

ADVANTAGES OF REGIONAL SYSTEMS OF INNOVATION: CONTRIBUTION OF THE REGIONAL INNOVATION POLE OF C. MACEDONIA

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Abstract

The paper discusses the evolution of innovation theory from linear to systemic perspectives and the rise of regional innovation systems and strategies as dominant form of innovation systems in Europe. Regional innovation poles is a further step in this direction that addresses certain weaknesses in those strategies, such as their very wide scope covering all the industry sectors and components of the innovation system, the lack of a global perspective in innovation networking, and the uncoupling of strategy from funding immediate available to implement it. The paper illustrates the regional innovation poles concept by reference to the Regional Innovation Pole of Central Macedonia, Greece. The Pole's strategy is networking and system-building in new product development, addressing gaps in the innovation performance of enterprises (new products, patents, business research, etc.). Regional Innovation Pole of Central Macedonia is based on the cooperation between ICT companies, research laboratories, technology transfer organizations, and technology management consultants.

Keywords

Innovation; systems of innovation; regional innovation strategies; regional innovation poles.

Introduction

In the 1980s the reliability of Schumpeter's original theory of innovation was challenged on many sides since it had become clear that innovation is affected by many factors outside a business, regardless of whether it is large or small. The linear model of innovation production directly from research began to be abandoned. Jaffe (1986 and 1989) found that the innovative performance of firms depends not only on their own investments in R&D, but that they are also strongly affected by the R&D spending of other firms and universities. But if the ability to innovate is affected by external sources of knowledge and technology then we should expect wide differences in the innovative performance of firms located in different regions.

Systems of innovation

The impact of external factors on innovation was expressed more plainly with reference to the environment in which companies operate. The evolutionary metaphor formulated by Nelson and Winters (1982) introduced a robust relationship between the internal and external environment of the company, in terms of *organizational routines, search activities*, and modification of routines by an external *selection environment*.

These fundamental processes of innovation (routines, search, and selection environment) create a cognitive space, which is specific and exclusive to each organization. Central to Nelson and Winters (1982) thinking is that technologies set boundaries to innovation patterns; learning processes are dependant on their technological environment, which they characterize as 'technological regime'. The concept of technological regime more accurately describes the technological environment in which a company operates. They identified two technological regimes: an 'entrepreneurial regime', associated with scientific research, where new innovative firms easily can enter; and a 'routinized regime' which characterizes innovation of established firms, having a cumulative knowledge base.

A further push to the turn towards the external environment of innovation was given in the late 1980s and early 1990s with a series of publications on 'National Innovation Systems'. The term was introduced by Freeman (1987) and a few years later Nelson and Rosenberg published '*National Innovation Systems*'. The book described the operation of national innovation systems arguing that 'the technological capabilities of a nation's firms are a key source of their competitive prowess, with the belief that these capabilities are in a sense national, and can be built by national action' (Nelson and Rosenberg 1993). National innovation systems continue and advance evolutionary thinking.

Systems more efficiently describe the external selection environment influencing the processes of change of organizational routines within the company. In particular, systemic approaches focus on the interplay between institutions involved in the creation, diffusion, and application of knowledge, and lead to a better appreciation of the importance of the framework conditions of innovation, like regulations and policies within which markets operate, and the wider governance of innovation.

All definitions of innovation systems put an emphasis on institutions: 'the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies' (Freeman 1987); 'the national institutions ... that determine the rate and direction of technological learning' (Patel and Pavitt 1994); the 'set of distinct institutions which jointly and individually contributes to the development and diffusion of new technologies' (Metcalf 1995); 'institutions and economic structures affecting the rate and direction of technological change in society' (Edquist and Lundvall 1993).

Regional systems of innovation

In the 1990s innovation theories turned towards learning organizations and regions, while policies started experimenting with regional innovation strategies. The focus has clearly shifted to learning institutions and regional systems of innovation.

The region was conceptualized as a living organism with technology learning, management, selection, and knowledge development capabilities. Innovation is based on a system of clusters and institutions in the fields of R&D, tech transfer, finance, technological information, and production. The system contains both demand and supply institutions, and integration is due to knowledge, financing, and marketing networks. Networks within the regional system allocate 'formal' and 'tacit' knowledge and enable collaboration and joint efforts at three different levels: in the interior of clusters, between clusters and innovation support institutions, and between R&D and technology intermediation organizations. Funding institutions work as switches selecting (on) or rejecting (off) ideas for potential innovations. Priorities are placed on intangible infrastructures, human skills, intellectual capital, innovation financing, cooperation and social capital.

Regional innovation strategies and systemic approaches are now at the core of EU regional policy. This is clearly reflected in the new objectives for 2007-13 (convergence, competitiveness and employment, and European territorial cooperation), in which innovation appears as the top cohesion priority.

Regional innovation poles

The development of Regional Innovation Poles is based on experience acquired by the EU in the period 1994-2004 concerning the design and operation of regional strategies and systems of innovation. It is a further step in the field of regional innovation strategies that addresses certain weaknesses in those strategies, such as their very wide scope covering all the industry sectors and components of the innovation system, the lack of a global perspective in innovation networking, and the uncoupling of strategy from funding immediate available to implement it.

Both regional innovation strategies and poles focus on the regional system of innovation. They are approaches that adopt a systemic view of innovation as a process of collaboration and integration of R&D, technology transfer, and new product development institutions and skills. In the case of Poles, we are referring to a system of innovation focusing on a small number of industry sectors and cutting edge technologies, with a clear framework for collaboration between research, technology transfer and entrepreneurialism bodies. The rationale of Regional Innovation Poles is to create an environment favoring innovation which is characterized by three key features: (1) sectoral targeting, (2) powerful management capabilities and (3) a direct link between the Pole's strategy and projects to implement it.

Each Regional Innovation Pole attempts to establish a *regional-sectoral system of innovation*. It may focus on new industrial sectors (telecoms, computers, electronics, new materials, scientific instruments and apparatus), knowledge-intensive services (IT, media, finance, consultancy, medical services) or on traditional industries (food, clothing, furniture, etc.) where they are associated with innovation and new technology activities, and services (tourism, transport, etc.).

Regional Innovation Pole of C. Macedonia

The Pole of CM is one specific example of the program designed on the basis of these principles. The Pole focuses on one single technological area, that of ICTs and covers three interrelated industry clusters in NACE 32 (manufacturing of radio, television and communication equipment), NACE 64 (telecommunication services), and NACE 72 (computer related and other similar services). This narrow choice is counter-balanced by the fact that innovative applications in ICTs involve end-users from all the other manufacturing and service sectors.

The Pole's strategy is networking and system-building for leveraging the most important weaknesses in new product development: gaps in the innovation performance of enterprises (new products, patents, business research, etc.) and limited production of intellectual property. In the case of the Pole, the system of innovation is based on cooperation between ICT companies and R&D institutions: research laboratories,

technology transfer organizations, liaison offices of universities, business incubators, and technology management consultants. The system operates on two levels: (1) creating an innovation supportive environment, and (2) establishing partnerships and consortia to develop innovative products and services.

To make this sectoral system a reality, the Pole has developed four types of actions:

- Regional technological platforms;
- New product development consortia between ICT enterprises, research laboratories and institutions, and user enterprises, in the same areas as the technological platforms;
- New spin-offs companies based on the exploitation of research results; and
- Horizontal activities for the entire ICT sector dealing with the development of the business intelligence, international technological cooperation, and technology transfer for the creation of innovative entrepreneurship activity.

Regional technological platforms take a cooperative approach when it comes to the selection and application of technologies. A technological platform is set around the agreement of the stakeholders of an industrial sector and their common vision of the technologies that the sector should develop as a matter of priority. Organizations from industry, research, and financial institutions, regulatory authorities, as well as users cooperate to identify both the vision and technologies that can make this happen. Three technological platforms were chosen based on the *Regional Technology Foresight Exercise* which was recently concluded: (1) Broadband networks and Internet services, (2) Digital systems and telecommunication systems, and (3) Software technologies and knowledge software.

New product development consortia bring together ICT companies, end-user companies, and technology providers from universities and research centers. Each consortium emerges to address the making of an innovative product or service. Following an open call and double assessment, 14 RTD consortia were selected out of 70 proposals submitted, taking into account the strategic importance of the proposed technology application that the consortium intended to develop; a clear evidence of the usefulness and viability of the new product or service; and a clear evidence of consortium partners in a long-term commitment for continuous cooperation and effort to place the new product / service on the market.

The creation of spin-off companies and commercial exploitation of research results is another action of collaborative networking. The birth of new enterprises is a critical path and empowerment strategy for the development of high-tech activities. For the ICT sector especially, spin-offs established to commercial exploit

public R&D are a classic pathway for innovation and growth. Efforts in this field are intended to create new knowledge-intensive companies that are based on the utilization of research results. As in the case of product development consortia, spin-offs represent cooperation between R&D labs and motivated people having the necessary skills to set and run a new business.

Finally, *horizontal activities* create wider cooperation networks involving all actors related to ICTs. They seek to offer innovation support services to all organizations comprising the ICT innovation system: enterprises, research laboratories, consultants and technology transfer companies. The rationale behind horizontal activities is open up networking in the fields of business intelligence, market promotion, international cooperation, and technology transfer.

- Business and cluster intelligence are offered to all companies through the systematic monitoring of markets, technologies, and competitors, with a view to improving business management, discovering new markets, and assessing future needs.
- International cooperation and product promotion are about the brand name of the Pole, its identity, logo, and marketing campaign.
- Technology transfer for innovative business activity deals with inherent risks and uncertainty regarding the final outcome of start-ups and spin-offs.

The Pole is set up as regional non-profit association by forty six organizations: the regional authority, two universities and many labs, one higher technological educational institute, a national research center, business incubators, a Technology Park, two business associations, numerous ICT companies, specialized ICT providers, and technology dissemination agencies. It is run by a directing board of nine members from the academic, business, and public administration world, and chaired by the General Secretary of the Region. A management team has undertaken daily operation tasks. An independent evaluator monitors the progress made with platform actions, R&D consortia, spin-offs, and horizontal activities, and reports to the association. The actions are implemented by the organizations participating in the association that is the Pole.

Conclusion

Regional innovation poles of Central Macedonia convey certain messages about how the collaborative innovation model is set up and run and how to achieve the transition from a closed to an open model of innovation. They show that new product development in-house, is associated with the wider system of innovation (sector, regional, national and global) within which it takes place.

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Biography

Giorgos D. Tsiotras is Secretary-General of Region of Central Macedonia, since April 2004. He served as Rector of the University of Macedonia from 2000, up to the undertaking of his duties in the Region of Central Macedonia. Also, he has served in the same University as Vice-Rector of Academic Affairs and Personnel; Chairman of the Department of Business Administration; and Chairman of the University Research Committee. He is professor at the Department of Business Administration.

He holds a Ph.D in Operational Research (1986) from State University of New York (S.U.N.Y.) at Stony Brook; M.Sc in Operational Research (1983) from Columbia University; and degree from Mathematics Department of Aristotle University (1980).

Giorgos Tsiotras has worked as Director of Research Department in the international research centre of AT&T Bell Laboratories, while he has taught in American Universities of Iona College, Graduate School of Business, N.Y., in the S.U.N.Y at Stony Brook, in Saint John's University, and in Columbia University.

Has been scientific responsible for a large number of research projects in subjects related to Total Quality Management, Quality Assurance, Production

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He has been rewarded with the Cross of Battalion of Price of the Polish Democracy, with honorary medal from the EFQM for supervising dissertations on TQM, with quality awards from AT&T Bell Laboratories, as author of the most important publication in the field of Quality for 2003, for the book "Improvement of Quality", from the periodical ECO-Q, and the Chairman of Parliament. He can be reached at tsiotras@rcm.gr

Nicos Komninos is currently a professor of Urban Development and Innovation Policy at the Aristotle University of Thessaloniki. He holds a Master's Degree of Architecture-Engineering from the Aristotle University and a Ph.D. from the Ecole des Hautes Etudes en Sciences Sociales, Paris. He teaches courses on 'Learning Regions', 'Technopoles', 'Digital Cities', and the postgraduate seminar on 'Intelligent Cities and Systems of Innovation'.

He is founder and director of Urban and Regional Innovation (URENIO) Research Unit and has coordinated about seventy research projects under the European R&D Framework Programmes and the ERDF Innovative Actions. His research interests are on innovation ecosystems and intelligent cities. In parallel to research projects, he has been involved in the development of technology parks and regional innovation strategies in Greece, Spain, Italy, Cyprus, Bulgaria, Czech Republic, and Lithuania, and in UNIDO activities on regional innovation in developing countries. He had been member of the committee for the design of regional innovation poles in Greece; vice-chair of the Greek RIS network; and currently he is member of the Directing Board of the 'Regional Innovation Pole of Central Macedonia' and the 'Innovation Zone of Thessaloniki'. He is member of the Editorial Board of the International Journal of Innovation and Regional Development (Inderscience Publishers).

His research has been published widely. He has authored about 100 papers in academic journals and book collections, (co)authored numerous research reports, and fourteen books, including '*Technopoles and Development Strategies in Europe (1993)*'; '*The Innovative Region*' (1998); '*Innovation Development Technologies in Regions and Production Complexes*' (2001); '*Intelligent Cities: Innovation, knowledge systems and digital spaces*' (2002); '*Intelligent Cities and the Globalisation of Innovation Networks (2008)*'. He can be reached at komninos@urenio.org