Štefan LUBY*

HOW TO FILL THE GAP BETWEEN RESEARCHES AND INDUSTRY: THE CASE OF SLOVAKIA

Abstract: The natural gap between research on one side and industry on the other side is a consequence of different psychology of both partners. This is the case also in some Central European countries, e. g. in Visegrad-4 countries, including Slovakia. In our country at present only the 1st generation linear model of technology transfer and innovation activities is applied. One of the roles of ERDF supported project CERIM (Central Europe Research to Innovation Models) is to help to surmount the existing barriers and to implement the 2nd generation mechanisms of technology transfer in the region.

In this paper, starting from the new European strategy Europe 2020, attention will be paid to the innovation index of Central European countries, especially of Slovakia, to our legislation framework with some bottlenecks, but also to the absorption potential of local companies, including small and medium enterprises, which is low in the present period of global crisis and high unemployment. The situation is compared with the 2nd generation technology transfer in developed countries. Thereafter, a new model for support of research, experimental development, technology transfer and its instruments is discussed. The gap between research and innovation area should be filled by transfer centers, spin offs, risk capital agencies and other institutions.

INNOVATIONS IN EUROPE

The basic documents related to innovations in European Union are the strategy *Europe 2020* and a new flagship initiative *Innovative Europe* from October 2010.

Europe 2020 links up with the failed *Lisbon strategy* enfolding this project into a new one with increased goals and prolonged terms. Having in mind that crisis has wiped out the years of economic and social progress, strategy formulates three priorities:

– growth based on knowledge and innovations,
– sustainability,
– inclusive growth – high employment and social cohesion.

* Prof. Štefan Luby, Slovak Academy of Sciences, Bratislava, Project CERIM

It is expected that in 2020 75% of population 20–64 years old will be employed and investments into R&D will reach 3% of GDP in all of E 27 countries. (It should be mentioned that soon after publishing this document ministers of finances of member states declared that they are against the 3% target and they demand a new output oriented criteria of R&D efficiency.)

Europe is weak in support of R&D, in applications of information and communication technologies and, especially, in the frequency of innovations.

Global competitors, China and India, invest into R&D much more then before.

In EU member states less than one third of people 25–34 years old have a university degree, in USA and Japan these numbers are 40% and 50%, respectively. Only two European universities are among the top 20 in the Shanghai ranking. We need more commercialization of research, unification of European patent, better education to creativity and entrepreneurship, new tax incentives, improved access to capital and effective market of risk capital for innovators and small and medium entreprises (SME).

Flagship Initiative *Innovative Europe* demarcated a broad field of innovations including technology and non-technology innovations, application driven innovations, ecoinnovations and innovations in services. The document is demanding more money into basic research, education and long life education, integrated capital market, research&innovation activities supported from structural funds (SF), EU patent as an innovation instrument, increased creativity in industrial sector and coordination of innovation policies. In the field of administrative approaches a new unified indicator for monitoring innovations as a complement to 3 % GDP into R&D – indicator should be created.

THE CASE OF SLOVAKIA

Slovakia has an export oriented processing economy with low commercialization of our own R&D. Innovation index is 53,7% of EU 15 average (Table 1). In next 5–10 years a slow growth of wages is expected, thus, SMEs will benefit from cheap labor force (Table 2). In EU 15 the 2nd generation innovation policy tools are applied. In Slovakia 1st generation policy still survives.

Table 1. Structure of the innovation index of Slovakia

Factor	EU 27	EU 15	SK	SK/EU 15
Education, internet	0,47	0,55	0,33	60 %
Creation of knowl., expend. In R&D	0,31	0,40	0,07	17,5%
Innovation in entrep., risk capital	0,40	0,41	0,19	46,4 %
Export, new prod., employment in HT	0,41	0,40	0,55	137,5 %
Int. prop. rights protection, patents	0,26	0,42	0,03	7,2 %
Average	0,39	0,44	0,25	53,7 %

Recommendations of new Slovak government (2010) for universities are as follows: less specialization, teaching more general knowledge, critical thinking and

the ability to gain information. Higher impact should be put onto domestic and international patents. It is necessary to define the mission of university: the top quality research is one eventuality, others are applied research for the region or for an industrial branch. Short curricula for fast transfer into praxis are to be developed.

Table 2. Prize of labor in some countries related to the average of OECD (100)

Germany	148	Portugal	74
Nederland	134	Czech Rep.	62
France	123	Hungary	54
Japan	117	Poland	52
USA	106	Slovakia	46
OECD average	100	Mexico	27
Canada	94		

LEGISLATION FOR R&D IN SLOVAKIA

In Slovakia we have the basic acts for the support of science (172/2005), the state assistance (231/1999) and stimuli for R&D (185/2009). Innovation act is needful. Tax incentives are unrealistic at the general low tax level (19 %).

In the field of intellectual property right protection we have a complete set of acts of the intellectual property rights (90/1993), patenting act (435/2001) and copyright act (618/2003). Into patent act a grace period should be implemented as a resonable compromise between publishing and patenting.

According to our rules employee must inform his employer about invention leading to patent. If employer does not claim his rights within 3 months, patent belongs to the author/creator.

There are not big demands for changes in the legislation. Unfortunately, legislation *per se* is not a considerable driving force for innovations.

TECHNOLOGY TRANSFER IN GERMANY AND OTHER COUNTRIES, BEST EXAMPLES

During last two years I have studied the technology transfer (TT) in Germany. Here the TT, WT (Wissenstransfer) or IT (Innovationstransfer) is a part of web pages of all universities and research institutes, including new federal countries. TT is organized

a – via an own university office,

b – via external company.

The broad field of TT activities in Germany covers consultations, TT contracts, patents, marketing, foundation of spin-off or start-up companies, exchange of knowledge, transfer-portals, networking, measurements, analyses and audits using own laboratory equipment. Spin-off and start-up companies are most frequent in biotechnology and health area.

TT is common at both technical and natural-science universities, nevertheless, also universities in social sciences and humanities are involved (education and consultation activities, e. g. in economy – University Augsburg).

As best examples from other countries Agency TEKES in Finland founded in 1983 may be mentioned. It distributes approx. 500 mil € per year for projects, esp. risk projects, foresight studies, etc. In 2007 the output represents 690 filled patents, 500 new products, 400 improved processes. Similar role fulfills the Agency VINNIVA in Sweden.

Risk capital is operated by „Betailigungsprogram" in Germany, by SITRA in Finland or by Seed and Venture Capital System in Ireland. Everywhere the 3rd role of universities or 2nd role of research institutions in commerce is stressed.

All enumerated activities are a part of 2nd generation models of TT. These models need a densely populated interface between research and industry to overlap the „mentality" gap between them. The 1st generation models – down-hill movement of inventions– does not work.

INNOVATION AND ABSORPTION ABILITIES OF SLOVAK APPLICATION AREA

In the EC CIP (Competitiveness and Innovation Program, 3,6 mld. € in 2007–2013), we play a passive role with e. g. 2 projects in 2009 only. State assistance in 2009 for R&D is approx. 10 times lower than for agriculture projects. JEREMIE – Joint European Resources for Micro and Medium Enterprises with 100 mil. € from SF and national resources will be evaluated later.

In SF calls of our Ministry of Economy low and medium technologies dominate – printing equipments, food, cleaning shops, etc. Only 5 projects belong to solar energy conversion and ICT. High-tech projects are seldom.

Examples of awarded innovations in Slovakia in 2010 are a complex system of customers relation management, editor of internal norms, invoice automatization, software virtualization, etc.

OFFERS FROM R&D SIDE IN SLOVAKIA

Number of patents is Slovakia is about 200 per year. We have first spin off examples in the Slovak Technical University. The licensing activities of Slovak Academy of Sciences represent only 10 contracts after 1990. Before the political change in 1990 Academy produced almost 100 patents per year. This was because patenting and maintaining of patents was free of charge and patent was considered as a special publication. After going through a deep minimum, number of patents increases again, approaching to a level of 20 per year. In the same time Slovak national patents retreat, being substituted by European patents

NEW INFRASTRUCTURE BUILT FROM SF IN SLOVAKIA

Ministry of Education of Slovakia declared that in 2009 the state support of R&D increased abruptly from approx. 0.45% GDP to 0.83 % GDP. Obviously, his is because money obtained from SF were included. Our Academy will gain a new in-

frastructure worse of 95 mil. €. This means that soon expectations from political area but also from public side related to the innovation activities will appear. Thus, the TT instruments should be fast developed. Especially, in this case they cover the marketing of infrastructure, list of offers, information days, conferences, new web pages, etc.

CONCLUSIONS

It is obvious that havinh in mind crisis, our incorporation into ERA, research infrastructure built from SF and other circumstances, it is a very time to accelerate the Slovak transition into the 2nd generation TT policy and to increase the pace of innovations in our country. This means to develop all instruments for support of TT policy, like more money into R&D, improved tax policy and state assistance, risk capital (for Slovakia we need 510 mil. € following the analysis of EIF), correct tenders and procurement, good political climate, education of spirit of entrepreneurship and business skills.

We have three alternatives of the fuurther development: fast recovery – innovation policy with powerful interventions of government, slow recovery or a lost decade, if innovations will grow only after exhausting the cheep labor force potential.

ACKNOWLEDGEMENT

ERDF supported project CERIM (Central Europe Research to Innovation Models) with 10 partners from seven countries (Germany, Austria, Hungary, Italy, Poland, Slovakia, Slovenia), Slovak Academy of Sciences being one of partners, is acknowledged.