

Sustainable development through the resource use - regional innovation system

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Abstract: - Innovation policy has come to mean more than a bright idea or creative solution. The paper presents the project "Integrating Innovation and Development Policies for the Forest Sector". The main objective of the Action is to develop knowledge that enables integration of innovation and development policies for a more effective and sustainable development of the sector, according to sustained development through the resource use and environmental protection. The Action adds a crucial component of policy research, namely the integration and coordination of development orientated policies and programmes relevant for forest and forestry sector including innovation policy (Technology platform, recycling wood products and paper – a new material resource).

Key-Words: - development, innovation, innovation policy, innovation system, regional development, resource, sustainable development.

1 Introduction

The OECD (2005) defines innovation in its Oslo Manual as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations."

The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the economic system. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations (OECD 2005). Besides being new to the firm innovations may be new to a country or new to the world.

A common feature of an innovation is that it must have been implemented. A new or improved product is implemented when it is introduced on the market or when it is taken into use by customers. New processes, marketing methods or organisational methods are implemented when they are brought into actual use in the firm's operations (OECD 2005).

2 Innovation system

Technological innovations comprise new products and processes and significant technological changes in products and processes. An innovation has been implemented if it has been introduced on the market (product innovation) or used within a production

process (process innovation). Innovations therefore involve a series of scientific, technological, organizational, financial and commercial activities". The complete innovation process involves creation of the new and its implementation. The later can be done directly or after a transfer process through the knowledge market. The innovation infrastructure bridges the research system and the innovation drivers, basically including:

- Incubators, which provide basic infrastructure for start-ups;
- Technological parks, which provide experimental facilities;
- The knowledge market (transfer of intellectual property and technological transfer).

The Oslo Manual distinguishes four main types of innovation - product, process, marketing and organisational innovations – which are further sub-divided.

A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

A marketing innovation is the implementation of a new

marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

An organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

An organisational innovation is the result of strategic decisions taken by management.

Organisational innovations in *business practices* involve the implementation of new methods for organising routines and procedures for the conduct of work. Innovations in *workplace organisation* involve the implementation of new methods for distributing responsibilities and decision making among employees for the division of work within and between firm activities (and organisational units), as well as new concepts for the structuring of activities, such as the integration of different business activities. New organisational methods in a firm's *external relations* involve the implementation of new ways of organising relations with other firms or public institutions, such as the establishment of new types of collaborations with research organisations or customers, new methods of integration with suppliers, and the outsourcing or subcontracting for the first time of business activities. Organisational innovation here does not include institutional innovation in the public/policy sphere. As business model innovation is not an explicit category in the OECD definition and classification, it should be included under this category.

In particular, the evolving views reflect the transition from the linear view on the innovation process to the current systemic one. While both of them position RD as either the initiating or the decisive factor of the innovative process most recent approaches tend to give always-higher emphasis to factors defining innovation outside research and even outside the technological progress, as well as to other related sides of the phenomenon as organizational and managerial changes. The proposed framework is based on the most recent theoretical background underpinning the Lisbon strategy and its further developments and describes both the role of innovation in the economic structure of a country, and the functionality parameters of the innovation system defined. Usually the innovation process involves five elements:

- the research system (which is the centre of knowledge production);
- the innovation drivers (enterprises, which transform knowledge into market products);
- the innovation infrastructure;
- the capital and financing channels;
- the labour resources and education services (human capital).

In reality the five elements are often overlapping, as for

instance a research unit can also function as an innovation driver, companies might have their own research units, etc. but theoretical simplification may be more useful in order to grasp better the different functions of an RDI system.

Most of the domestic firms produce goods or services designed in other, more-advanced countries. Technology is assimilated through imports, foreign direct investments and imitation. Firms have limited roles in the value chain, focusing on assembly, labor intensive manufacturing, and resource extraction. However, there is also a part of the economy, which may be considered investment-driven. The last couple of years have brought new investment in efficient infrastructure and policy measures aimed at creating a business-friendly administration. The products and services become more sophisticated. Technology is accessed through licensing, joint ventures, FDI and imitation. At the same time, embryos of an innovation-driven economy have developed, especially in the Information and Communication Technology sector, which has a high competitive potential.

At the current level of development of Romanian economy the urge for structural reforms tends to shadow the more subtle, whilst equally important, issue of innovation. While EU is currently most concerned with social cohesion, job creation and priority to research and innovation, this seems less applicable to Romania in the short-run, where restructuring (incl. job destruction), wage limitation, control on inflation and improving basic business environment (incl. control on payment arrears) are the top priorities. Romania, as candidate country is guided primarily by the Copenhagen criteria following the target of "establishing a functioning market economy and having the capacity to withstand competitive pressure and market forces within the Union". While integration into the single market without market economy is not possible, lack of emphasis to preparing the capacity of the country to withstand the competitive pressure might hinder the country position in the longer run. A decisive action in the field of Research-Development and Innovation might be the key of reconciling the two sets of objectives.

Policies fostering investment and innovation are considered in European Union as increasing economics vector, competitiveness and rural development. The global economy has helped to create for many business today an environment of hypercompetition. Because the competition is direct and intense, any competitive advantage that is realized is temporary. Successful of company are often copied and firms must continue to find new strategies (new products, services, organizational informational) that deliver new sources of competitive advantage.

3 The sustained development through the resource use

Sustainable development is development that meets the needs of current generations without compromising the ability of future generations to meet their needs. In this context, environment and natural resources are capital that must be maintained in order to support sustained economic activity. Protecting the environment thus preserves the very basis for development.

Environmental sustainability refers to the need to protect biological and physical systems that support life (e.g. ecosystems, the hydrological cycle and climatic systems). Environmental sustainability is a cross-cutting principle which needs to be integrated across all areas of decision making.

This requires development planners to assess the environmental impact of all proposed policies, programmes and projects, and to take action to minimize the adverse environmental impacts and to take advantage of opportunities for environmental improvement

Several factors are recognized by the literature as conducive to an innovative business environment:

Basic factors for modern businesses: *educated labor* and *capital*. These are analyzed in previous sections. To these adds the active presence of *entrepreneurship*. The number of companies (below 20 active companies per 1000 inhabitants) is still low, as compared with the average of 45-50 per 1000 inhabitants in the EU and the network alignment process is still ongoing. The image of the entrepreneur: 57% think that the businessmen are mostly corrupt. Only 28.7% of the population have a pro-market behavior .

Potential demand: *young educated population, purchasing power and human development, business investment propensity*.

Among an overwhelming literature, OECD, 2003 states that "entrepreneurial activity contributes extensively to innovation and adoption of new technologies and, ultimately, to productivity growth. New technologies are often more efficiently harnessed through the creation of new enterprises and the redesign of existing ones, both factors depending on the entrepreneurial environment". This calls however, for modern approaches of doing business implying:

- *awareness regarding the need and usefulness for innovation*; Although for the moment there are still other factors that might have positive impact on the companies growth, this situation will change soon Trade openness will continue to upgrade consumer preferences on the internal market and the higher revenues will free resources for developing more sophisticated tastes. The increasing trade deficit in 2003 argue in favor of this assumption. After integration in

the EU and the adoption of EURO, the exchange rate policy will be no longer able to help local exporters. With lower-tech exports, Romanian companies might face the fierce competition from the emerging low costs economies, as well as the risk of de-localization of the existing FDI. Under the pressure of losing both internal and external competitiveness, the Romanian companies will be forced to adopt innovation-oriented business strategies to survive.

- *innovation management techniques based on intangibles*, increasingly important today as a result of a number of factors, such as the "dematerialization" of manufacturing and the industrialization of services and the recognition of knowledge as the main source of competitive advantage and *on understanding of the role of high skilled human resources and on participative business organization*

- *ICT appropriation and e-commerce practice*: In 2002, the amount of expenses and investment in industry and services reached EUR 384 mil for IT products and services (EUR 93 per employed person) and EUR 376 mil for communication products (EUR 91 per employed person). As this means less than EUR 8 per month per person for IT and almost the same figure for communications, we can assess that it is a very low level. In 2002 the share of enterprises selling online was 0.6% of the total.

The Technology platform are consider the key benefits of the development. European Technology Platforms are playing a key role in the preparations for the EU Seventh Framework Programme (FP7). For the 7th R&D Framework Programme, EU Commission has created a new tool, Technology Platform, characterized by

- Shared vision
- Long-term perspective (2030)
- Major challenges

Technology Platforms unite stakeholders from industry, the research community, public authorities, the financial community, regulators, consumers and civil society around a specific technological challenge.

The key concepts for the Technology platform are:

- Development of a shared long-term vision
- Creation of a coherent, dynamic strategy to achieve the vision
- Implementation of an action plan to deliver agreed programmes of activities
- Leading role of the industry.

The Technology Platform is managed as a project with a High Level Group as the decision body. For Romania national support groups are important elements of the organizational structure. They will have a key role in securing national support for the platform.

- Engages all interlinked parts of the forest-based sector.
- Concerns all EU-countries (to various degree and with various focus depending on national and geographical conditions), including national financing bodies.
- Concerns long and complicated supply chains from tree to consumer.
- Requires access to a multiplicity of competencies and experiences.
- Requires a holistic approach.

Noteworthy, for all companies, the quality of the business environment is strongly correlated with their propensity to innovate. In Romania, the business climate has improved over the last years, but much remains to be done in order to create a friendly environment for doing business and for innovating. Several monitoring instruments have shown, among others, that in Romania businesses complain about market entry and exit procedures, which they still perceive as obstacles, about legislative instability or about the high amount of red tape, which increases the cost of doing business. All these regulatory and administrative barriers hamper business creation and development, thus reducing the number and the economic power of potential innovation drivers. Product market regulations are generally complying with the relevant *aquis*, being of moderate stringency. Strong employment regulation, instead, as Romania has, would favor, according to the OECD countries, high-tech high-concentration industries. For these, innovation is incremental, therefore it is less costly to further train a current employee than to hire and prepare a new one. Further development of the ICT sectors, currently perceived as most innovative, are favored by this structure.

4 Innovation policy and innovation support

Innovation policy has considerably changed over the last decades and varies from country to country. In the Action “Integrating Innovation and Development Policies for the Forest Sector”, for our analysis we will differentiate between the following ideal types of understandings of innovation policy, i.e. the understanding of what role policy should have in fostering private sector innovation: no role for policy: understanding that innovation is a completely private sector issue and policy shouldn’t interfere, and traditional S&T policy approach: the basic understanding of innovation is that the development of innovations follows a linear process. This process begins with laboratory science and moves through

successive stages until new knowledge is built into commercial applications that diffuse in economic systems. The emphasis of policy was on fostering critical directions of scientific and technological advance, and enhancing the flow of knowledge down along the innovation chain (Lengrand et al. 2002). There is a distinct role for education/university ministries, considering innovation as the expected end of RTD process, and economy/industry ministries dealing with innovation as a tool for encouraging investment and modernizing SMEs. Main policy instruments include public financing of research in universities and public research institutions, subsidies to industrial R&D, and securing intellectual property rights through more embracing and enforceable patents. Besides looking at innovations that are new to the firm it important to analyse in how far policies support innovation that are new to the country and their adoption by firms. The introduction and adoption of innovations differs from country to country.

For the purpose of the analysis in Action E51 it important to study the differentiate between 3 stages of adoption: early adoption: only a few leaders (firms) have implemented the innovation. It is new to the sector in the specific country and not yet a mainstream product, process, marketing method or organisational method; broad adoption: in this stage the innovation is already introduced in the sector in a specific country for some time and is clearly becoming a mainstream product, process, marketing or organisational method; late adoption/saturation: in this phase most firms of the sector have adopted the innovation and only few have not.

Systemic innovation policy approach: recognises the complexity of the innovation system, with many feedback loops between the different ‘stages’ of the process as outlined in the first-generation model (Lengrand et al. 2002). Policy seeks to enhance two-way communication across different points in the innovation “chain”, and to improve innovation systems in ways that can better inform decisions about research, commercialisation, technology adoption and implementation, etc. The role of policy is to solve problems that occur within innovation systems, e.g by supporting the creation and development of institutions and organisations, supporting network development, facilitate transition and avoid lock-in (Edquist and Johnson 1997). Innovation is viewed primarily as a systemic activity in which policy instruments are not only directed to individual organisations (e.g. research and development subsidies, management support) or bilateral relations (e.g. knowledge transfer), but also to the innovation system as a whole (e.g. managing interfaces and organising learning platforms) (Goorden 2004). The scope, scale and actors of innovation policy

thus widen. Innovation policy is no longer limited to the economic domain but is placed on the agenda of various policy domains, such as industrial policy, policies for science and technology, education, health, ICT and other regional policies.

Innovation support can take many forms from direct funding of research and development activities to the support of the diffusion of innovations, to improving the knowledge base and interaction of actors, to adapting framework conditions. Some of these support measures are targeted directly at fostering concrete innovation activities, others are more structural. For the analysis of the documents in the Action "Integrating Innovation and Development Policies for the Forest Sector" we distinguish measures along the following categories of 'innovation support':

Research and Development: This includes innovation support in a narrower sense, i.e. financing of basic and applied research, development of new products or processes, pilot projects, demonstration projects and support for the commercialization of innovations. Support for Research and Development generally aims at innovations new to the sector (forest sector), i.e. products, processes, marketing and organisational methods that have not been introduced to a particular sector in a particular country before.

Diffusion of innovation: This includes support for the early and broad adoption of named, already known goods, services and processes by enterprises in a sector in a specific country. It excludes support to standard managerial processes or late adoption (e.g. species diversity support or road building in forestry or standard IT in SMEs).

Strengthening the knowledge base: The innovation capabilities of a firm, a sector or an economy among others strongly depend on the availability and quality of human capital, i.e. individual know-how, skills and motivation of entrepreneur and employers, level of qualification and competencies of employers. Further, the access to and exchange of information and knowledge influences the innovation propensity as well.

Promoting interaction/ Managing interfaces: Firms do not innovate in isolation. Rather a range of other actors/ organizations contribute in different ways to innovations, e.g. other firms/competitors, research organisations, extension services, interest groups, etc.. Policy may foster innovation by strengthening the interaction between different key actors in the forest sector.

Public demand creation for innovation: The demand side is crucially important for the promotion of innovations. Policy may not only promote innovations by supporting the input – side but also by inducing demand for innovation. This is often applied in the case of environmental/sustainable innovations.

Improving frame conditions: General framework

conditions including institutions such as laws, regulations, standards, taxes or the access to financing have a crucial influence on firms' decisions to innovate. Changing framework conditions is often not in the responsibility of sectoral policies.

5. Conclusion

The knowledge economy puts in the centre of the innovation system the innovative enterprise, of which technological/knowledge investment decision, therefore behaviour, is the very driver of economic growth. It balances the expected benefit from innovation given the perceived consumer preferences with the cost of developing traditional products at the average profit margin, on a specific market, and are initiating the innovative process, based on their market strategies.

The technology Platform will serve as an important catalyst in all these areas, not least by bringing stakeholders together for common goals. The key benefits are:

- Engages all key stakeholders and provides a forum for public-private dialogue and partnership.
- Facilitates targeted investments in research and development.
- Mobilizes and focuses existing research and development capabilities, thereby fostering a more efficient approach to innovation.
- Stimulates coordination of European and national research agendas.
- Supports the ongoing development of a relevant knowledge base for the sector.
- Contributes to the overall growth of the EU economy.

Therefore, firms acting as innovation drivers should not be regarded as a passive demand for knowledge, but rather as active designers of the innovation.

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