Innovation and Competitiveness Policies

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NATIONAL INNOVATION SYSTEMS AND POLICIES

Innovation key driver of economic growth

CREATING A SUPPORTIVE ENVIRONMENT FOR INNOVATIVE DEVELOPMENT

A broadly accepted definition of innovation is the successful commercial or social exploitation of new ideas, where the idea is successfully brought to the market by offering a more effective alternative to existing arrangements. Firms and other business entities are the main agents of innovation in the modern economy.

Innovation in the commercial sector provides a competitive advantage over others in their market place. In today's economy, it is necessary for all companies to connect knowledge to the market successfully in order to remain competitive. At the macro level, dynamic innovation activity by firms raises the competitiveness of the national economy. Policies enhancing the innovation performance of firms therefore also help boost national exports and economic growth.

In order to innovate, firms need to gain a good understanding of their markets in order to appreciate the market pull for commercial benefits and to connect relevant knowledge that may be new to the market. Consequently, they need to look at related technology push and to develop internal management systems that bring them together and combine them with business opportunities.

Innovation relies on the production, diffusion, absorption and utilization of knowledge. For this process to reach its potential, each stage has to be understood and managed in relation to the other components and has to be driven by incentives. The recognition that there may be shortcomings in the performance of the operational units in this chain of activities has led to the development of policies and institutions which attempt to coordinate supply and demand for knowledge and set in place the capacity that builds the potential to diffuse and absorb ideas.

In the modern economy, innovation emerges from a continuous interaction between firms, their suppliers and buyers and external actors like universities or research and development (R&D) organizations. Firms are not isolated in their innovation activities but rather perform them in networks; these activities are highly dependent on the external environment at the sectoral, regional and national levels. The term "national innovation system" (NIS) characterizes the systemic interdependencies within

a given country, which influence the processes of generation and diffusion of innovation in that economy.

The new models of innovation emphasize the collaborative relations between firms as a source of competitive advantage. This requires from firms the ability to develop specific skills and put in place strategies aiming to achieve superior innovation performance by explicitly incorporating the interactions with other innovation stakeholders.

Small and medium-sized enterprises (SMEs) are important stakeholders in the innovation process. They enjoy greater flexibility and can therefore take more risks than larger companies in experimenting with new processes or technologies. Thus SMEs are well placed to capture ideas from the research base of universities, other public sector institutions and commercial laboratories and drive them to the market place.

Commercializing an innovation can be an extremely difficult and cumbersome process, especially for start-up innovating entrepreneurs who need to overcome a myriad of barriers in the financing, technological, managerial, regulatory, administrative and other spheres. The main role of public policy in this regard is to establish a conducive environment that supports innovating entrepreneurs in bringing their innovation to the market. This includes both direct and indirect support through various public agencies, but also public support for the establishment of private innovation support institutions.

Effective implementation of innovation policy therefore requires the presence of an efficient institutional system. The horizontal nature of innovation policy and the variety of entities involved in innovation performance at both central and regional levels demands appropriate coordinating mechanisms.

To strengthen the technology environment, there needs to be support from innovation networks that link a number of national and regional institutions and programmes. These include research and innovation funding, networks that link demand and supply of technology, programmes of individual ministries that support the national innovation strategy, physical infrastructure, technology transfer organizations, business support, discussion fora, standards organizations, finance structures, research activities, national and learned societies and industry, etc.

Firm innovation activity is a key driver of competitiveness and economic growth. Although the process occurs at a company level through the skilful management of firms, firms' innovation performance can be enhanced by appropriate policy measures conducted in a business-friendly environment.

The provision of such a supportive business environment calls for a coordination of a number of policies and the related public investment that help in shaping the "soft" and physical infrastructure, as well as the legislative framework in which the private sector operates.

Innovation and Competitiveness Policies

Developing national innovation systems provides a framework in which to embed policy, guide investment and bring together the stakeholder partners in the process:

- The national innovation system provides an institutional and business environment that supports the creation and demand for knowledge as well as its diffusion and absorption into business activities; and
- Such a system is most effective if business benefits from this and increases its investment in the innovation process.

The most effective influence on business is market opportunity. Businesses will innovate when they see innovation as an important business opportunity. This implies that companies can both recognize and understand how to exploit the innovation-driven market. Policy can also provide support to businesses in identifying innovative business opportunities.

Innovation by companies also requires access to capital to commercialize innovative market opportunities. Capital needs to be channelled to innovating companies in an effective manner to make the innovation process self-sustained.

Among the key factors driving the innovative activities of firms are the following:

- Investment in education that is relevant to business. Universities need to link with business and develop courses that are relevant to the operational units that make up national innovation systems.
- Support to investment in R&D by both government and business. Governments can stimulate private R&D investment by ensuring the fiscal structures provide the necessary incentives to businesses.
- Business investment in innovation strategies. It can be stimulated by both relevant education and incentives to influence companies so that they recognize the need to change. Appropriate management training programmes can support this process;
- Specific policy measures to address the concerns of SMEs and to provide a conducive environment for such firms to engage in the commercialization of innovative business opportunities.
- Establishing strong and self-sustained industry science linkages. Public policy is a key factor for stimulating the cooperative efforts of all the relevant stakeholders in the innovation process.
- Policy needs to drive the development and support of the soft and hard infrastructure that breeds innovative companies.

Careful consideration should be given to planning and developing innovation support institutions and the related business support programmes.

- Joint efforts by public and private sector (public-private partnerships) are an efficient and effective way to develop innovation support institutions.

Governments in cooperation with other relevant stakeholders also need to improve the management structures to identify and protect intellectual property with commercial value in order to broaden the scope of the entrepreneurial approaches to appropriating the benefits of intellectual property and of the investment in innovation.

THE REGIONAL DIMENSION OF INNOVATION POLICIES

The regional dimension has played an increasing role in national innovation strategies. The economic dynamism of regions, which is based on their own set of assets and skills, is seen by national policymakers as making an important contribution to overall innovation performance. In addition, regional development policies, which are designed at a sub-national level, emphasise the importance of innovation in promoting growth and increasing the share of high-value-added activities in economic activity. In the current economic environment, policies that promise to generate new jobs and foster economic development have become even more relevant.

The degree of regional diversity differs significantly across countries and economic growth is regionally uneven. Some regions within each country account often for most of the observed expansion in output. Globally, a few selected hubs concentrate most innovation activity across the world. Innovation policies are being seen as a way to preserve the competitive advantage of the more advanced regions and contribute to exploit the underdeveloped potential of those that are lagging.

Regions can make an important contribution to national innovation performance by mobilizing local assets and developing linkages which rely on the proximity of stakeholders. Supportive policies can enhance the potential of regions to innovate and increase the consistency of interventions at different territorial levels.

Policy actions aiming to promote regional innovation should consider the following principles and recommendations:

- The strengthening of linkages between innovation actors should be supported by institutional structures that facilitate cooperation. Social and cultural aspects are also important to develop networking capacities at the regional level.
- Besides the strengthening of local ties, policies should pay attention to the need to avoid regional isolation by fostering

cross-regional and cross-border collaboration, so that regions can have access to global knowledge and exploit synergies and complementarities. International openness is an important success factor.

- Regional innovation strategies should be built on a realistic assessment of existing capacities, identify clear goals and involve the private sector in both design and implementation.
- The integration of different policy instruments in a consistent manner and the coordination of interventions at different territorial levels greatly increase the effectiveness of public interventions. These tasks present major challenges that can be addressed through well-established mechanisms for consultation and sharing of information.
- The public sector has a critical role in providing leadership to facilitate collaboration between different actors, supporting the entrepreneurial discovery of new comparative advantages and providing the necessary assets that facilitate changes in regional productive specialization.
- The focus of regional innovation policies should be well beyond R&D and technological aspects, as other forms of innovation have a significant potential to contribute to regional development and should not be neglected.

Evaluation mechanisms should be developed to facilitate policy learning, both within and across regions. Communication with stakeholders on the outcomes of interventions contributes to the continued engagement of these actors, which is an essential factor in the implementation of regional innovation strategies.

PROMOTING INNOVATION IN THE SERVICES SECTOR

Services play a growing role in economic activity, accounting for up to three quarters of total output in developed market economies. In countries with economies in transition, the shift towards services was part of the transformation towards the market economy. Globalization and increased international opening have also changed the environment in which services operate. Deregulation has increased competitive pressures for some type of services. As technological advances have facilitated tradability, delocalization trends have emerged, as some services activities shift to lower cost countries.

The development of services is a major source of productivity growth, as it provides critical inputs for other activities and makes possible new forms of activities and business models. Information and communication technologies, in particular, have a direct impact on

organizational innovation capabilities in manufacturing.

There are significant differences in productivity in services sectors across countries. To some extent, these are partially explained by national variations in the composition of services. Slow productivity growth in this sector, as a result of low innovation, can be a major drag on economic dynamism. The disparity observed in national performances suggests a role for policy to enhance the competitive position of this sector and, by extension, the whole economy.

At the company level, including firms whose primary activity is manufacturing, services represent an important dimension of their competitive position. Moreover, the boundaries between services and manufacturing are often unclear, as services are an important element of the production processes and commercial offerings of manufacturing companies. Intangible add-on activities (for example, after sales services) are a factor in determining the value of manufacturing products. As manufacturing companies are often involved in the production of services, the implications for policies and regulations concerning services extend well beyond the services sector per se.

In many cases, successful innovations represent the combination of technology-based products with new services that jointly define compelling commercial proposals. Manufacturing companies are often both consumers and providers of services. The distinction between manufacturing and services is evolving as a reflection of business strategies to adapt and take advantage of changing economic circumstances. Thus, companies may have sought to exploit opportunities in new activities or may have shifted specialisation in response to competitive pressures.

Some manufacturers have repositioned themselves as business services companies, in an attempt to move up the value chain. In other cases, manufacturers have seen the potential of delivering services that tap into the knowledge they have of their own products. In some cases, firm dynamics lead to the outsourcing of manufacturing processes while retaining service functions. In others, companies that started initially as service providers evolve to encompass also manufacturing functions.

In fact, it has been noted that a certain convergence can be observed in the dynamics of manufacturing and service firms through a process of horizontal integration. Service companies seek to be more closely involved with supply chains and manufacturing companies want to improve the commercial appeal of their products through added services. The concept of "integrated solutions" has blurred the distinction between sectors – in practice, this means that service and manufacturing activities are integrated into complex chains that seek to deliver value for customers and enhance the competitive position of these networks.

Given the difficulties in isolating services from other activities, a conceptual difference is often made

between innovation in services (i.e. within the services sector) and service innovation (innovation in activities that have the characteristics of services and that can take part in any other sector). However, in practice, data limitations preclude a close examination of services functions embedded in other sectors.

There is a general awareness that reforms in the services sector can have significant positive impacts on employment, productivity and innovation. Knowledge-intensive services, in particular, can make a significant contribution to increased productivity in other sectors. A well performing services sector is increasingly seen as an important dimension of an effective innovation system.

The acknowledgement that services play an important role in ensuring overall economic dynamism and in enhancing the competitiveness of manufacturing has replaced the more traditional view of services as passive consumers of technological innovation produced elsewhere. Services firms are no longer seen just as consumers of technology but real innovators. From this broader perspective, service innovation is considered as a key factor in economic growth, while avoiding an excessive focus on technological innovation.

The increased relevance of services for economic performance has brought a growing interest in understanding the specific drivers that influence innovation in this sector and on how to design and implement supportive policy initiatives. However, despite their economic significance, the recognition of the importance of the services sector in innovation policies is a relatively recent phenomenon that is still not well understood.

Policy instruments for promoting innovation in the services sector may aim to:

- Correct existing biases against services in the conduct of traditional innovation policies;
- Devise specific interventions that are tailored to the particular problems of some services activities; and/or
- Develop measures that are based on the understanding of the services sector as an essential dimension of the overall innovation capacities of the economy.

In practice, concrete interventions may include a mixture of these approaches, often reflecting a combination of sectoral and horizontal policies. The choice of instruments and areas of intervention is usually a reflection of concrete national circumstances, including the particular innovation governance set up. Moreover, the policy mix is an expression of the views on how to develop a strategy for innovation in the services sector.

The heterogeneity of the services sector and the difficulties in differentiating services from manufacturing activities may explain the general absence of broad strategies supporting innovation in services.

Innovation initiatives in specific subsectors are much more frequent, with countries targeting areas that are particularly relevant for the national economy.

The potential scope of innovation in services is very wide, encompassing, among other possible aspects, new services concepts, business models, organizational arrangements and customer interfaces. Designing innovation policies poses a challenge, as the new agendas involve different target groups. Specific instruments that target innovation in services remain rare.

Policy documents at the more general level typically do not discriminate against services and, in some instances, may even make an explicit mention to the promotion of innovation in this sector. However, it is at the level of the design of specific instruments and mechanisms where problems often arise. While the policy instruments available in this area may be sector neutral, the evaluation of proposals or projects often has an implicit bias toward technological innovation that may put services at a disadvantage. It is therefore critical that instruments appropriately reflect the distinctive features of innovation in the service sector.

Overall, innovation in services is sensitive to general framework conditions. In particular, the degree of competition, including foreign competition, and the conditions for labour mobility influence innovation in the services sector.

The fact that traditionally services have been sheltered from foreign competition and that they are more difficult to trade across borders may have been one of the factors constraining innovation in some countries. However, with the advance of globalization competitive pressures from international markets are becoming more widespread. The opening of markets has created new opportunities for firms to expand and innovative mechanisms to reach out different markets. Initiatives to widen the markets and increase the internationalization of services are likely to have a positive effect on the rate of innovation.

However, services are delivered locally and therefore are very sensitive to local circumstances. Some services operate in areas where there is a high degree of regulation. Policies need to assess the appropriate degree of regulation and find a suitable balance between the need to protect consumers and achieve other goals while providing an impetus to innovation.

Labour market policies appear also as particularly relevant for the development of the services sector, which depends on the existence of a qualified and mobile workforce endowed with a varied range of skills to interact with customers and capable of engaging in the labour market in a flexible way. This may include arrangements that facilitate part-time work.

The promotion of SMEs and entrepreneurship may have a particularly favourable impact

regarding innovation in the services sector, as small companies are more prevalent in services activities, which often have a more local orientation. High rates of new firm creation are typical of the services sector. This is a factor encouraging innovation that can be nurtured by supportive policies.

Internationalization may spur innovation but it also generates significant competitive pressures for SMEs, which may require specific forms of support to address this challenge, providing them with the necessary international marketing and sales capabilities.

As non-technological innovation plays a more significant role in services, it is important that innovation policies have a broader focus that encompasses also support to other forms of innovation, including, for example, organizational and marketing arrangements. However, R&D expenditures have also a positive impact in fostering innovation in services, so policy efforts may also be directed towards promoting awareness and the use of R&D in services.

Services firms are generally less connected than manufacturing companies with the science and technology base, with the exception of knowledge-intensive services. Addressing these weak links may require the use of specific policy instruments. Innovation vouchers and similar schemes can be used to facilitate the upgrade of innovation capabilities by services providers.

However, the absence of a stronger relationship may reflect the fact that existing research outputs are of limited use to services companies. The challenge is how to make the science base more responsive to the needs of services companies, which may not have a special emphasis on technological innovation. Such efforts demand new attempts to create concepts and disciplines that address these tasks.

In this regard, "service sciences" have emerged as a multidisciplinary approach that seeks to provide a foundation for the creation of new services and business models in a systematic manner, in particular in connection with the use of ICT. The availability of individuals who have a varied mix of skills (both technical and managerial) appears as an important ingredient of this approach, which therefore emphasises the need for appropriate training and learning initiatives.

In many countries, in particular, in economies in transition, areas such as consumer behaviour, marketing, cultural understanding and communication, have been neglected in comparison with the more technological aspects of innovation. It is important that research and education policies reflect the relevance of these areas for innovation in services.

Overall, the services sector's need for a wide range of skills implies that vocational training and training on the job play an important role in ensuring the availability of qualified personnel. It is important that policy instruments

recognise and encourage this type of qualifications.

Effective partnerships between different types of services providers and between services and manufacturing companies are an important factor of economic flexibility and dynamism. The traditional mode of in-house production has been replaced by more complex arrangements than link various companies in developed business networks.

Participation in these value chains has both an external (between firms) and internal (within firms) dimensions. Innovation policies face the challenge of how to create conditions that promote the development of these relationships and how to adapt existing instruments to an environment defined by collaboration, specialization and sharing of information.

Standards can facilitate the development of complex value chains and support efforts to increase productivity. They are an important ingredient of the institutional framework that provides certainty for business to operate. In a globalized world, this has an important international dimension that may require cross-border coordination efforts.

Policy mechanisms could therefore be developed that facilitate networking and cooperation among the various stakeholders on innovation in services processes. This may involve the creation of suitable ICT-based platforms that operate on the basis of open innovation principles.

Human capital plays a particularly important role in fostering innovation in the services sector, where there is the need not only to generate new solutions but to implement them on a continued basis in close connection with customers. A high degree of customisation, facilitated by closer interrelationship with customers, is an important ingredient of commercial success.

Overall, services companies seem to rely to a larger extent on the skill base of their staff to gain a competitive advantage. A wide range of skills is demanded, including non-technical. Tacit knowledge, often resulting from the interaction with other members of staff, clients and suppliers, is critical for successful adaptation. The involvement of employees in the innovation process, which can be encouraged through appropriate organizational structures and incentive mechanisms, is therefore an important element of services innovation. Given the type of continuing and growing exigencies on the workforce, this may require particular attention to vocational education and life-long learning.

Service companies rely less on patents than manufacturing firms to protect their innovations. However, other intellectual property rights (IPRs) such as copyrights and trademarks are more significant, as these are more suitable to the characteristics of the sector. Typically, trademarks serve to address the problems of how to evaluate the

quality of a service prior to consumption, as they facilitate building the necessary reputation. However, the increased use of R&D in the services sector that can be observed in most countries suggest that awareness of IPR mechanisms is also becoming increasingly relevant.

The heterogeneity of the services sector should be recognised when proposing measures targeting IPRs. In some subsectors, such as software, engineering and computer services, R&D is more important and therefore, traditional protection through patents would be more appropriate.

In any case, the existence of mechanisms of IPR protection that do not have a formal character, including first-mover advantage, should be underlined. IPR systems need also to pay attention to the relevance of collaborative methods in the provision of services. A paramount example is the development of open source software and the creation of open standards. The flexibility and speed provided by these arrangements are important contributors to innovation.

As in generalist innovation policies, supply-side measures tend to predominate among the initiatives undertaken to promote innovation in the services sector. While demand-side actions tend to be rare, these have a particular relevance for the services sector. User-demand has an important role in fostering innovation in this sector, as new services often result from the interaction between suppliers and users. The creative industries, which have a great potential in modern economies, is a paramount example of the need to maintain and develop close contacts with users.

Services in which close relationships with clients are the norm tend to display higher innovation rates, as these links allow companies to acquire the necessary information to make attractive new proposals and to react quickly to the demands of users. Engaging customers and suppliers represents a source of competitive advantage that reflects well the non-linear nature of innovation and provides a continuous focus on market needs.

Clients, who are often closely associated with the design and delivery of services, encourage innovative firms to make adjustments to the services they offer in order to tailor them to their needs. This may continue even after the initial service has been rendered in the form of technical support or after-sales care. Such a high degree of interactivity emphasises again the importance of skills. Policy instruments may be deployed to facilitate and encourage these relations, including through the development of appropriate skills.

However, as with manufacturing, weak demand can stifle innovation. Policy measures to encourage the demand for innovation through the use of standards and public procurement are also useful to foster innovation in services. The visibility of new offerings by early adopters from the public sector can contribute to the subsequent diffusion of these innovations. Public procurement can stimulate the offering

of new services but for the beneficial effects of such instruments to materialise, it is important to have mechanisms that are open and transparent while seeking the involvement of SMEs and addressing existing barriers to competition.

The development of services is often part of policies that seek the general promotion of innovation, in particular, with a territorial dimension. Cluster policies are a clear example, as the development of transport, logistic and business services are seen as means of establishing a favourable environment that encourages the growth of firms and their interaction. A thriving services sector provides locational advantages and a channel for the circulation of information. Cluster policies are particularly relevant also for the promotion of specific types of services like tourism, finance or creative industries, where proximity between companies is a source of economic dynamism and customer attraction.

Regional development programmes are often a main conduit for the articulation and implementation of initiatives to foster innovation in services. Central agencies tend to be more concerned with the planning and delivery of public services of general significance but private stakeholders usually operate at the regional and local levels. Regional innovation policies are also more closely aligned with the economic structure of the region.

Therefore there is a need to effectively integrate the strategies and measures carried out at different levels of government. Policies should not neglect the importance of small local projects, which are easier to coordinate than large scale national initiatives and which can focus on local needs.