

HOW TO INCREASE THE ROLE OF R&D HUMAN RESOURCES FOR REGIONAL DEVELOPMENT? SOME CHALLENGES FOR SLOVENIA

Franc Mali

University of Ljubljana

Faculty of Social Sciences

Kardeljeva pl. 5

1000 Ljubljana

Abstract: In the contribution, attention will be paid to certain obstacles preventing the establishment of a more organic concept of the regional innovation system in Slovenia. In Slovenia a central problem is that the key social actors only look at the normative and political sided of this problem. Namely, to supplement the traditional concepts of innovation system with the modern concept of the regional innovation system does not only mean producing a normative platform. It is much more important to create suitable policy instruments that would lead to realisation of the regional component in science.

Introduction

In recent times the increasing role of academic science knowledge for regional development has been noted. For this reason, one of the highest

priorities of innovation policies is to create suitable conditions to ensure the transfer of academic science knowledge to business-enterprise and service sectors at the regional (local) level. In the modern globalised world regional and local factors are important. However, in spite of the rapid globalisation processes underway it is clear we cannot think about these processes without referring to specific locations and places. Globalisation is a dialectic process in which the global and the local (regional) do not exist as polar extremes but are combined and mutually implicating principles.

Over the last few decades, the notion of systems of innovation, either local, regional, sectoral or national, has been used widely to explain interactions among stakeholders involved in innovation processes. In the contribution, attention will be paid to some issues of the regional innovation system. As mentioned, local (regional) factors are important in the globalisation era. What is most important and often forgotten is the fact that geographical proximity enables the reproduction of many intangibles which are the conditions for the creation of a progressive innovation environment at the regional level. Let us take the example of social trust between different stakeholders involved in recent innovation processes. Trust plays one of the key roles in establishing different forms of collaboration between scientists, industrialists and politicians.

In the theory we do not find a homogeneous concept of the regional innovation system. Analysts dealing with the regional innovation system identify various elements. Notwithstanding this, most of them regard 'regional proximity' as the most important indicator within which other elements which build the regional innovation system are summarised. In this

regard, let us mention only the diamond structure theory (Porter 1990) or the theory known by the term Triple Helix (Etzkowitz & Leydesdorff 2001) which are very strongly connected to elements of innovation systems at the regional level.

In this short contribution, attention will be paid to certain obstacles preventing the establishment of a more organic concept of the regional innovation system in Slovenia. In my view, a central problem here is that the key social actors only look at the normative and political sided of this problem. Namely, to supplement the traditional concepts of the national innovation system (the national innovation system concept was initially presented by Lundvall (Lundvall 1992) and Nelson (Nelson 1993) with the modern concept of the regional innovation system does not only mean producing a normative platform. It is much more important to create suitable policy instruments that would lead to realisation of the regional innovation system concept. Here, ensuring the education for high quality human resources must be one of the basic goals. In this regard, what is the function of the Young Researcher Programme which has been running in Slovenia since 1985? Does this policy action seeking to educate highly skilled personnel for employment in the business-enterprise sector actually meet the demands of the recent concept of the regional innovation system? In the contribution, a tentative answer to this question will be offered.

The regional innovation system concept in the context of the new European Research Area (ERA)

Today, European innovation policy is increasingly based on the concept of »territorialisation«. This concept is directed to the increasing recognition of 'spatial' factors in R&D and innovation policies (for more, see: COM 2003; COM 2001). Here the European Commission has launched several policy activities aimed at boosting the regional component in the processes of building of new European knowledge society. As a result of the European Commission's directives, EU member states are applying different practical measures which are leading to the enhanced innovativeness of particular regions. The strong regionalisation of innovation systems is fuelled by the EU's Structural Funds and the corresponding need for the co-ordination of sectoral and regional policy measures.

The EU encourages the development of regions that transcend national boundaries for two purposes: to enhance European unity and to create focal points for knowledge-based economic development. It is also true that the European Commission has on different occasions suggested that the EU programmes devoted to research and regional policies must be co-ordinated so as to promote projects for the development of research which are as close as possible to the citizens. Bottom-up policy interventions are thus no longer desirable. Policies are fine-tuned to suit the demands and interests of local environments. Many of the EC's documents indicate that the most important factor is the embedding of the available R&D infrastructure within the regional economic area to promote its development. Spatial proximity can help form different types of networks aimed at transforming scientific knowledge into industrial applications within regions. In recent times, science-based technologies such as nanotechnology and biotechnology have been areas especially able to benefit from a regional approach. It is thus no

surprise that at the European level a number of initiatives have been triggered to encourage regional-based biotechnology networks transcending national borders (Mali 2004).

According to the new ERA concept, regions may play the role of a »motor« in the overall context of economic growth based on research, technology and innovation. In the EC's study successful cases of so-called 'motor' regions in Europe were analysed (Involving regions in the European Research Area, 2002). Motor regions share in common the ability to make intensive use of R&D potential at the regional level. What is especially important is that they generally host high quality R&D infrastructure, mostly centred around universities and other academic research institutions in specific areas. The regional innovation policy is oriented to support innovative SMEs. In most motor regions the good functioning of so-called scientific intermediary structures ((liaison offices, bridging institutes) and services (IPR, liaison to venture capital schemes/ business-angel networks) is seen. The intermediary structures play an important role in the commercialisation and commodification of academic science knowledge.

Among the different types of 'motor' regions (R&D front-runners, take-off regions, R&D impulse regions), the first group is especially interesting. The following regions were identified as representatives of the first group: Bavaria, East of England ('Cambridge area'), Northern Finland. Although the abovementioned regions differ substantially in terms of their geographical strength, political autonomy, peripherality, quantitative supply of R&D infrastructure and presence of high-tech SMEs, they have in common successfully established synergic working innovation systems

involving all relevant players (excellent universities, entrepreneurially-oriented SMEs, smart policy actions of local authorities etc.).

The 'Cambridge Phenomenon' still attracts a lot of interest. On one hand, the University of Cambridge is one of the leading research universities in the world. On the other, it is also among the world's most renowned universities in terms of the transfer of its scientific knowledge to the local business-enterprise sector. It is part of a long tradition of co-operation between academic science and business-enterprise systems. A long history in clustering is significant for the East of England where 20 years ago the first clusters were established.

Let us mention here the results of a recent comparative study made by the University of Ljubljana and the University of Cambridge (for more, see: Kuscer & Kos & Mc Tavish 2006). The results of this study indicate the main difference between both universities is not so much the availability of theoretical knowledge but the efforts to commercialise and commodify the theoretical knowledge. In this regard, the University of Ljubljana is well behind the British university. For example, the Cambridge area hosts one of Europe's biggest high-technology clusters with over 20 technology and research parks. The innovative and entrepreneurial culture has helped the University of Cambridge to become a leading regional innovation centre. Today, the so-called 'Cambridge Technopole' comprises over 1,500 high-technology companies in over 20 science and technology parks. The Cambridge Technopole attracts over 25% of the UK's venture funding.

To conclude this part of our discussion, the success stories of regional innovation systems do not depend so much on single factors but much more on the synergetic collaboration of all stakeholders involved in innovation activity at the local level. It must be also clear that each of the motor regions represents its own successful developmental model, which cannot merely be copied. Namely, European regions have very different profiles, especially in relation to their capacity to generate successful innovation systems. Hence, it is very important not to exaggerate the strength of Brussels' recommendations:

1. On one hand, the whole ERA 'philosophy' could provide a common analytical framework for establishing different policy measures to enhance the regional dimension of the innovation system. The regional innovation systems fit very well within the overall methodology set up in the Lisbon strategy and the various policy instruments in the ERA (EU Framework Programme, Structural Funds) could be of big help for realising the goals.
2. On the other hand, we must be aware that policy measures and schemes always reflect the diversity of the framework conditions, cultural preferences and political priorities of particular EU countries. Here, an open method of co-ordinating national efforts together with benchmarking policies may be of valuable assistance especially for the new EU member states and also for other EU candidate countries when encountering the critical challenges of how to establish the best regional innovation policies.

Some obstacles to development of the modern concept of the regional innovation system in Slovenia

In the recent past in Slovenia infrastructure for innovations (universities, research institutes etc.) was mainly concentrated in big urban centres (Ljubljana, Maribor) (see, for example: Mali 2000). One of the consequences was the weak and slow innovation performance levels seen in other local areas in Slovenia. Unfortunately, recent policy strategies still require adaptation to overcome the key deficiencies.

At the moment in Slovenia different normative acts and documents put the role of R&D as the main promoter of socio-economic development in the fore. Notwithstanding, in most of them one cannot find a more articulated re-thinking of how to increase the co-operation of the science and business-enterprise sectors at the local (regional) level. For example, in the new National Research and Development Programme 2006-2010 the modern concept of the regional innovation system is absent. The only exception in this regard is an indirect statement made in the National Research and Development Programme 2006-2010 that R&D should be geared towards minimising regional differences at the level of economic and social development.

One of the main reasons for this unfavourable situation is the politically and normatively dominated approach to the issues of regional development. Slovenia is a small country. From an administrative point of view, the country has 193 local communities. Mostly, they are small communities

with limited human, infrastructural and financial resources. As small administrative units, they are unable to mobilise any greater innovation capacities.

Formally, 12 regions exist in Slovenia. In fact, these regions are more of the nature of statistical units. In none of these regions is there a coherent development strategy which should be based on a high degree of co-operation between the different stakeholders involved in innovation processes. In the 1990s so-called developmental agencies were established in 11 of 12 statistical regions. The main goal of setting up these agencies was to increase local developmental activities at the regional level and to work out a more strategic approach to local issues in collaboration with chambers of industry. These agencies as some form of intermediary structure at the local (regional) level could become the precondition for innovation-oriented regional development. Unfortunately, the absence of key innovation actors never increased their functions (roles) to such an extent as to become the promoter or creator of the regional innovation system.

Taking the recent situation into account, we could say that in Slovenia regions which mostly represent statistical units have not succeeded in ensuring strong innovative efforts. The administrative units that are called 'regions' in Slovenia are too small in terms of their geographical area, numbers of inhabitants and economic weight. They are also not strong enough to develop an independent innovation policy. There is no comparability with the situation in Austria, one of the neighbouring countries. In Austria, regional innovation systems are encouraged by the regional governments (Landsregierung). The regions in Austria are big

enough so they can mobilise substantial resources to create dynamic regional innovation systems.

One of the basic conditions of realising the modern concept of the regional innovation system is the availability of highly educated human resources. In this context, policy schemes for the training and mobility of researchers are very important. The most important EU R&D policy actors are aware that the need for enhanced localised research mobility is a key requirement and success factor in establishment of the regional innovation system. As has been noticed in different EU documents, the orientation of academic researchers to resolving practical problems is essential for the dissemination of scientific results to the local social-economic environment.

Slovenia is placed at the highest level among new EU member states concerning the number of total researchers per 1,000 workforce (5.0). It is near to the average value of EU-25 (5.4). The age structure of scientists in Slovenia is one of the best in Europe. It is quite opposite to some countries which belong to the group of the most scientific developed countries. In these countries concerns about the age structure of the S&T labour have grown. In most Scandinavian countries the age distribution of the highly qualified S&T workforce is skewed towards older age groups. In these countries, more than 40% of the highly qualified S&T workforce is aged between 45 and 64. Contrary to Slovenia, these countries could face significant difficulties concerning the replacement of retiring researchers.

What are the reasons for Slovenia's good position concerning R&D human potential? The main reason is the presence of organised governmental action

to give complete financial support for the education of doctoral students. This policy instrument is called the Young Researchers Programme and was launched already at the end of the 1980s. Since the beginning of the 'Young Researchers Programme' about 5,500 doctoral students have been included in the programme. Most of them finished their training with a PhD degree. (The failure rate was very low during the whole period.)

On the grounds of the Young Researchers Programme we can see that Slovenia began with a very smart policy action to recruit talented young people for scientific work much earlier than many EU member states. Let us mention one similar programme, the so-called Ramón y Cajal Programme in Spain which started at the end of the 1990s. It has attracted a lot of attention among the European public and even in leading professional journals such as Nature and Science. The programme was targeted to improve the 'academic career prospects' and employment opportunities of doctoral students in the public research sector (Cruz-Castro & Sanz-Menendez 2005).

Unfortunately, the biggest deficiency of the Young Researchers Programme in Slovenia is that the most important goal of this policy action was never realised: to increase the mobility of young and highly educated researchers in the business-enterprise sector and to other user sectors (public institutions). This is despite the fact that the financial burden involved in supporting this action is quite heavy for the state. For example, in 2005 the Slovenia government allocated 20% of the whole budget dedicated for R&D to the postgraduate education of young researchers, 62% for basic and applied science, 10% for research infrastructure, 7% for international co-operation and 1% for the promotion and public understanding of science.

The data on the mobility of young researchers vis-à-vis the business-enterprise sector are critical. It is especially those scientists with a PhD degree who have not made the shift to industrial R&D departments. In total, about 60% have remained in academic research institutions (75% of all PhD holders), about 20% joined the business sector (10% of all PhD holders) while a similar number continued their careers in the public administration (15% of all PhD holders).

TABLE 1: Number of PhDs financed in the framework of the ‘Young Researchers Programme’ by scientific field (2000- 2005)

SCIENTIFIC FIELD	2000	2001	2002	2003	2004	2005
NATURAL SCIENCES	57	55	40	53	60	57
ENGINEERING	91	68	46	67	76	74
MEDICINE	32	25	18	23	26	26
BIOTECHNOLOGY	35	28	19	24	30	32
SOCIAL SCIENCES	33	24	17	25	28	26
HUMANITIES	27	24	18	24	28	28
TOTAL	275	224	158	216	248	243

To conclude this part of our discussion, in Slovenia the policy instrument called the Young Researchers Programme has not contributed to the

revitalisation of R&D capacities in industry at the local (regional) level. It is true that in the last few years some efforts to improve the above mentioned policy action have also been made. For example, the Ministry of Science started a new programme in which business enterprises can apply for grants for young researchers in their research establishments provided the candidates fulfil general conditions (e.g. age, average mark of undergraduate studies etc.). Notwithstanding this, so far there has been no crucial reorientation of the mobility of highly educated human resources. The mobilisation of research human resources to play the central role in the regional innovation system has never been successfully realised.

Conclusions

In this paper, some issues of the regional innovation system were presented. In the modern processes of globalisation, the role of regional factors has not diminished. That is especially true for the modern concept of the regional innovation system. Today, European innovation policy is increasingly based on the concept of the regional innovation system. According to the new ERA concept, regions may play a »motor« role in the overall context of economic growth based on research, technology and innovation. As a result, EU member states are encouraged to introduce the different practical policy measures which are leading to the improved innovativeness of particular regions. The successful cases which might be used as a model for Europe are the so-called 'motor' regions. These motor regions share in common the ability to make intensive use of R&D potential at the regional level. Further, what is especially important is that they host a generally high quality R&D infrastructure, mostly centred around universities and other academic

research institutions in specific areas. Of course, they possess many other factors which are important for innovativeness. Although in Slovenia different normative acts and documents have put the new role of science and technology as the main promoter of socio-economic development in the forefront, what is missing are more articulated ideas for how to increase the co-operation of science and the business-enterprise sector at the local (regional) level. One of the main reasons for this adverse situation is the politically and normatively dominated approach to the issues of regional development. Regions in Slovenia are more statistical units than strong innovative factors. An additional obstacle is the lack of localised research mobility. The state-supported policy action called the Young Researchers Programme has not contributed to revitalising the R&D capacities of the business-enterprise sector at the regional level.

LITERATURE:

- COM (2003), *Innovation policy: updating the Union's approach in the context of the Lisbon strategy. Communication from the Commission (112 final)*. Brussels, 11th March 2003.
- COM (2001), *The Regional Dimension of the European Research Area*". *Communication from the Commission. (549 final)*. Brussels, 12th April 2001.
- European Commission (2002), *Involving Regions in the European Research Area. Tuning the territorial conditions to optimize knowledge creation and transfer in Europe. Final Report to the European Commission*. Luxembourg: Office for Official Publications of the European Communities.
http://europa.eu.int/comm/research/rtdinfo_en.html (downloaded 22 May 2006)
- Etzkowitz, Henry and Leydesdorff, Loet (2001), *Universities and the Global Knowledge Economy. A Triple Helix of University – Industry – Government Relations*. New York: Continuum.

- Kuscer, Enej, Blaz Kos, Stewart Mc Tavish (2006), 'Inspiring Innovation and Entrepreneurship: Comparing and Contrasting The Entrepreneurial Environment Surrounding The University Cambridge, UK and The University of Ljubljana, Slovenia', in Miroslav Rebernik (Eds.), *Cooperation between the economic, academic and governmental spheres: mechanisms and levers*, Maribor: Faculty of Economics and Business, 129-143.
- Lundvall, Bengt-Ake (1992), *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning*. London: Pinter Publishers.
- Nelson, Richard (1993), *National Innovation Systems. A comparative analysis*. New York: Oxford University Press.
- Mali, Franc (2004), 'Recent dilemmas in the social and legal regulation of biotechnology in the European Union.' *Vest. Journals for Science and Technology Studies*. 17 (3-4): 39-60.
- Mali, Franc (2000), 'Obstacles in developing university, government and industry links: The Case of Slovenia.' *Science Studies*. 13 (1): 31-49.
- Porter, Michael (1990), *The Competitive Advantage of Nations*. London: Macmillan Press.