2 RESEARCH AND DEVELOPMENT AS A DETERMINANT OF SERVICES SECTOR COMPETITIVENESS

Nela POPESCU[*]
Laurențiu TĂCHICIU[**]

Abstract

Innovation in services has traditionally been neglected in the literature, perhaps because of the assumption that services do not innovate or are primarily users of innovation in manufacturing. In reality, services do innovate in both processes and products, but much of this innovation does not involve formal research. Nevertheless, innovation in services is important for development and Romania is facing the challenge to ensure the most effective connection with global research networks and the innovation systems of other countries.

Key words: services, innovation, competitiveness;

JEL Classification: F 15, G2.

Introduction

In economics, services have been defined as elements of economic transactions that are largely intangible, invisible, or non-storable. Goods transactions, which are more straightforward, are seen as the opposite: tangible, visible, and storable (Matoo, 2001). According to Gadrey *et al*. (1995) producing a service is: «to organize a solution to a problem…which does not principally involve supplying a good. It is to place a bundle of capabilities and competencies (human, technological, organizational) at the disposal of a client and to organize a solution, which may be given to varying degrees of precision». This approach covers the basic common characteristics of services that are pointed out above: intangibility, co-production/interactivity, simultaneity (of production and consumption), heterogeneity, perishability and information-intensity (Miles, 2004; Gallouj, 2002; de Jong et al, 2003). These characteristics are described as fairly unique to services. However,

[*] *The Academy of Economic Studies, Bucharest, PhD, associate professor, e-mail: nelapopescu@yahoo.com; www.ceco.ase.ro.*

[**] *The Academy of Economic Studies, Bucharest, PhD. Professor, e-mail: laurentiu.tachiciu@gmail.com; www.ceco.ase.ro.*

manufacturing has adopted some features from services, such as flexible specialization or mass customization (Miles, 2004).

Various approaches to studying service sector innovation have been developed (Tether, 2004; Drejer, 2004). There are four different and successive approaches: indifference – until the 1980s services were not considered innovative; subordination or assimilation – during the 1990s and until recently, innovation in services has mostly been studied by applying concepts from manufacturing (Pavitt, 1984); autonomy or demarcation – emerging as a response, mainly during the 1990s, to the previous view; in this approach service innovation is seen as very different from innovation in manufacturing; synthesis – most recent approach, according to this view, innovation in services and manufacturing are more similar than dissimilar, with the differences of degree only. Some researchers sustain that the synthesis approach may be the way of the future, as it attempts to capture innovation more broadly also in manufacturing.

Economists have attempted to reduce the huge diversity among services by classifying service companies into groups that share similar innovative characteristics. These innovation types are as follows: knowledge-intensive services – companies with tight links with external science-based organizations, and close customer relations; network-based services – companies utilizing technological systems, mostly for information and communication processing; scale-intensive services – companies whose output is wholly standardized; supplier-dominated services – companies whose innovations have been developed externally.

Hipp and Grupp (2005) found that, based on their data, service sectors could not adequately be divided according to the above typology because innovation patterns in services are less sector-dependent, as every type of innovator can be found in every service sector (Hipp and Grupp, 2005). Indeed, many authors have tried to identify different general modes of innovation based on various criteria and perspectives, rather than just groups of firms or sub-sectors. Schumpeter (1934) considered five types of innovation: product, process, market, input, and organizational innovation.

Minna Kanerva *et al*. (2006), depict many other innovation types. For instance, Gallouj and Weinstein (1997) explore modes of innovation and they find the following forms: radical, improvement, incremental, *ad hoc*, and recombinative and formalization innovation. Den Hertog and Bilderbeek (1999) look at innovation from the point of view of the role played by the service firm and identify five types of innovation: supplier-dominated innovation, innovation within firm, client-led innovation, innovation through firm and paradigmatic innovation. Howells and Tether (2004) suggest that instead of distinguishing between product and process innovation, it might make more sense, especially in services, to make a distinction between inward and outward looking innovation activities. Inward looking innovation is concerned with how the firm undertakes its activities, often to reduce costs, but this may have an impact on products too, and outward looking innovation is concerned with how the firm interacts with others, most importantly with customers - new products and/or new ways of delivering them. Finally, innovation can also be viewed from the point of view of what the related service transforms or how the service creates added value. Tether et al. (2001), categorized services based on transforming the environment, artifacts - produced by manufacturing, people or symbols - data, information or knowledge, and

ECON (2006) classifies service firms between problem solvers, assisting services, distributive services and leisure services.

In our opinion many of these concepts have been developed for the purposes of studying service innovation in particular, and we believe that Schumpeter's definition of innovation is wide enough to cover service innovation. Moreover, the nature of innovation – and of required capabilities – varies greatly between activities according to their technological complexity, the creation of new technology being at one extreme and the use of existing technologies at the other. Some services now perform considerable research. Others do not conduct much formal research but innovate in terms of product development (new financial services by banks or new packages by tour operators) and management practices. In broad terms, service activities and functions can be ranked by the level of skills required – formal, education levels, or informal, employee training.

The determinants of local competitiveness

The globalization of services is not only about trade, however investment also forms a large part of services activity in the global economy. The service industry by its very nature is very close to the markets they serve and therefore tend to require higher skill levels among workers, and tend to employ more local workers than goods producers (UNCTAD, 2004b; OECD, 2001).

There is wide consensus in the economic literature that the possibility of regional system to grow is closely related to its capacity to export products outside its boundaries and to sell its services to the non-resident population. The competitive advantages of the productive system are therefore key to a region's (national or at lower level) competitiveness. The economic literature has discussed such competitive advantages in depth, from Smith to Ricardo, Krugman and Porter.

Human capital and foreign direct investment

The analysis of competitiveness and therefore of the development level of a region requires both to consider all the endogenous resources, including the collective ones, and to analyze the relationships between the various elements of the local system - between the individuals and the firms, between the firms and the institutions, and so on. The speed at which such resources grow is not enough to account for such performance. It is also essential to analyze whether and how the characteristics of the system - the economic characteristics but also social and territorial ones - also continue to reproduce or to evolve. The economic, social and territorial variables are all important variables to consider in order explaining a region's performance. In addition, in a phase of economic development in which services take growing importance relative to manufactured goods and in which the ability, the know-how and the productive traditions, together with information, knowledge and the cognitive and relational processes replace homogenous factors in the endowment of productive factors that determine competitiveness, the most fundamental resources become the human resources. The problem is to understand how the variety of contexts generates competitive advantages for the local system and how the latter reproduces such advantages through time. The role of human capital is essential in this respect in that

the set of entrepreneurial capabilities and of abilities of the workers represent a large part of the competitive advantage of a region. In terms of economic performance over time, the problem is to understand whether the country in consideration has a set of tangible and intangible assets that will allow it to adapt to changes.

Innovation in the services sector is generally brought about by investment in acquisition of new skills, new organizational structures, new ways of co-operation, creation of new enterprises and relations with customers and suppliers. Therefore the propensity to innovate varies substantially across different activities due to the heterogeneity of the business-related services. Business-related services show a dual pattern in terms of innovations; network services and distributive trades are lagging far behind financial services and business services.

Human capital is a key input to services innovations and therefore of fundamental and strategic importance for the performance of services enterprises. A skilled labour force contributes to productivity growth by enabling the companies to utilize and take advantage of their investments in ICT and other innovative features. The labour-intensive nature of many business-related services, the high degree of interaction with customers, the knowledge intensity of many services and the importance of tacit knowledge are all factors implying the importance of sufficient supply of skilled human capital for future productivity gains.

Business-related services have a larger share of highly skilled persons employed than in manufacturing. As the jobs are mainly created within business-related services, increased demand for highly skilled persons can be foreseen in the coming years. Given the on–going technological transformation, the skills intensity of the European economies will increase. The Lisbon goals can only be achieved by a process of an extensive general upgrading of the stock of human capital.

Becoming the most competitive and dynamic knowledge-based economy cannot be achieved by investing in formal educational attainment alone. The dynamics of the knowledge-driven economy requires a constant update of the skills of the labour force in the EU, if European businesses shall be competitive. The formal education provides a basis for the continuous upgrading of skills, but inevitably the demand for vocational training increases along with the adoption of new production and organizational methods, usually stimulated by the introduction of new technologies. Training has become an increasingly critical tool for maintaining the adequate levels of human capital in enterprises, particularly in knowledge-intensive services.

Another way of achieving the required skills is by „skills circulation", for instance, flows of skilled persons from one business to another, from one region to another or from one country to another. Such skills circulation can be an important tool in overcoming skills gaps in certain parts of the economy, as it is an important tool for transfer of knowledge and skills in general. One special type of skills circulation is the international migration of highly skilled personnel, which recently has attracted a certain political focus, especially related to the mobility of IT-personnel.

The role of services is relatively more important in foreign direct investment (FDI) than in international trade, due to the importance of proximity to the market for services companies. In terms of flows, FDI in services is very similar to trade in services: the

majority of FDI in services flows to and from developed countries. In terms of determinants, there are fewer similarities between FDI and exports: FDI is largely market seeking. Moreover, there is no evidence that investment agreements such as the GATS will bring additional FDI in services to developing countries.

Research and development

Research and development is only one component of innovation activities, but it represents the most developed, widely available, and internationally comparable statistical indicator of industrial innovation activities.

Research and innovation are recognized as key drivers for enhancing competitiveness, not only the traditional, technology based innovation, but also the non-technological innovations are important factors for sustainable economic growth. Non-technological innovation - new service concepts, new clients interface or new service delivery systems - is the prevailing form of innovation in business-related services, and the increasing use of ICT in enterprises has put attention to the importance of organizational innovation and its impact on business processes and ultimately on business performance and productivity. Some of Europe's most innovative companies are to be found in the business-related services, even if the overall level of research and development, and innovation in these sectors is generally lower than in manufacturing and lags substantially behind the US.

As the services sector has been generally perceived as being non-innovative due to the less importance of technological innovation, insufficient attention has been given to innovation in the services sector, in spite of this sector's potential not only for significant growth in employment and output, but also for its impact on the competitiveness of European enterprises in general.

Research is the most frequent source for innovation in manufacturing, but sources such as knowledge from customers, co-operating and networking enterprises or employees are also significant inputs for innovation in services. Consequently, innovation in services requires investments in different types of intangible assets - not only in research and development, but also in product development, training, customer relationship management and creation of an efficient organization with the ability of managing knowledge using information and communication technologies.

According to international guidelines, research and development, also called research and experimental development, comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. Research and development involves novelty and the resolution of scientific and technological uncertainty. It includes basic[1] and applied[1] research along with development[2].

[1] *The objective of basic research is to gain a more comprehensive knowledge or understanding of the subject under study without specific applications in mind. In industry, basic research is defined as research that advances scientific knowledge but does not have specific immediate commercial objectives.*

Many of the fundamental characteristics of the innovation process differ between manufacturing and services. These include the following: *a)* ability to develop and protect proprietary technologies: imitation is simpler in the services sector—process/system patents are more difficult to obtain and protect; *b)* incremental nature of innovation versus discrete technology transition/obsolescence*:* because of competitive pressures and the relatively low cost of modifying service provision (compared to changes to manufacturing processes), services are continually evolving; *c)* degree of interoperability required among related technologies: service innovations involve interactions among many products and systems, and a large part of the research and development process involves systems integration. In addition, because services are less likely to be stand-alone products, they need to be integrated with larger IT and societal systems; *d)* ability to build prototypes or conduct tests in a controlled environment: services need to be tested with real customers, making it difficult to isolate research and development testing activities in stand-alone laboratories, limiting the number of tests that can be performed, and increasing the cost of poor performance or failures.

Innovations in services often consist of elements of non-technological nature as new service concepts, new ways and channels of communicating with intermediary and final clients and innovative services organizations are needed to provide these new services. Innovation in the services sector is generally brought about by investment in acquisition of new skills, new organizational structures, new ways of co-operation, creation of new enterprises and relations with customers and suppliers. Therefore it is apparent that the propensity to innovate varies substantially across different activities due to the heterogeneity of the business-related services.

Enterprise interactions constitute an important source for innovation in services. Non-technological innovations are mostly a joint effort carried out by the services companies and their clients or suppliers in both vertical and horizontal networking, including public and private research institutes. These interactions can be of both formal and informal character. Especially the knowledge intensive business services plays a major role in developing, transferring and enabling innovation for their client companies and thus manufacturing and services innovating companies are increasingly interdependent. New products and services tend to combine an increasing number of technological elements. To remain competitive, many firms focus on core competencies and complement their own knowledge and expertise by gaining access to externally produced knowledge and expertise, via outsourcing or cooperation, often with knowledge intensive business services.

Co-operation and networking play an ever-greater role in services and have become more formalized owing to the increasing use of external knowledge and cost sharing

[1] The objective of applied research is to gain the knowledge or understanding to meet a specific, recognized need. In industry, applied research includes investigations to discover new scientific knowledge that has specific commercial objectives with respect to products, processes, or services.

[2] *Development is the systematic use of the knowledge or understanding gained from research directed towards the production of useful materials, devices, systems or methods, including the design and development of prototypes and processes.*

between enterprises. According to innovation surveys, services rely extensively on other firms for knowledge inputs and sharing. Consultants, training, research and development, and computer services play a crucial role in innovation networks, as they help disseminate technology and innovative concepts to other firms. These knowledge-intensive business services thus facilitate innovation in other firms and are important drivers for innovation in all sectors of the economy.

CONLUSIONS on the innovation in regional context

Our analysis and the innovation indicators included in this paper are based on the lists of indicators for the innovation system contained in the Knowledge Index used by the World Bank, for create our own scorecard using a combination of variables grouped in several functional clusters to realize a cross-country comparison. Our results of analysis on innovation system converge to those points out by Community Innovation Survey (CIS) - European Innovation Scoreboard (EIS) and the Sector Innovation Scoreboards - that is a relatively new European statistical source for innovation surveys. The indicators have been chosen to represent what is considered to be the main elements of innovation performance in the services sector, keeping in mind that services and manufacturing are interdependent. We acquainted ourselves with there is general agreement that the available indicators to measure (service sector) innovation are often not adequate. Primarily, they concentrate too heavily on technical innovation and ignore non-technical innovation. We think that to capture innovation adequately, better innovation indicators must be found and used, and preferably for both manufacturing and services, if for no other reason, to ensure adequate comparisons and to be finally explored satisfactorily.

Innovation, Education, ICT: Romania in the regional context

Regarding to services sector, from an economic perspective, services trade can affect economic growth in several ways. Services transactions generate income and welfare in and of themselves. Services also contribute to economic growth by serving as inputs into other parts of the economy. Better education services make efforts toward innovation and research and development more productive, strong telecommunications networks make knowledge diffuse faster, better transport make goods get distributed faster and so on. Health and education are core components that allow us to live up to our capabilities and potential.

Successful innovation involves much more than exploiting scientific research results. Broader framework conditions including the *demand* for innovation - growth and stability oriented macro-economic environment, effective competition, good science-industry links, access to risk capital and management expertise for start-ups - and networking conditions -knowledge transfer organizations, research mobility - are essential.

In fact, innovation is based on investment in knowledge generation as well in knowledge utilization and diffusion. Innovative activities of enterprises are essential to this process even when based on the diffusion of less advanced technology. It is

therefore important to consider the diffusion of quality control techniques, vocational training and IT infrastructure as channels for diffusion.

Table 1

Share of innovative enterprises

Country/Region	(%)	Country/Region	(%)
Ireland	73%	Latvia	48%
Germany	69%	France	43%
Lithuania	68%	Luxembourg	42%
Austria	67%	Slovenia	38%
Netherlands	62%	Poland	36%
United Kingdom	59%	Finland	36%
Romania	56%	Spain	29%
Sweden	54%	Belgium	27%
European Economic Area	53%	Turkey	25%
		Slovak Republic	17%

Source: Community Innovation Survey (CIS).

According to the figures shown in the table nr. 1, in Lithuania, Romania and Latvia the share of innovators is high. A possible explanation is that the frequency of innovative activities does not tell us anything about the economic relevance of these activities. Especially in the economic transition years of former socialist countries, firms searched extensively for new products and processes. However, as innovation became costly and as market barriers increase they gradually decreased the frequency of innovation activities while the revenues based on innovation activities gradually increased.

In the case of Romania, a high rate of innovators is a result of the frequency of search efforts of firms. In this respect, lower rates of innovators in the others countries do not mean that the revenues from new products and processes in these countries are lower. In fact, the outcome may be exactly the opposite. So that, a higher frequency of innovators in some eastern European countries suggests that they are still lagging in terms of the economic relevance of innovative activities. In the these countries, the dominant share of innovation expenditures goes on acquisition of machinery and equipment, while research and development and other intangible components are very marginal. However, a strong preference for technology acquisition, as opposed to pure research and development in the innovation process in the eastern European countries may be considered positively. In order to restore productivity growth, there is

a need for technical change and technological assimilation. Hence this mode of innovation may be best suited to the needs of enterprises, at least in the short-term.

Most fundamentally, investment in the creation of new knowledge is the weakest dimension of innovation capability of Romania and the eastern European countries. Low investments in public research and development are accompanied by very limited investment in research and development by the business sector (table 2). The very weak position of the majority of these countries with respect to business expenditures on research and development is likely to continue.

Creating a business environment favourable to innovation implies not only direct measures to support innovation in enterprises but also taking into account the impact on innovation of a range of other policies. In this context, the application of a so-called „Third-Generation" approach to innovation policy (where innovation is placed at the heart of other policy areas, in a manner similar to environment issues) in Romania, and not only, seems overly ambitious, though much needed. The Romanian policy remains largely focused on restructuring the research and development system and stronger links between research and development institutes and industry.

Table 2

Romania in the context of regional comparative analysis of variables with impact on innovation in services

Variable	Romania	Bulgaria	Slovenia	Poland	Slovakia
GDP Growth(%)	4.68	4.88	3.40	3.08	4.08
Employment in Industry (% of total employment)	26.20	27.60	38.10	30.50	37.60
Employment in Services (% of total employment)	31.50	46.00	50.80	50.40	56.20
Trade as % of GDP	71.60	116.20	119.30	47.30	157.60
Gross Foreign Direct Investment as % of GDP	2.58	4.71	2.67	3.69	5.32
Science & Eng. Enrol. Ratio (% of tertiary students)	26.87	27.17	22.01	20.06	26.56
Researchers in R&D / million	909.68	1,157.94	2,363.54	1,468.57	1,706.82
Total Expenditure for R&D as % of GDP	0.38	0.49	1.54	0.59	0.59
Manuf. Trade as % of GDP	58.48	62.25	80.74	46.57	113.84
University-Company Research Collaboration	2.40	2.50	3.50	3.20	3.50
Scientific and Technical Journal Articles / mil. pop.	45.05	99.12	439.76	148.65	177.54
Availability of Venture Capital	2.80	3.30	3.30	3.60	3.30
Patent Applications Granted by the USPTO / mil. pop.	0.41	0.51	12.00	0.50	0.93
High-Tech Exports as % of Manuf. Exports	3.65	4.30	6.26	3.07	3.72

Variable	Romania	Bulgaria	Slovenia	Poland	Slovakia
Private Sector Spending on R&D	2.90	2.80	3.70	3.50	3.10
Firm-level Technology Absorption	4.30	3.60	4.50	4.50	5.30
Secondary Enrollment	84.15	94.28	107.59	101.27	89.46
Tertiary Enrollment	30.42	37.68	66.05	59.51	32.11
Computers per 1,000 people	110.00	58.90	355.40	191.00	294.60
Internet Users per 10,000 People	2,019.75	2,810.00	4,795.56	2,334.57	4,209.36

(continued Table 2)

Variable	Romania	Hungary	Turkey	Lithuania
GDP Growth(%)	4.68	3.90	4.50	6.70
Employment in Industry (% of total employment)	26.20	34.70	24.30	27.60
Employment in Services (% of total employment)	31.50	58.90	43.10	56.10
Trade as % of GDP	71.60	133.00	58.60	113.80
Gross Foreign Direct Investment as % of GDP	2.58	8.10	0.88	3.80
Science & Eng. Enrol. Ratio (% of tertiary students)	26.87	20.97	20.52	25.53
Researchers in R&D / million	909.68	1,473.07	344.63	1,823.58
Total Expenditure for R&D as % of GDP	0.38	1.01	0.67	0.68
Manuf. Trade as % of GDP	58.48	94.59	35.95	62.47
University-Company Research Collaboration	2.40	3.30	3.10	3.10
Scientific and Technical Journal Articles / mil. pop.	45.05	243.35	59.80	78.12
Availability of Venture Capital	2.80	3.60	2.50	4.20
Patent Applications Granted by the USPTO / mil. pop.	0.41	5.16	0.26	0.87
High-Tech Exports as % of Manuf. Exports	3.65	25.63	2.06	4.67
Private Sector Spending on R&D	2.90	3.20	3.10	3.30
Firm-level Technology Absorption	4.30	5.20	5.20	4.90
Secondary Enrollment	84.15	103.60	76.00	100.52
Tertiary Enrollment	30.42	44.09	24.76	64.45
Computers per 1,000 people	110.00	150.10	51.20	154.70
Internet Users per 10,000 People	2,019.75	2,746.40	1,413.16	2,809.14

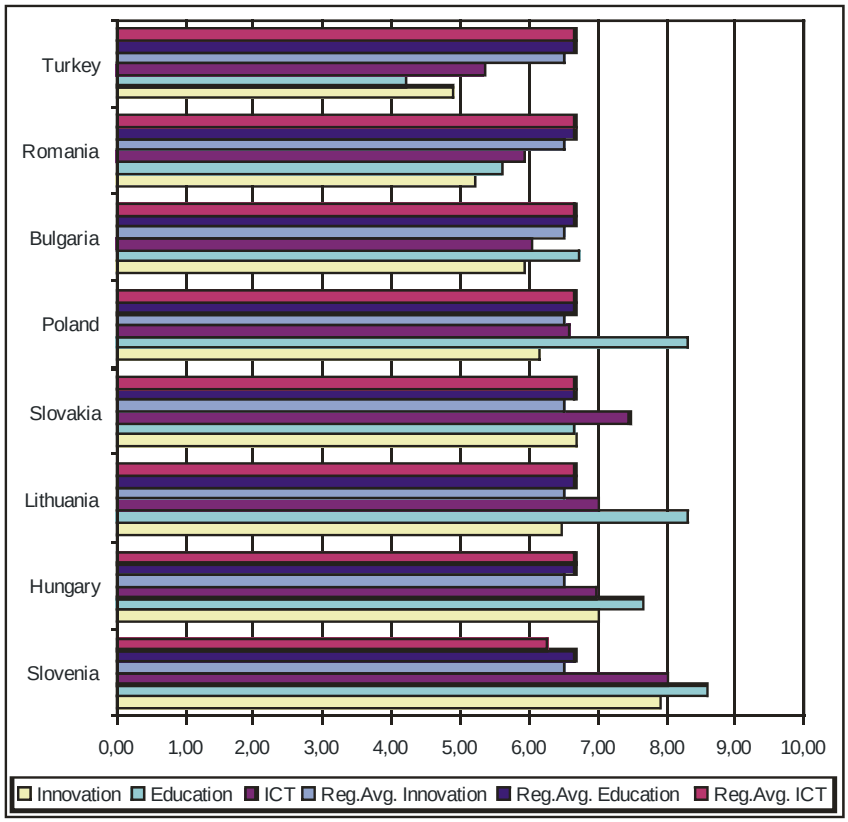
Source: Process of data from World Bank Survey (2003-04 years).

The broader economic context is an important starting point since innovation is driven by economic competition, trade openness and property rights incentives, which are a

function of macroeconomic and institutional set-ups. Opportunities and incentives for innovation are highly dependent on levels of income and productivity.

Chart 1

Innovation, Education, ICT: Romania in the regional context



Source: Process of data from World Bank Survey.

Romania faces serious challenges in building a national innovation system (Table 2 and Charts 1, 2, 3). It performs very poorly on innovation creation indicators. In this context, a major challenge is to substantially improve lifelong learning in order to create the necessary skills within the workforce for adopting new technologies. A skilled labour force contributes to productivity growth and competitiveness by enabling the companies to utilize and take advantage of their investments in ICT and other innovative features.

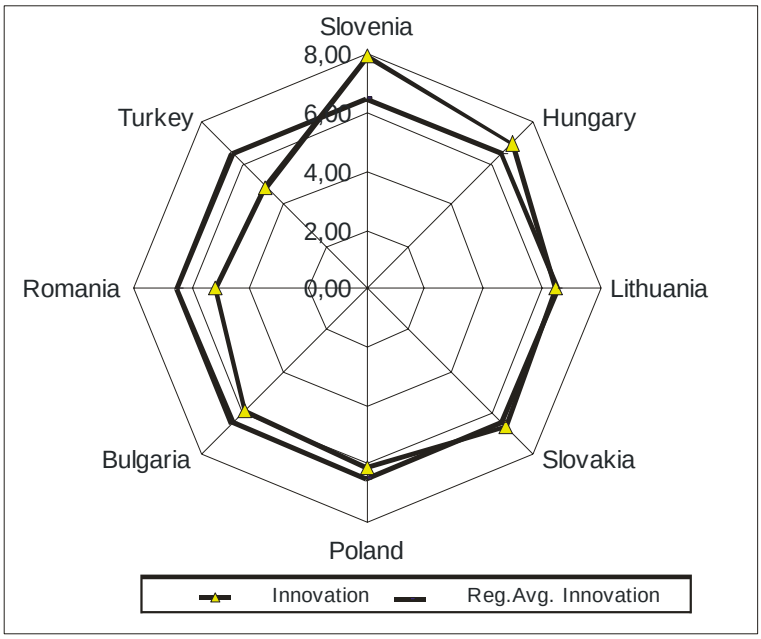
One of the major constraints to innovation is the extremely weak financial system and the quasi-absence of private-equity for innovative high-risk firms. We hope that the use of Structural Fund will support the development of such schemes.

Investment in the creation of new knowledge is the weakest dimension of the innovation capability of Romania. Low investments in public research and development are accompanied by very limited investment by business sector. Participation in technology frontier activities through USPTO and EPO patents is marginal.

Intellectual property rights (IPRs) are also essential to knowledge generation. But in terms of innovation, the overall benefits of IPRs for developing economies are ambiguous: a strong IPR framework can hinder diffusion and encourage investors to license instead of investing. This is especially relevant in countries that have weak research and development systems. Weak IPR rules deteriorate foreign investors from entering into research and development intensive sectors.

Chart 2

Innovation: Romania in the regional context



Source: Process of data from World Bank Survey

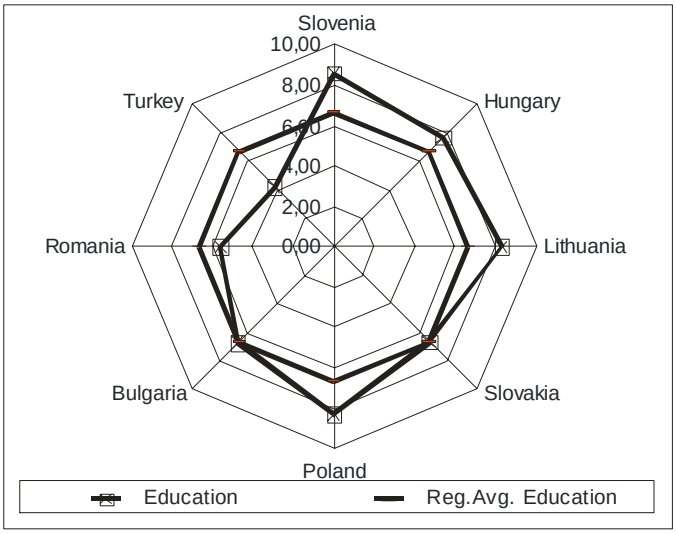
In Romania enterprises are more likely to look to clients or competitors as innovation partners. A stronger emphasis on funding structures involving partnerships of enterprises, research centers and other intermediaries should be infused into current policies.

Because industry-science relations remain very weak and a major priority is to create an „entrepreneurial culture" in higher education and research establishments. Reinforcing the current initiatives to introduce innovation management, as a part of

core science/engineering and business/economic curricula in higher education is a target of education Minister in Romania.

Chart 3

Education: Romania in the regional context



Source: Process of data from World Bank Survey

Diffusion and absorption of new technologies is crucially dependent on a skilled workforce, which is one of the main determinants of quality (production) and innovation capability. As noted above, education indicators suggest unfavourable position for Romania. Radical structural change, improving skills and learning capability are vital. Also, higher education institutions must encouraged more entrepreneurial methods such as redefining promotion criteria of academics to give greater weight to industrial research co-operation, the creation of „commercial subsidiaries„ responsible for maximizing return from research result, etc.

By Romanian perspective, building stronger national innovation systems in the competitive environment of an enlarged EU will require the creation of numerous new interfaces between private and public agents, between supply and demand for investment and innovation, and between domestic and foreign markets.

Different types of research and development yield different benefits in terms of adding value, learning, skill creation, productivity improvement, market growth and spillovers to other activities. Complex research and development activities generally call for, and so create, more advanced skills and knowledge than simple ones; they also yield higher value added. Activities associated with rapid technical progress offer better prospects for future productivity increase and enjoy faster growth than other activities. The deepening of the industrial structure from simple to complex activities, and of innovative activities from simple to advanced functions, is a natural result of economic

development, but accelerating and facilitating the process often requires active policies.

Bibliography

De Jong (J.P.J.), Bruins (A.), Dolfsma (W.), Meijaard (J.), 2003, «Innovation in service firms explored: What, how and why? Literature review», *Strategic Study B200205,* Zoetermeer: EIM Business and Policy Research.

Den Hertog (P.), Bilderbeek (P.), 1999, «Conceptualising service innovation and service innovation patterns», *Thematic essay within the framework of the Research Programme Strategic Information Provision on Innovation and Services (SIID) for the Ministry of Economic Affairs, Directorate for General Technology Policy.*

Drejer (I.), 2004, «Identifying innovation in surveys of services: A Schumpeterian perspective», *Research Policy*, No 33, 551-562.

ECON, 2006, «Innovation in services: Typology, case studies and policy implications», *Report 2006-025*, Oslo: ECON Analysis.

Gadrey (J.), Gallouj (F.), Weinstein (O.), 1995, «New modes of innovation – How services benefit industry», *International Journal of Service Industry Management,* No 3, 4-16.

Gallouj (F.), 2002, «Innovation in services and the attendant old and new myths», *Journal of Socio- Economics*, No 31, 137-154.

Gallouj (F.), Weinstein (O.), 1997, «Innovation in services», *Research Policy,* no 26, 537- 556.

Hipp (C.), Grupp (H.), 2005, «Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies», *Research Policy*, No 34, 517-535.

Howells (J.), Tether (B.), 2004, «Innovation in services: Issues at stake and trends», *Studies on innovation matters related to the implementation of the Community 'Innovation and SMEs programme'*, ESRC Centre for Research on Innovation and Competition, Institute of Innovation Research, University of Manchester and Commission of the European Communities, Brussels – Luxembourg, Final report.

Mattoo (A.), 2001, *Trade in Services: Economics and Law*, Washington.

Miles (I.), 2004, «Innovation in services, in Fagerberg», Jan, David C. Mowery and Richard A. Nelson (eds.), *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.

Minna (K.), Hollanders (H.), Arundel (A.), 2006, «Can We Measure and Compare Innovation in Services?», European Trend Chart on Innovation, june, 2006, 7-31.

OECD (2001), Science, Technology and Industry Outlook, Drivers of Growth: Information Technology, Innovation and Entrepreneurship.

Pavitt (K.), 1984, «Sectoral patterns of technical change: Towards a taxonomy and a theory», *Research Policy*, no 13, 343-373.

Schumpeter (J.A.), 1934, *The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle*, Cambridge, MA: Harvard University Press.

Tether (B.S.), 2004, «Do services innovate (differently)? », *CRIC Discussion Paper* n° 66, Centre for Research on Innovation and Competition, The University of Manchester.

Tether (B.S.), Miles (I.), Blind (K.), Hipp (C.), De Liso (N.), Cainelli (G.), 2001, «Innovation in the service sector – Analysis of data collected under the Community Innovation Survey (CIS-2)», *A study funded by the European Commission within the Innovation Programme*. Brussels-Luxembourg: ECSC-EC-EAEC, May.

UNCTAD, 2004b, *World Investment Report: The Shift Towards Services*, Geneva.

WORLD BANK, 2004, *World Bank Survey Report.*

WORLD ECONOMIC FORUM, 2001, *The Global Competitiveness Report*.