

Moreover, slow productivity development seems to be a serious obstacle for the service sector in general. Because services have an impact on the economy, productivity problems in the sector can affect the whole economy and hamper economic growth. Low productivity in the services sectors is passed down as an intermediary input to other sectors through high prices. The negative externality (in the form of lack of competition, poor incentive to innovate and cost efficiency) "travels downstream" reducing competitiveness and innovation in other sectors.

*Positive externalities:* Growth in business services has proved to create positive externalities outside the sector. For example, business services contributes directly to technological

innovation (in software and engineering), as well as to non-technological innovation (labour productivity) in client industries. Another relevant positive externality benefits SMEs, which can overcome scales limitations and setup costs by using external business services.

There are other areas where positive externalities may have been under-provided. One of these areas relates to incentives for innovation whereby the benefits of an innovation are picked up by firms other than the innovating firm and the social returns from the investment in the innovation are higher than the private one. This argument has often been applied in the case of technological innovation, but may apply equally well to non-technological innovations. In addition, it is known that SMEs in particular, spend a small share of their revenues in innovation, even though innovation would be fundamental for the industry. More could be done in terms of incentives, institutional structures, bureaucratic procedures, fiscal climate and intellectual properties, although most of these issues relate to systemic failures and not market failures. Knowledge diffusion is hampered when knowledge assets become obsolete. This is particularly relevant in small firms, which dominate the business services sector, where employees are required to spend most of their time in daily activities, with little opportunity to acquire new knowledge and skills.

- Markets can also fail due to the **nature of certain goods, or the nature of their exchange**. For example, goods can display attributes of public goods, while markets may have significant transactions costs, agency problems, or informational asymmetry.

*Public goods* are goods and services provided by the government because a market failure has occurred. In many cases, provision of public goods and services (defined as economic products that are consumed collectively, like highways, schools, defence) may be beneficial, but in other occasions, it would be preferable if markets could provide them.

*Credence goods* are related to many knowledge intensive business services. It means that before or even just after purchasing them, the customer may not be able to assess their quality. According to Kox and Rubalcaba (2007), markets tend to correct this situation by using firms' reputation, where the clients rely on a firm's past experience, trusting that the economic agent will behave in the same way as it did in the past. Firms with reputation consequently earn a price premium, normally charging a higher price for its offerings. Moreover, firms with reputation have less incentive to reduce inefficiencies and to exploit scale economies to gain cost advantages. Building reputation requires time. It also functions as entry barrier, leading to market segmentation. As a result, the premium segments of the market are "protected" by firms with a proven reputation. New entrants or SMEs are kept outside these premium segments.

*Information asymmetry and non transparencies* happen when buyers and sellers are not well informed or when information is not equally distributed among participants. Without proper and timely information, uneducated decisions are made. This is particularly relevant for SMEs. The less-informed parties end up in disadvantage or they avoid taking risks to reduce exposure. The result of such behaviour is a reduction on the volume of transactions.

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 the sector and their consumers are less informed about alternatives and choices. Information asymmetry has a negative impact on innovation activity as less-informed parties tend to avoid risk by reducing exposure, which would negatively impact innovation activity.

- **Resource immobility** occurs when resources are not free to move from one industry to another or geographically.

The efficient allocation of resources requires that the factors of production (land, labour, entrepreneurs, and capital) be free to move to wherever returns are the highest. Resource mobility is considered ideal in competitive market economies. Efficient allocation of resources in the services sector is more difficult to take place due to the sector characteristics. Mobility of factors of production is impacted by more stringent regulations in the sector, resulting in more obstacles for services firms to cross borders. Internal regulations at member state level affect the services sector in terms of establishment, use of inputs, provision, promotion, distribution, sales and after sales activities. Other barriers include legal ones: protection leading to lack of transparency and imperfect competition, intellectual property appropriation and other restrictions to cross border provision. Although barriers impeding the formation of an EU services market still abound, most of them could be removed through common regulations and setting of standards.

Moreover, culture and language are also important factors affecting mobility and efficient allocation of resources in the sector. Because resources can not freely move along national borders, the service sector is less competitive when compared to the manufacturing one: lack of competition leads to inefficiency and increasing costs.

Across the EU an obstacle to raise competitiveness in the service sector is the lack of a European common market for services or the existence of national markets' access restrictions at nations' level within the EU. The reduction, if not elimination of such barriers would create incentives for firms to invest in innovation. 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. 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. 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. According to the European Commission report "An Internal Market Strategy for Services" (2000), "If firms do not, or cannot, innovate by aggregating demand into larger geographical markets, the drive to compete on the basis of quality will be stopped dead in its tracks".

European consumers and firms would benefit from common ground rules regulating an EU services market. The opening of services markets to competition would result in increased productivity, and have a positive impact in terms of innovation, growth and creation of new jobs across borders.

- Frequently, the underlying cause of market failure is a problem of **property rights**.

Firms engage less in innovation activity, if they can not have control on innovation output because of a poor system of property rights. Even though firms in the service sector tend to invest less in R&D due to the nature of the sector, some sub sectors have R&D investments that compare to the levels of investments in manufacturing firms. In these sub sectors the use of property rights should not have many differences when comparing to manufacturing.

On the other hand, it is exactly the nature of the sector that opens up for the need using property rights, and more specifically, trademarks. Many services are considered credence

goods, meaning that it is not possible to evaluate the quality of the service before it has been purchased and consumed. There is a high risk involved when acquiring credence goods. One way to reduce the risk is to buy from reputable firms. Reputation takes time to build and involves brand recognition / brand awareness. Once consumers can make the link between credence good and a brand name, they tend to repeat sales and reject alternative providers. In this case, the use of trademarks in the service sector functions as a differentiating factor.

### **2.3 Systemic failures - introduction**

The review by Gustafsson and Autio (2006) of innovation system literature pointed out four types of failures: failures in evolutionary dynamics of innovation systems, lack of actor interactions and functions bridging knowledge production and use, sub-optimal lock-ins by implementing actors and lack of supportive structures for innovation.

For the purpose of this paper, we group the different typologies of systemic failures under the general title "systemic failures" as there are many linkages between structures for innovation, systems and functional elements within systems.

The sub optimal adaptation of innovation structures may take place due to firms' inability to unlock from dominant externalities. Firms are locked into systems and find it difficult to break away from them and pursue new knowledge or to establish new collaborations. The failure to be able to engage in new and better opportunities has been called "lock-in or path-dependency failure" by Smith (1997). Factors leading to failure to evolve from present systems may relate to institutional commitments and power relations (Walker, 2000). There is a tendency to strengthen both social and technological relations over time, making it difficult to break free (Weick and Roberts, 1993). The increasing rigidity of systems is due to uncertainties and financial risks. Consequently, systems tend to enforce exploitation rather than exploration. The actors and new technologies are hampered by both lack of legitimacy (Stinchcomb, 1965) and lack of interaction within the system (Carlsson et al., 2002).

Firms fail to react to discontinue technological change due to their path dependencies. If change is incremental, the tendency is towards structural inertia (Lundvall, 1988). Inertia creates a barrier for adaptation of new technologies. Firms may be able to overcome changes by establishing structures under the new technology regime. They can do that through standardization and new venture funding. If firms are not able to overcome changes brought about by radical or new technologies unrelated to their domains, they may not be able to establish structures under the new technology regime (Salter and Martin, 2001). Lack of standardization and market acceptance will increase users' risk to adopt new technologies and products. Moreover, in face of disruptive technological changes, deeply rooted path-dependent information processing mechanisms makes adaptation difficult (Nelson and Winter, 1982).

Failures in structures for innovation, systems and functional elements within systems hamper innovation activity and consequently may require intervention.

### **2.4 Systemic failures in services innovation**

Systemic failures refer to structural, institutional and regulatory deficiencies which lead to sub optimal investment in knowledge creation and other innovative activity. Actors not only perform at individual levels but they interact and exchange knowledge. Consequently, firms

establish links with other firms, universities, and government. If these interactions are poor, they will have a negative impact in the pace of innovation activity.

Moreover, systems interactions may be suboptimal, due to the system inability to function free from established externalities. Smith (1997) called it "lock-in or path-dependency" failure. Systems tend to evolve from more loose arrangements to more tight ones. Resources dependency limits action by individual actors, who tend to favour exploitation rather than exploration (Pfeffer and Salancik, 1978).

Gustafsson and Autio (2006) pointed out that systems tend to perform sub optimally specifically when profound technological changes are taking place. This is mainly due to lack of internal interactions and the high costs and risk involved in exploratory reconfigurations. When confronted with high uncertainty, systems tend towards inertia, and avoid taking the necessary measures to adapt to new circumstances. Government intervention is then necessary to help structural adaptation of innovation systems. Suggested measures to correct for system failure include policies to enhance interaction, trust, and coordination (Lundvall, 1988). Other incentives to correct for system failures include academic spin off schemes, science parks, venture capital, public procurement incentives in novel technologies (information and communications, health) (Gustafsson and Autio, 2006).

### **3. Policies and policy intervention**

A common concern is that innovation policy is not adequately serving the needs of services firms. By comparing innovation indicators for firms in the service and manufacturing sectors one can examine whether firms' responses to questions related to their innovation behaviour support this concern or not. The 2007 INNO Metrics thematic paper on "Innovation Statistics for the European Service Sector" has analyzed two different databases, the Community Innovation Survey (CIS) and Flash Barometer Survey (FBS) to look at differences between manufacturing and services firms on 8 different policy areas. Results of this report and more details are provided in Annex A and Annex C. Section 3.1 will first discuss the 8 policy areas and related market failures in more detail in particular as they might apply to KIBS. Section 3.2 will discuss the policy areas and related systemic failures. Section 3.3 will discuss four types of broad policies which could be used to solve market and systemic failures. Section 3.4 provides a summary table linking the market and systemic failures to the 8 policy areas and the policies which could be used to correct for these failures.

#### **3.1 Policy areas**

##### **3.1.1 Intellectual property**

Approximately twice as many manufacturing than services firms applied for a patent and more manufacturing than services firms applied for a trademark (cf. Arundel et al., 2007). A much lower percentage of firms in KIBS apply for a patent than manufacturing firms (12% versus 20%) and KIBS firms are also less likely to apply for a trademark. The percentage of service and manufacturing firms that registered an industrial design is similar (16% versus 19%). Service sector firms are slightly more likely than manufacturing firms to claim copyright (6% versus 5%). However, this is almost entirely due to KIBS, where 13% of firms claim copyright. This is probably due to the use of copyright by computer software firms.

Two possible market failures may be present when innovation involves protecting intellectual property. The first one relates to externalities. It is commonly agreed that the services sector has a positive impact on other sectors. In specifically, certain services sub

sectors, such as business services, contribute directly to technological innovation (software and engineering) and impact other industries that make use of the sub sector outputs.

Even though the sector, in general, has a lower participation in R&D investments, when compared to manufacturing, due to the sector heterogeneity, the degree of R&D investment and consequently, the use of intellectual property are unequal. Engineering and computer services, for example, score higher in R&D expenses when compared to retailing, wholesale, transport, and financial services.

When the services sub sector involves technology, protecting intellectual property becomes relevant for firms investing in R&D to safeguard their findings, so as to recoup R&D costs. This would be particularly relevant for SMEs, due to their limited market power and financial constraints. Developing strong systems that would prevent appropriation of intellectual property would pave the way for increasing investments in the services sub sectors that have an R&D (technology) component, with consequent positive impact in other sectors.

The second market failure relates to asymmetric information or lack of transparency. One possible way to avoid less informed parties to end up in a disadvantage or to avoid taking risk (and innovate) is to protect innovation through intellectual property rights. Furthermore, as pointed out by Kox and Rubalcaba (2007), many knowledge intensive business services are considered credence goods, where reputation is fundamental. The large gap between manufacturing and services firms for the use of trademarks suggests a lack of information or experience by service sector firms, since trademarks should be equally relevant to both industrial and service sector firms.

Encouraging service firms *in general* to make use of intellectual property (such as patents, design registration), would not be relevant considering the sector heterogeneity, but qualified policies, designed specifically for certain sub sectors, which have an important component of R&D, for example, software, engineering and computer services, would not only create incentives for firms to take risks and invest in R&D, knowing that their innovations would be protected by intellectual property laws, but would also reduce relative disadvantages of less informed parties, specifically SMEs.

Moreover, there is no apparent reason for services firms not to make use of trademarks, considering the relevance of reputation (and consequently the need for brand recognition). The fact that the sector recurs less to trademarks when compared to the manufacturing sector, suggests the existence of information asymmetry, where firms that make use of trademarks have an advantage in terms of brand recognition and repeated sales.

In summary, policy might be able to correct for externalities and asymmetric information, by designing qualified IPR policies for services firms involved in innovation activities, with specific incentives for SMEs due to their vulnerable position and creating the necessary incentives for firms to make use of trademarks and build awareness through brand recognition and the building of reputation.

### **3.1.2 Public procurement**

According to Arundel et al. (2007), a higher percentage of innovative manufacturing firms (14%) than service sector firms (11%) report a lack of demand as a problem, although there is little difference between KIBS and manufacturing firms. Government plays a role in demand, as a consumer of innovative products and services. The existence of a public procurement mechanism that is open, competitive and efficient would have a positive impact in innovation activity. Public procurement can stimulate the development of new services, as for example, e-government, e-health, e-education, etc.

The three market failures that would impact negatively on public procurement relate to asymmetric information / lack of transparency, market power and property rights. It is only through an open, competitive and efficient public procurement that the development of new services could take place. To be open, all participants should have access to information. To be competitive, markets can not be dominated by monopolies or few large players. Market power should be spread, so more firms are able to participate.

In summary, public procurement if used well could be an important driver for those sectors where the public sector is a major client. In particular, public procurement could drive innovation by increasing competition and the number of companies active in a market.

### **3.1.3 Qualified personnel**

The CIS asks innovative firms about the importance of a 'lack of qualified personnel' as a factor hampering their ability to innovate. According to Arundel et al. (2007), more manufacturing than service sector firms report this factor as of high importance (12% versus 10%). There is little difference within the service sub-sectors, with equivalent percentages for KIBS and other service sectors. Moreover, according to the FBS survey, there is no difference between the two main sectors in terms of satisfaction with the qualifications of university graduates.

These findings suggest that there might be no reason to preferentially favour service sector firms over manufacturing firms in innovation programmes to improve the supply of trained personnel. On the other hand, the nature of the skills need for innovation in service sectors may differ from manufacturing and there are a few areas that policy could benefit the services sector: private household as employer and family policy measures (and their inter-relations) and special skills.

Family policy measures may improve the balance between family and work, which is specifically beneficial for women, specifically mothers. These measures could have a positive impact in the number of highly skilled women joining the job market. Although family policy measures would benefit all economic sectors, they would have a significant impact in the service sector due to its nature and characteristics. Service sector allows for greater flexibility in terms of location (for example, the household has become an increasingly important field for new jobs) and time. Part-time arrangements are more common in the services sector than in manufacturing, due to greater flexibility in services in general. Related policies would include infrastructure of education (child care, day care centres, full-day schools), tax allowances for the cost of child care, encouraging mothers to take jobs, etc.

Services ask not only for highly qualified personnel, which are supplied by the tertiary sector, but due to the sector's heterogeneity, a wide range of skills, which can be acquired through vocational training and training on the job. To make the qualifications obtained in the dual system easily accepted elsewhere in Europe and increase mobility, foreign language skills and intercultural competences could be improved and more periods spent abroad included as part of the training.

In summary, policy on supplying qualified personnel, in particular, tertiary education would benefit the economy as a whole, but policy focus on promoting new services skills, vocational training, and training on the job, with a clear mobility component (training abroad, language and intercultural skills) would be specifically beneficial for the services sector and the formation of an EU common market for services. Policy intervention in the supply of qualified personnel and programs geared towards labour mobility (training abroad, languages and intercultural skills) would facilitate resource (labour) mobility.

### **3.1.4 Access to public science**

Due to the complexity of modern science<sup>2</sup> and the need to combine knowledge in new ways, firms frequently source knowledge and capabilities from other firms and institutions. Of interest to policy is the function of the 'public science' sector (publicly funded universities or other higher education institutes plus government or public research institutes). National innovation policies may facilitate public science to transfer research results with potential commercial applications to the private sector. This system has focused largely on the manufacturing sector. The service sector, on the other hand, may be at a disadvantage.

The CIS contains several relevant questions, based on the percentage of firms that collaborate with public science and the percentage of firms that give a 'high' rating to the importance of public science as a source of information to their innovation activities. Results are available separately for universities and higher education institutes and for government and public research institutes. The question on collaboration also asks respondents to indicate which collaboration partner was 'most valuable for their innovation activities?'

With the exception of KIBS, service sector firms are considerably less likely to collaborate with universities than manufacturing firms. One possible explanation could be that service sector firms, except for KIBS, could have little to gain from university research results, which are often far from the market. As suggested by Arundel et al. (2007), the fact that the gap between manufacturing and services declines for collaboration with government and public research institutes, which tend to focus on applied research, suggests that part of the lack of collaboration with universities is due to research results that are not of use to service sector firms.

According to the theory of market failures in resource mobility, the efficient allocation of resources requires that the factors of production are free to move to wherever returns are the highest. If the public science sector sees limitations for the service sector (except for KIBS) to find commercial applications for their research results (possibly due to the intangible nature of services), then resources for funding applied research may not be allocated for the public research with possible service oriented (intangible) output. In this case, innovation activity in the service sector would be hampered by lack of resources in the public sector for projects not involving tangible outputs. If this is correct, then policy is required to support research in the public science sector that would result in intangible outputs with commercial application in the services sector.

In summary, some re-orientation of policy intervention on links between public science and firms may benefit KIBS in particular, which is more likely to gain from collaborations with both universities and governments due to its knowledge component and for a broader incentive for the public science sector to invest in research with possible intangible results that could have commercial applications in the service sector.

### **3.1.5 Start ups**

CIS firm level data provides information about start-ups between the years 1998-2000. The data indicates that higher shares of firms in services than in manufacturing are start ups and start up formation is highest in KIBS, particularly among innovative firms. Even though these results suggest that there is no need to preferentially support start ups in the service versus manufacturing sectors, considering that in general, start-up formation rates are higher in services, the same conclusions may not apply across all services sub sectors. A

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<sup>2</sup> Public science is used here in a broad sense to include engineering, humanities and the arts.

more detailed analysis of start up formation at sub sector level would be relevant for designing policies.

Although SMEs have the potential to innovate, they tend to spend low shares of their revenues in innovation, negatively impacting innovation activity and productivity growth in their industry and in the economy in general. One of the reasons is that SMEs lack the necessary funds to both be established and to develop. One possible market failure at play would be related to resource mobility, in specific, lack of venture capital.

The establishment of attractive conditions for an internationally oriented venture capital market would facilitate the formation and development of new firms. In Germany, for example, one of the aims for creating new businesses is to increase the self-employment ratio (Annual Economic Report, 2006).

Although the presence of new and small businesses in an economy creates a series of positive externalities (such as employment), small businesses are mostly bounded to operate in domestic markets and in certain sub sectors. For these reasons, policy at national level could be more effective. Even though SMEs tend to operate at national level, the formation and development of new firms would benefit from a common EU services market, with common regulations and standardization.

There may be other types of market failures at play, including the existence of market power in the hands of a few larger firms, creating entry barriers for new firms with innovative offerings; or the existence of information asymmetries, leading to the use of reputation by incumbents, which would be more difficult in the case of new and small firms, that have not had the time to build their own brands.

In summary, policy could benefit all economic sectors by creating an attractive venture capital market, with a particular positive impact on new and small firms. Considering that services firms face more barriers than manufacturing ones to operate outside national borders, and consequently have less opportunities to grow based on economies of scales created by larger markets, SMEs in the services sector would benefit from an increased access to available financing and from an increase in financing.

### **3.1.6 Support for innovation programs**

Policy support for innovation is believed to favour industrial over service sector firms. This could partly be due to higher levels of investment in innovation in manufacturing firms, or at least in activities such as R&D where public support is widely available. An evaluation of a possible bias in innovation support to industrial firms should be informed by the percentage of firms by sector that are eligible for receiving specific types of support.

The CIS data only permit an evaluation of the percentage of all innovative firms that receive public support. Data is available for firms that received any public support for innovation and such support from the European Union. A substantially higher percentage of manufacturing firms (29%) than service sector firms (16%) report any support (mostly from regional or national authorities), although KIBS firms (23%) perform almost as well as manufacturing firms. A higher percentage of manufacturing (5%) than services firms (4%) receive support from the European Union, although this percentage is inflated by the presence of KIBS firms, which reports an even higher percentage of firms receiving European support (7%).

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 programmes more towards the needs of service sector companies. This applies equally to EU programmes which can also then influence national and regional programmes, and may also play a role in fostering a common market in services.

### **3.1.7 Regulatory burden**

In the FBS, innovative SMEs that had introduced a product or service innovation in the previous two years were asked if the need to meet national regulations for their innovations placed their firm at a competitive disadvantage in respect to their competitors. The regulations were divided into four types: environmental, consumer protection, safety, and product design characteristics. Although a lower percentage of service sector SMEs than industrial SMEs report that national regulations on product and process innovations placed them at a competitive disadvantage, with the exception of consumer protection rules affecting service sector, these results may not be applied to all services sub sectors. In addition, service firms may be less affected than manufacturing firms by differing national regulations because services are less likely to be traded across national boundaries.

The services sector is seen as highly regulated. Due to its heterogeneity, regulatory burden needs to be explored at sub sector level. Certain sub sectors may require de-regulation while others may even require re-regulation. To add to the problem, the fragmented nature of the European markets leads to heterogeneity in regulation not only at sub sector level but also at national level.

Negative impact of regulation at sub-sector level may be related to different types of market failures, including negative externalities, market power, asymmetric information, and lack of resource mobility. These market failures may be present in different sub sectors, at different intensities. Considering that regulation differs at sub sector level, and national level, the creation of a European common services market would be influential in terms of common regulations at sub sector level. Such policies should have the greatest impact in specific sub sectors where excessive rules hamper cross border provision of services, leading to diseconomies of scales and lack of incentives to innovate.

### **3.1.8 Access to finance**

According to CIS-4 data, a higher percentage of manufacturing than service sector firms report problems with shortage of funds within the firm, which could be related to higher innovation costs. In terms of external financial sources, a higher percentage of manufacturing than service sector firms report difficulties. As for KIBS firms, considering that many of them are likely to be start-ups, there seems to be a lack of venture capital in general, rather than a bias in supply towards manufacturing.

Results indicate that firms in the services sector were less likely to report high innovation costs as a barrier for innovation compared with manufacturing firms, suggesting that innovation is less expensive in the service sector. However, both services and manufacturing responses indicate that there might be a problem of finance due to underdeveloped venture capital markets within Europe.

Efficient and sound financial markets are necessary to ensure a constant supply of capital for both formation and development of enterprises, regardless of the sector. Financial

markets not only benefit established firms, but also provide venture capital for new firms and for firms to fund innovation programs. Sound financial markets demand also a sound legal and regulatory system, which provides for the efficient functioning of the markets. Moreover, in order to attract funds from outside, EU financial markets must ensure that international standards are complied with and that markets are transparent. Consequently, sound financial markets demand a certain level of homogenization, transparency and supervisory systems in place. The existence of such markets would benefit all economic sectors. In this sense, possible market failures in this area would relate to negative externalities, market power (control of financial markets by large institutional investors, for example), asymmetric information and lack of mobility in terms of funds. There do not appear to be market failures that are specific to services firms.

### **3.2 Policy areas and systemic failures**

Systemic failures may be related to several of the policy areas discussed in this paper. Considering that systems might be under performing due to either poor or lack of interactions among actors, the policy areas “Improve use and access to public sciences” and “Improve support of innovation programmes for service sector firms” would be relevant for intervention. Effective measures in both policy areas would lead to more coordination and incentives for services firms to invest in innovation activities leading to novel technologies. Such measures can help firms to break away from lock-in systems, and explore new configurations, involving new collaborations.

Other policy areas may be connected to systems failures. For example, policies can help building up trust, so firms will be motivated to engage in exploratory activities. One way to build trust is to ensure a regime of appropriability (“use of intellectual property”) that would create incentives for firms to explore new configurations, and exploit the results of their efforts. Another example relates to policies in “public procurement”, which would also create incentives for firms to explore novel technologies or configurations.

Policies in the area of “support foundation of start ups” (venture capital) and “financing” would help firms in terms of costs and risks involved in new exploration activities, such that these firms’ new ventures or incumbents taking the risk of breaking free from rigid systems and looking for new alternatives.

Finally, systems failures may relate to policies to “reduce regulatory burden”. As discussed, systems tend to evolve from loose arrangements to more tight and rigid ones, or from less bureaucratic ones to highly regulated, with little margin for change. The end result is that firms tend to favour exploitation instead of exploration. For innovation activity to take place, policy needs to assess the necessary level of regulation, so firms have a supportive environment to pursue new knowledge, and break away from inertia, which is characteristic of highly regulated systems.

In summary, systemic failures may be associated with most policy areas discussed in this paper, which may indicate the need for policy interventions.

### **3.3 Mapping policies**

There are many different ways to map services innovation policies. Van Ark et al. (2003) suggested grouping them into four categories: horizontal, vertical, broadening and deepening policies. By using this structure, the authors emphasized the idea of convergence with manufacturing policies / cross sector policies plus the reinforcement of synergies and complementarities between manufacturing and services sectors, avoiding contradictory effects between the two sectors. We adapted the authors’ 4D structure to incorporate

targeted policies, which we believe would be relevant for the services sector. Considering the sector heterogeneity, and different needs at sub sector level, we believe there is scope for targeted policies that would be developed to access specific needs at sub sector level.

- **Horizontal policies**

Horizontal policies are not directly related to innovation, but they are also important in supporting innovation activity. Horizontal policies are cross sector, and consequently they lead to convergence with manufacturing oriented policies. For example, human capital in terms of education, training, and mobility; cooperation among firms and between firms and research institutes. Another important area relates to demand as a driver for innovation and the need to deregulate markets to stimulate demand for new offerings, leading to an innovation culture.

- **Deepening of current innovation policies**

The idea of deepening current innovation policies suggests that existing policies that have been developed for the manufacturing sector should be extended to the services sector and that should focus more on non-technological aspects of innovation. The deepening of current innovation policies should also aim to create spill over effects, with clear benefits for all sectors.

Innovation policies in place tend to focus on technological aspects of innovation (R&D). The deepening of such policies would mean incorporating incentives for non technical innovation (organizational and marketing innovation). Furthermore, the technological component of actual innovation policies should also be extended to both services firms and services functions and to promote an “innovation culture” in the service sector. Van Ark et al. (2003) suggested that current policies should promote links between services firms and public and private research organizations in areas of technical and non-technical innovations.

- **Broadening policies**

Considering the links between the manufacturing and services sectors, the existence of services functions within manufacturing firms and the link between organizational innovation and ICT, it is clear that services and manufacturing are increasingly interconnected. If this is true, then there will be less need to develop specific policies tailored to the services sector, as the lines between the two are becoming more and more blurred. Van Ark et al. (2003) suggested that in the future, when designing new innovation policies, they should be aimed at the services function in both services and manufacturing sectors. Broadening policies would be particular relevant for reinforcing synergies between the two sectors.

- **Targeted policies**

Due to high heterogeneity within the services sector, there is scope for targeted policies. As discussed, KIBS has a significant role in services innovation. KIBS firms are more likely to introduce a technical innovation than other services firms, although less likely than industrial firms to apply for patents and trademarks. Moreover, KIBS firms rely more on public sciences than other services sectors, probably due to the technology component of its innovation activity. KIBS firms also collaborate more with universities than any other services sub sector and are more likely to be start ups than firms in other sectors or services sub sectors. These results place KIBS firms in a different position when compared with other services sub sectors. If KIBS occupies such a relevant position in the services sector, then policy directed for further development of KIBS could be relevant, considering positive spill over in other areas of the economy.

But the relevance of KIBS in the services sector also points to the need to support other sub sectors where innovation is non-technology oriented (organizational and marketing

innovation), that lack adequate (financial) support. Moreover, there are a significant number of SMEs in the services sector, due to its more local oriented scope. SMEs require more support in terms of venture capital, financing and intellectual protection to engage in innovation activity. Furthermore, other areas may require target policies. For example, although policy related to education benefits the economy as a whole, there is a need to develop vocational training targeted to new skills demanded by the services sector. These are only a few examples that illustrate how targeted policies could benefit the sector and its sub sectors.

### **3.4 Market failures and policies**

Innovation in services faces a range of market failures and systemic failures that are similar to those that occur in the manufacturing sector. But for services innovation these failures differ in their nature and their degree as compared to manufacturing. The existence of these failures suggests that there is under-investment in services innovation. Governments could remedy the effects of these failures by either extending and/or adjusting already existing policies or by designing and implementing new policies. Based on the discussion in the previous sections, Table 1 tries to summarize the nature of the different market failures in the 8 identified policy areas, suggests which kind of policies could be used to correct these failures and lists several examples of national policies already implemented in some of the EU Member States.<sup>3</sup>

## **4. Conclusions**

Services are becoming increasingly important as an engine for economic growth. Innovation policies have for a long time focused on technological innovation, in particular on R&D driven innovation. The Knowledge Intensive Business Services (KIBS) come closest to this concept of technological innovation. But in most services firms a significant share of innovation is of a non-technological nature, firms innovate by way of organisational and marketing innovations. These firms face similar market and systemic failures as manufacturing firms relying on technological innovation. But for a long time innovation policies have been focused on correcting market failures in technological innovation. Nevertheless there is a growing consensus that services innovation is in need of similar support mechanisms in order to raise investments in innovation towards a socially optimum level.

This report has tried to identify existing market failures in services innovation and to match them with 8 policy areas where services innovation might be different from manufacturing innovation. An attempt has been made to identify relevant policy types for each of these failures and to suggest examples of already existing policies at the national level within the EU.

Market failures are most prevalent in the following policy areas: Use of intellectual property, Public procurement, Start-ups, Support of innovation programmes, Reducing regulatory burden and Improved (access to) financing. Systemic failures have been identified in the following policy areas: Use of intellectual property, Public procurement, Use of and access to public science, Start-ups, Support of innovation programmes, Reducing regulatory burden and Improved (access to) financing. Government intervention could be called for to correct

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<sup>3</sup> Annex D gives examples of countries' approaches to innovation policies in services. Annex E gives examples of specific policies at the national level.

for these failures, but more research is needed to identify the extent and impact of these failures so that the most appropriate policies can be implemented.<sup>4</sup>

Some of the key messages resulting are:

- There is a need to increase competition in services to raise innovation. Competition could be stimulated e.g. by increasing cross border tradability and by an increased use of public procurement aimed at provoking creative solutions;
- Within services we observe that there is a relatively higher importance of intercultural and language skills. These could be supported by more (and targeted) training and mobility programmes.
- Non-technological innovation is much more prevalent in services than in manufacturing. Innovation support programmes are needed which support organizational and marketing innovations similar as R&D support programmes have supported technological innovation.
- Services firms need to be encouraged to make more use of existing intellectual property rights. IPRs may need to take further into account the specificities of services and services innovation such as their reliance on non-technological innovation and the fact that many services are credence goods where reputation plays a determining factor for achieving market success.

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<sup>4</sup> It is necessary to first identify these market and systemic failures in detail as implementing policy interventions which do not precisely tackle these failures might lead to other market distortions.

**Table 1 Services innovation: policy areas, market failures and (examples of) policy intervention**

Policy area	Market failures/Systemic failures	Yes/No	Type of policy (horizontal/ deepening/ broadening/targeted)	Examples of (national) policies <sup>5</sup>
1. Encourage service sector firms to use intellectual property	Externalities (positive / negative)	YES	<b>Deepening / Targeted</b> <ul style="list-style-type: none"> <li>Attention to credence goods, where reputation is fundamental / Brand awareness and Trademarks registrations</li> <li>Sub sectors with R&amp;D component</li> <li>SMEs</li> </ul>	Sweden: <ul style="list-style-type: none"> <li>Intellectual property rights to assess risks and future investments</li> </ul> Belgium: <ul style="list-style-type: none"> <li>Attention to legal issues (EU regulation on copyrights)</li> </ul>
	Market power / distortion			
	Asymmetric information / Transparency	YES		
	Resource mobility			
	Appropriability / Property rights	YES		
	Systemic failures	YES		
2. Public procurement (demand factor)	Externalities (positive / negative)		<b>Horizontal / Deepening</b> <p>Indirect effects from policies in other areas:</p> <ul style="list-style-type: none"> <li>Creating a financial market – availability of credit</li> <li>Reduction of regulatory burden to create conditions for firms to tap foreign demand</li> <li>Clear regulations and creation of standards (facilitating cross border operations)</li> <li>Incentives for firms to compete / control of market power</li> </ul>	Estonia: <ul style="list-style-type: none"> <li>e-government (e-taxation; e-voting)</li> </ul> Sweden: <ul style="list-style-type: none"> <li>public e-services (e-health)</li> </ul> Bulgaria: <ul style="list-style-type: none"> <li>e-government</li> </ul>
	Market power / distortion	YES		
	Asymmetric information / Transparency	YES		
	Resource mobility			
	Appropriability / Property rights			
	Systemic failures	YES		
3. Improve supply of qualified personnel	Externalities (positive / negative)		<b>Horizontal / Targeted</b> <ul style="list-style-type: none"> <li>Private household as employer (tax benefits) / family policy measures (child care, flexible hours ) supporting women's participation in the workforce</li> <li>Vocational training, training abroad, language, intercultural skills</li> <li>New services skills</li> </ul>	Finland: <ul style="list-style-type: none"> <li>Focus on education</li> </ul> Ireland: <ul style="list-style-type: none"> <li>Attention to education</li> </ul> Lithuania: <ul style="list-style-type: none"> <li>Innovation skills and culture</li> </ul>
	Market power / distortion			
	Asymmetric information / Transparency			
	Resource mobility	YES		
	Appropriability / Property rights			
	Systemic failures			

<sup>5</sup> Based on Cunningham (2007).

Policy area	Market failures/Systemic failures	Yes/No	Type of policy (horizontal/ deepening/ broadening/targeted)	Examples of (national) policies <sup>5</sup>
4. Improve use of and access to public science	Externalities (positive / negative)		<b>Horizontal / Deepening / Targeted</b> <ul style="list-style-type: none"> <li>• KIBS</li> <li>• Incentives for Public sciences sector to invest in research with intangible results, which could be commercialized by the services sector</li> </ul>	
	Market power / distortion			
	Asymmetric information / Transparency			
	Resource mobility	YES		
	Appropriability / Property rights			
	Systemic failures	YES		
5. Support foundation of start-ups	Externalities (positive / negative)	YES	<b>Horizontal / Targeted</b> <ul style="list-style-type: none"> <li>• KIBS</li> <li>• Internationally attractive conditions for venture capital</li> <li>• Availability of financing for Start up formation, development and investment in innovation activities.</li> </ul>	Portugal: <ul style="list-style-type: none"> <li>• financing and risk sharing</li> </ul> Croatia: <ul style="list-style-type: none"> <li>• facilitation of innovation-based start-ups (innovative services companies in IT)</li> </ul> Greece: <ul style="list-style-type: none"> <li>• entrepreneurship</li> </ul>
	Market power / distortion	YES		
	Asymmetric information / Transparency	YES		
	Resource mobility	YES		
	Appropriability / Property rights	YES		
	Systemic failures	YES		
6. Improve support of innovation programmes for service sector firms	Externalities (positive / negative)	YES	<b>Horizontal/ Deepening / Broadening</b> <ul style="list-style-type: none"> <li>• Support in this policy area will require first the formation of an EU common services markets, so services firms will have the incentives to invest in innovation, gaining economies of scales due to larger markets.</li> <li>• Formation of an EU common market for services will require intervention in several areas, correcting for negative externalities, market power, asymmetric information among agents, lack of resource mobility across borders and lack of a culture of property rights in the services sector.</li> </ul>	Finland: <ul style="list-style-type: none"> <li>• support for research, innovation, development of partnerships between public and private actors, internationalization and linkage with export industry</li> </ul> Ireland: <ul style="list-style-type: none"> <li>• support for international traded services (financial services)</li> <li>• support for research in services</li> <li>• support for generation of critical mass</li> </ul> Czech Republic: <ul style="list-style-type: none"> <li>• Improvement of innovation environment, including organizational and marketing innovation</li> </ul>
	Market power / distortion	YES		
	Asymmetric information / Transparency	YES		
	Resource mobility	YES		
	Appropriability / Property rights	YES		
	Systemic failures	YES		

Policy area	Market failures/Systemic failures	Yes/No	Type of policy (horizontal/ deepening/ broadening/targeted)	Examples of (national) policies <sup>5</sup>
				Spain: <ul style="list-style-type: none"> <li>• support for R&amp;D in services</li> </ul> Lithuania: <ul style="list-style-type: none"> <li>• R&amp;D intensive services</li> <li>• facilitation of knowledge transfer among actors</li> </ul> Luxembourg: <ul style="list-style-type: none"> <li>• Innovation policy in financial sector</li> </ul>
7. Reduce regulatory burden	Externalities (positive / negative)	YES	<p><b>Horizontal / Broadening</b></p> <ul style="list-style-type: none"> <li>• Need to look at sub sector level, as regulation may be sub sector specific.</li> <li>• At EU level, need for a common ground in terms of regulations and standards to allow for efficient cross border provision</li> </ul>	<p>Sweden:</p> <ul style="list-style-type: none"> <li>• deregulation of services markets</li> </ul>
	Market power / distortion	YES		
	Asymmetric information / Transparency	YES		
	Resource mobility	YES		
	Appropriability / Property rights			
Systemic failures	YES			
8. Improve financing	Externalities (positive / negative)	YES	<p><b>Horizontal / Targeted</b></p> <ul style="list-style-type: none"> <li>• Policy would benefit all sectors, not necessarily services. Within services, KIBS due to numbers of start ups in the sub sector</li> </ul>	<p>Portugal:</p> <ul style="list-style-type: none"> <li>• improvement innovation financing services</li> </ul>
	Market power / distortion	YES		
	Asymmetric information / Transparency	YES		
	Resource mobility	YES		
	Appropriability / Property rights			
Systemic failures	YES			

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## Annex A 2007 Thematic report on “Innovation Statistics for the European Services Sector” – Methodology and statistical results

A common concern is that innovation policy is not adequately serving the needs of services firms. By comparing innovation indicators for firms in the service and manufacturing sectors one can examine whether firms' responses to questions related to their innovation behaviour support this concern or not. The 2007 INNO Metrics thematic paper on "Innovation Statistics for the European Service Sector" (ISESS report) has analyzed two different databases to look at differences between manufacturing and services firms on 8 different policy areas.

### Methodology

The ISESS report analyses differences between services and manufacturing sectors by comparing the percentages of all firms and innovative firms to a range of questions in two surveys. A distinction is also made within services between KIBS and other services. Data analyzed in the ISESS report are obtained from two sources: the fourth Community Innovation Survey (CIS-4), which covers the innovative activities of firms in the three years between January 2002 and December 2004, and the Flash Barometer Survey 164 (FBS), which covers the two year period before the fall of 2004.

CIS-4 is a cross-sectional survey of all firms with over 10 employees in all 27 EU member states. It was conducted in most countries in the spring of 2005, with over 60,000 respondents in total. The survey includes all manufacturing sectors and many, but not all, services sectors (in most countries it does not include hotels and restaurants (NACE section H) or retail trade (Section G52)). Aggregate industry level CIS-4 data are available from Eurostat. The disadvantage of using aggregate CIS-4 data is that the data cannot be analyzed at the firm level, for example, to look at specific firm size classes or to combine different questions, and it is not possible to calculate the statistical significance of differences between the industrial and service sectors.

FBS is a cross-sectional survey, conducted in the fall of 2004. It collected data on policy use and the activities of innovative firms for the two-year period before the survey. No data were collected for firms that did not innovate. The results are based on a quota sample of 4,534 innovative small and medium sized enterprises (SMEs) with between 20 and 499 employees in 25 EU countries. The FBS results cover 2,005 industrial SMEs (mining, construction, and manufacturing) and 2,529 SMEs in the service sector. The latter are disaggregated into four sub-sectors: trade, transport, finance and communication, and 'other' services. The 'other' group includes knowledge intensive services, but also SMEs in the hotel and restaurant sector.

**Table A.1 Are policy interventions required to reduce programme bias against service sector firms?**

Policy area	Action needed?
1. Encourage service sector firms to use intellectual property	Qualified
2. Public procurement (demand factor)	Yes
3. Improve supply of qualified personnel	No
4. Improve use of and access to public science	Qualified
5. Support foundation of start-ups	No
6. Improve support of innovation programmes for service sector firms	Yes
7. Reduce regulatory burden	No
8. Improve financing	Qualified

### Results

By comparing responses to CIS-4 for firms in the services and manufacturing sectors, the ISESS report identified two policy areas where service firms' responses differ significantly

from those of manufacturing (Yes in last column), three policy areas where support could be required under specific conditions (Qualified in last column) and three areas where policy is not biased against service firms (No in the last column). Table A.1 summarizes these findings.

The statistical results are summarized in the following tables. The last two columns show the relative share of services and KIBS firms responding to each of the questions compared to the share of manufacturing firms.

**Section 1: Share of firms that introduced a product or process innovation (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Product and/or process	39	34	52	87	131
Product	27	22	42	82	157
Process	30	26	35	86	118

**Section 1: Share of firms that introduced a non-technical innovation (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Organizational and/or marketing	26	26	42	99	158
Organizational	23	24	38	104	169
Marketing	13	13	18	98	133

**Share of innovative firms that applied for a patent, registered a design or trademark or claimed copyright (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Patent	20	8	12	41	59
Design	19	16	18	87	94
Trademark	19	10	9	52	47
Copyright	5	6	13	109	231

**Section 3.1.1: Share of innovative SMEs that applied for a patent or registered a trademark (FBS)**

	Manufacturing	Services	KIBS*	Serv./Man.	KIBS/Man.
Patent	21	9	9	41	42
Trademark	21	14	11	68	53

**Section 3.1.2: Share of firms reporting a lack of demand for innovative products and processes (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
All firms	3	3	4	104	137
Innovators	14	11	13	79	97

**Section 3.1.2: Share of innovative SMEs reporting that public sector clients demand a higher or lower level of innovation from their products or services than business sector clients (FBS)**

	Manufacturing	Services	KIBS*	Serv./Man.	KIBS/Man.
Higher	16	14	16	90	98
Lower	11	13	14	118	130
Same	73	73	70	100	96

**Section 3.1.3: Share of innovative firms reporting a 'lack of qualified personnel' as a factor hampering their ability to innovate (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Higher	12	10	10	81	82

**Section 3.1.3: Share of innovative SMEs that are satisfied with the level of qualifications of national university graduates hired by the firm (FBS)**

	Industry	Services	Serv./Ind.
Very + somewhat satisfied	89	89	99
Somewhat + very dissatisfied	8	8	101

**Section 3.1.4: Use of public science: share of innovative firms valuing information source of high importance (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Universities	5	3	5	56	113
Research institutes	4	2	4	67	119

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**Section 3.1.4: Use of public science: share of innovative firms collaborating with universities or research institutes (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Universities	10	7	16	76	166
Research institutes	6	6	12	89	180
Seen as most important partner	4	3	8	82	208

**Section 3.1.5: Share of start-ups among innovators (CIS-3)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
All firms	3	4	7	115	194
Innovators	3	5	9	160	287

**Section 3.1.5: Share of start-ups among innovative SMEs (FBS)**

	Manufacturing	Services	KIBS*	Serv./Man.	KIBS/Man.
	10	10	10	96	97

**Section 3.1.6: Share of innovative firms that receive public support for innovation (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Any public support	29	16	23	56	82
EU support	5	4	7	74	134

**Section 3.1.6: Share of innovative SMEs reporting public support for eligible innovative activities (FBS)**

	Industry	Services	Serv./Ind.
Any public support for:	35	27	77
Use of innovation advice services	42	36	85
Participating in an innovation network	40	34	87
Training in support of innovation activities	17	17	100
Market research for innovations	15	13	92
In-house or contracted out R&D	20	12	57
Hiring new university graduates	13	7	50
Introducing innovative processes	11	7	68
Collaborating with firms, universities, etc.	8	6	70

**Section 3.1.6: Share of innovative SMEs that report that public support was crucial to their innovation projects (FBS)**

	Manufacturing	Services	KIBS*	Serv./Man.	KIBS/Man.
	27	24	31	89	125

**Section 3.1.7: Share innovative SMEs that report that national regulations for product and process innovations place their firm at a competitive disadvantage compared to their competitors (FBS)**

	Industry	Services	Serv./Ind.
Product and service innovations			
Environmental	26	16	60
Consumer protection	12	15	124
Safety	26	19	76
Product design	18	12	68
Process innovations			
Environmental	22	10	43
Consumer protection	16	14	88

**Section 3.1.8: Financial constraints: share of innovative firms giving a 'high' importance rating for financial barriers to innovate (CIS-4)**

	Manufacturing	Services	KIBS	Serv./Man.	KIBS/Man.
Lack of funds within enterprise	23	18	22	77	98
Lack of funds from external sources	18	14	17	75	93
Innovation costs too high	26	21	22	80	85

## Annex B Summary of differences between manufacturing and services innovation

<b>All firms</b>			
	<b>Manufacturing</b>	<b>Services **</b>	<b>KIBS ***</b>
<b>Technological innovation (new products and processes)</b>	Higher share for both product and process innovation	Lower performance compared to manufacturing	Most likely to introduce both product and process innovation when compared to both manufacturing and service sectors.
<b>Non technological innovation (new organizational and marketing methods)*</b>	No difference between manufacturing and services sector that introduced organizational or marketing innovation.		Far more likely to introduce both organizational and marketing innovation
<b>Innovative firms</b>			
	<b>Manufacturing</b>	<b>Services **</b>	<b>KIBS ***</b>
<b>Technological innovation (new products and processes)</b>	Higher share for both product and process innovation	Lower % of firms are technical innovators when compared to manufacturing firms.  Less difference with manufacturing firms when related to process innovation.	Most likely to introduce product innovation when compared to both manufacturing and service sectors, but less likely to introduce process innovation when compared to both manufacturing and service sectors.
<b>Non technological innovation (new organizational and marketing methods)*</b>	Less likely to introduce organizational or marketing innovation than service sector.	More likely to introduce organizational or marketing innovation than manufacturing firms, with greatest difference in terms of organizational innovation.	More likely to introduce organizational innovation than other sectors, but less likely than manufacturing and services to introduce marketing innovation.
<p>* Easier for firms to develop and implement. More common on service sector than manufacturing one.  ** Performance in service sector innovation is positively correlated with general innovation performance, although no evidence that KIBS is especially important as driver of general innovation.  *** Economic weight has been increasing in many countries. Sector includes many R&amp;D intensive firms that provide services to other firms (R&amp;D and software development). KIBS value added and employment shares are positively correlated with Innovation performance, but not its growth, due to different development patterns in new member states (rapid growth but still lower performance when compared to older EU member states).</p>			

**Annex C Summary of results: differences between services and manufacturing firms in each of the policy areas**

<b>Related Policies</b>	<b>Description</b>	<b>Status quo</b>	<b>Comments</b>
Encourage service sector firms to use intellectual property	Applying for Patents, design, trademarks and copyrights	Lower % of service firms use IP than industrial firms, except for copyrights where use rates are higher in the service sector, specifically for KIBS	Lack of information or experience with using IP (trademarks). Fewer eligible invention, designs and brands within service sector that can be protected by IP (fewer product inventions when compared to manufacturing)
Public procurement (demand factor)	Perceptions of potential market demand for innovative products. Demand from final consumers, other businesses and public sector	Industrial firms are more sensitive to demand conditions than services ones for low demand and reporting public sector as more demanding than business sector clients. KIBS firms are more similar to manufacturing ones	Lower % of services firms (except for transport) faces high public sector demand conditions for innovation than industrial ones
Improve supply of qualified personnel	Lack of qualified personnel as a factor hampering innovation and level of satisfaction with qualification of university graduates	Lower % of service firms than industrial ones have problems with obtaining adequate personnel, although levels of satisfaction with the qualification of university graduates is similar between the two sectors	
Improve use of and access to public science	Both publicly funded universities and other higher educational institutions plus government or public research institutes	<i>Collaboration:</i> More manufacturing than service firms collaborate with universities. As for services firms that collaborate with university, they are basically KIBS. Both manufacturing and services firms collaborate with government  <i>Information source:</i> Significantly more manufacturing firms give university a higher rating as an information source, followed by government	Universities are likely to provide less useful information to service firms and also there is less collaboration due to research results that are not of use to service sector (often far from the market)
Support foundation of start-ups		Proportionally more service firms and particularly KIBS as start-ups among all firms and innovative firms	

Related Policies	Description	Status quo	Comments
Improve support of innovation programs for service sector firms	Public support, support for using innovation advice services, R&D, hiring new graduates , introducing new processes and collaboration with other firms and universities	<p>Significantly higher proportion of manufacturing firms than service ones receive support (mostly regional or national), although KIBS firms perform similar to industrial ones. As for support from the EU, same patterns apply but not more skewed towards industry (due to higher % of KIBS firms than industrial ones receiving EU support)</p> <p>Significantly higher share of eligible industrial SMEs report public support, support for using innovation advice services, R&amp;D, hiring new graduates, introducing new processes and collaboration with other firms and universities when compared to services SMEs. Most frequent public support for industrial SME is to reduce costs, and for services SMEs is to improve quality of innovation</p>	<p>Tendency to favour manufacturing firms, at least in activities involving R&amp;D and hiring university graduates, where public support is available</p> <p>Industrial firms more geared towards reducing costs of projects that they would pursued anyways, while service firms more geared towards improving quality</p>
Reduce regulatory burden	Regulations may inhibit investment in innovation. Four types of regulation: environmental, consumer protection, safety, and product design characteristics	Lower % of service firms report problems with national regulations for product and process innovation compared with industrial firms. Except for the effect of consumer protection regulations on process innovations (involving service delivery)	
Improve financing	Need for venture capital markets and expertise in assessing risk and management needs due to knowledge asymmetries and risky nature of innovations	<p><i>Shortage of funds:</i> higher % of manufacturing firms than service ones report problems, possibly due to higher innovation costs</p> <p><i>External financial sources:</i> Higher % of manufacturing firms than service ones report difficulties</p> <p>Many KIBS firms are likely to be start ups, reporting higher innovation costs, lack of funds within enterprise and lack of finance from external sources than service firms, although lower than manufacturing ones</p>	<p>Possibly lack of venture capital in general rather than a bias towards manufacturing sector</p> <p>Service firms are less likely to report high innovation costs as barriers to innovate compared to manufacturing ones, suggesting that innovation is less expensive in the service sector</p>

**Annex D Services innovation: Countries' approaches to innovation policies in services**

	<b>Status and Approach</b>
<b>Australia</b>	Successful service economy Introduction of a limited number of instruments to facilitate innovation through services
<b>Finland</b>	Services as a growing area, also within the manufacturing industries Recently launched service innovation program Focus on productivity development
<b>Germany</b>	Recently launched service innovation program
<b>Ireland<sup>6</sup></b>	Quickly expanding services economy Productivity and innovation lagging behind manufacturing Services innovation critical to IT and manufacturing firms Study on policy options for services innovation: <ul style="list-style-type: none"> <li>• Re-branding and re-packaging policies and supports is not adequate</li> <li>• New and distinctive national services innovation policy is more effective <ul style="list-style-type: none"> <li>○ Framework environment: <ul style="list-style-type: none"> <li>▪ New and distinct business support framework for services innovation</li> <li>▪ Investment in telecoms and broadband infrastructure</li> <li>▪ Competitiveness and convergence: networks, clusters, centers of excellence</li> <li>▪ Innovation and creativity: education and skills development</li> </ul> </li> <li>○ Typology: <ul style="list-style-type: none"> <li>▪ New business models</li> <li>▪ Services delivery and new customer Interfaces</li> <li>▪ New Services-Products</li> </ul> </li> </ul> </li> </ul>
<b>Japan</b>	New Economic Growth Strategy Recognition of services along manufacturing
<b>New member countries<sup>7</sup></b>	Emerging policy area, still in awareness phase but with a few successful cases. Main problems relate to: <ul style="list-style-type: none"> <li>• Narrow understanding and focus on technological innovation</li> <li>• Insufficient awareness by stakeholders</li> <li>• Service firms are passive and not active innovators</li> <li>• Lack of research, case studies and media attention</li> <li>• Innovation in services seen as " soft concept" – requires more time to be absorbed by stakeholders</li> </ul>

Source: Kekkonen (2006).

<sup>6</sup> Evertsen (2006)

<sup>7</sup> Stare and Bucar (2006)

**Annex E Examples of national policies fostering services innovation**

Country	Program	Timing and Resources	Targets	Objectives	Challenges
Finland <sup>8</sup>	Serve	From 2006 to 2010 Approx. 100 million euros – Tekes (Finish Funding Agency for Technology and Innovation) finances 50%	Emphasis on B to B services  KIBS (software design, consulting, R&D, legal services, corporate finance and business administration, marketing, advertising, engineering) Trade Real Estate Services Industrial Services Financing and insurance Logistics Asset Management Services	Modernization of industries by service-driven business concepts (for manufacturing and construction sectors) Reforming service markets (for service sector)  Development of new services concepts and service business based on these concepts	Role of customer in service business and service innovation process <ul style="list-style-type: none"> <li>Understanding customer needs and turning them into profitable business</li> <li>Customer as a development partner</li> </ul> Service Business Management and Leadership <ul style="list-style-type: none"> <li>Creating a service mindset in organizations and their customers</li> <li>Pricing models and profitable business models</li> </ul> Development of new service concepts <ul style="list-style-type: none"> <li>Mechanisms for developing new services</li> <li>Scalability of services concepts (scale vs. customization)</li> </ul>
Finland <sup>4</sup>	IPPS – Innovation Policy Project in Services INNO-Net			Develop a common roadmap that will lead to: <ul style="list-style-type: none"> <li>Possibility to prepare joint activities at transnational level</li> <li>Knowledge of possible barriers</li> <li>Knowledge of suitable and eligible partners for transnational cooperation</li> </ul>	Exchange information and best practices with Member States Need for a broad-based transnational collaboration activities in the field of service innovation In the long term, achieve an effective and balanced innovation policy which will be industry neutral Need for more balanced mix of innovation policy using both demand and supply side measures to promote service innovations

<sup>8</sup> Tanninen-Ahonen (2007)

Country	Program	Timing and Resources	Targets	Objectives	Challenges
Germany <sup>9</sup>	"Innovation with Services"		Innovation management Fast-growing areas of the services sector People in service companies	Improve Germany's market position in the field of services Systematic development of new services plus guarantee of quality of existing services  Establishment of conditions necessary for attractive jobs at various levels  Realignment of service research according to economic, social and technological development	Cooperation between research and practice Public awareness International monitoring for areas of action and global trends
Japan <sup>10</sup>	New Economic Growth Strategy	As from 2006	Healthcare and welfare services Childcare services Tourism and visitor attraction services Media contents Business support services Distribution services	Promote and facilitate accelerated innovation in the service sector, as one of the "Twin Engines for Economic Growth"	Promote international cooperation among related researchers and organizations: <ul style="list-style-type: none"> <li>• Establishment of networks among public, private and academic sectors</li> <li>• Fostering research in services</li> <li>• Development of human resources</li> </ul>
Japan <sup>6</sup>	Other policy measures		Health and welfare, childcare Sightseeing and visitor attractions Business support services	Funding advanced business models of services	
				Collecting "best practice" business models and disseminating to the public	
				Human Resources development	

<sup>9</sup> Zahn-Elliott (2006)

<sup>10</sup> Ministry of Economy Trade and Industry Japan "Present Status of Services Industries in Japan and its Innovation Policy"

Country	Program	Timing and Resources	Targets	Objectives	Challenges
				Programs in respective services areas	
<b>Ireland</b>				Focus on: <ul style="list-style-type: none"> <li>• Productivity growth, cost competitiveness, off shoring</li> <li>• Innovation and Technology</li> <li>• Labor market and skills</li> <li>• Management capabilities</li> <li>• Expertise in markets and customer needs</li> </ul>	
<b>NMS<sup>11</sup></b>	<b>Initiatives from different stakeholders</b>		ICT and non-ICT related Service sectors and service functions SMEs as main targets	Based on own political, socio-economic and cultural environment Alliances Popularize good practices Pointing to different forms of service innovation Emphasis on education and training Cooperation and coordination among policies	Awareness building Lack of critical mass of innovation services Introduction of best practices of EU to NMS Upgrade administrative capacity Ensure policy coherence Manual / handbook for services innovation with case studies illustrating different dimensions of innovation in services

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<sup>11</sup> Stare and Bucar (2006)