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## **Introduction**

Since the Lisbon Agreement in 2000, the European Union has been focusing greater attention than before on the factors determining the competitiveness of the Union and the member states. Among these factors a decisive role is played by innovation and innovation potential as well as the strategies designed to strengthen them.

Innovation is the driving force of regional development. It is not by chance that for the programming period 2007-2013 the European regions have developed their independent innovation strategies which also have interregional relations.

The region of Northern Hungary and the region of Kosice (Slovakia) submitted their proposals for developing a bilateral regional innovation strategy in June 2004 to the call for proposals 'Regional Innovation Strategies' announced in Framework Programme 6 of the European Union. Following the positive decision, the NORRIS project was started on 1 July 2005 and had a project period of 32 months.

This issue provides a summary of the achievements of the joint work covering a period of nearly three years.

The first three methodological studies look at the issues of the measurement of innovation and the methodology of strategy development. The 'Workshop Section' sums up the achievements and recommendations of the strategy.

We are confident that summary of the work supported by INTERREG does not put an end to the collaboration of the enterprises and professional organisations of the two regions, but generates further work in the future.

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## **Thematic Issue on Innovation / Content**

|   |     |
|---|-----|
| <i>Oto Hudec:</i><br>Regional innovation strategy as a policy instrument  | 3   |
| <i>György Kocziszky:</i><br>Measurement methodology of Regional Innovation potential  | 14  |
| <i>Dezső Szakály:</i><br>Technology transfer: An efficient method of knowledge transfer   | 35  |
| <i>Nataša Urbančíková:</i><br>Innovation and Human Resource Development   | 50  |
| <i>Éva G.Fekete:</i><br>Innovations in Micro-regional and Local Development   | 57  |
| <i>Dániel Kuttor:</i><br>Creating Innovation Strategy in Bilateral Environment  | 69  |
| <i>Tomáš Želinský - Miriam Šebová:</i><br>Analysis of the regional economy and environment for innovation in Eastern Slovakia   | 78  |
| <i>Richárd Kása:</i><br>New Production Factor in Economics – Innovation and the New Economy   | 88  |
| <i>Gabriela Kol'vecková - Radoslav Tušan:</i><br>Supply and Demand on Innovation in Eastern Slovakia  | 100 |
| <i>László Dankó:</i><br>Development of Cross-Border Cooperation in the Tri-Border Region  | 110 |
| <i>Peter Džupka:</i><br>Increasing absorption capacity of the EU structural funds, on regional level in Slovakia, by improving decision tools, with focus on innovation | 126 |
| <i>Ildikó Kneisz - Kornél Kalocsai - Viktória Józsa-Búzás:</i><br>Supply and Demand in Innovation and R&D in the Region of Northern Hungary                             | 133 |

**Oto Hudec**

### **Regional innovation strategy as a policy instrument**

#### **Abstract**

The historical, cultural, political and economical disparateness of eventual trans-boundary regions makes the learning process of building regional identity, single economic space rather complex. The creation of a cross-border regional innovation strategy can play important role in enhancement of the interregional and international cooperation and competitiveness. This is particularly true on the parallel background of regionalisation of innovation systems in the most European countries. Also, former ideas of a success of innovation policies in developed countries and/or regions can be applied in lagging regions as well, taking into account special conditions and to fashion the regional strategy according to the character of the region of consideration. Cross-border regional innovation strategy as a tool for developing cross-border economic relations has a good chance to utilise regional integration effects in conditions of non-cooperating border regions and in enhancement of the interregional and international cooperation and competitiveness.

#### **1. Regional innovation and regionalisation process**

Efforts in the Research, Technology, Development and Innovation (RTD&I) both at national or regional level have been linked in the economic literature with higher growth rates, competitiveness and many other factors. Hence, the regional policy in the former post-communist countries should be more concentrated on the promotion of innovation to close the technology gap, especially in less developed regions. The main policy and indicator challenges at the present time deal with problems of change and transition, and on substantial issues related to the knowledge economy. For understanding the dynamics of innovation and knowledge creation in a wider social and economic context requires new methodological approaches for measuring quantity and quality of the process are required to be discovered, as well as to propose new policy mixes reflecting dynamic economic and societal changes. Governance should aim at the improvement of the system of public communication on RTD&I programmes. A system for monitoring each step of innovation policy implementation should be introduced with appropriate benchmarking and evaluation. The regulatory reform and governance should include several political aspects such as stronger market competition, education and culture with a greater focus on innovation, and high-quality training in innovation-related subjects. The regional governance system is in a process of changing toward more networking structure and away from hierarchical structures to a multilevel governance system. Also, there is a growing interest in study of pressures and interactions between the regional and national science policies. Globalisation brings diminishing importance of national borders and in such a new situation, regions happen to be more accountable for their own development. Regionalisation at the end of the first decade of the 21st century has a new shape resulting from the European Lisbon strategy aimed to make the EU "the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010".

Economic concepts of regional competitiveness based on innovations and knowledge-based economy on one side and economic and social territorial cohesion, strong regional policy orientation on the other side, result in the concepts of learning regions, regional innovation systems and regional competitiveness.

An increasing interest has emerged in literature, which focuses on the importance of knowledge, learning and innovation to the economic success of firms, regions and nation-states (LUNDVALL, 1988; FORRANT, 2001). New theories emphasise the role of human and social capital in regional growth and development as missing elements of its explanation. Publicity of human and social capital has become an important point of policy discussions. Regional strategic planning and decision-making postulate high quality of human capital and the involvement of citizens as a form of social capital to be mobilised to facilitate actions. Negotiating and building alliances and partnerships among different local and government institutions located in the region, universities, private sector interests and non-profit organisations is a crucial task, but hard to manage. The difficulties are compounded in the former communist countries facing their heritage of central-planned economies.

Regionalisation has been emerged partially from the New Institutional Economics, developing an approach, emphasizing efforts to upgrade the regional and local supply side infrastructure of entrepreneurial skill. The main difference between neo-institutionalist and neo-liberal theories is the alteration of the original assumptions about human behaviour and individual or state motivation. Aggregate social outcomes do not arise spontaneously from interaction between rational and perfectly informed individuals in pursuit of self-interest (POP, 2002). Neo-institutionalists believe that actors operate in an environment already structured by institutions. It is suggested to favour bottom-up, region specific, longer term and plural actor based policy actions. New institutionalism highlights two essential concerns:

- economic behaviour is embedded in networks of interpersonal relations and therefore crucially influenced by aspects such as trust and cooperation,
- economy is shaped by enduring collective forces - these may be formal institutions as well as informal or tacit institutions such as habits, routines and norms.

Innovation takes a central role in the process of economic development, when defining it as a product, process and organisational innovation in the firm as well as social and institutional innovation at the level of industry, region or nation. Innovation is considered as an interactive process – it is no longer seen as a linear process, the importance of feedback loops is now placed in the centre. Traditional approach (early works of J. Schumpeter and others) have emphasized R&D as the origin and driver of a successful innovation strategy. On this view, innovation is seen as a linear process, originating in R&D labs, and culminating in the introduction and marketing of new products and processes, (MOWERY and ROSENBERG, 1989). Also, innovation is shaped by a mixture of institutional routines and social conventions. Ever more habitual behaviours embodying knowledge - often tacit in its nature, as well as aspects such as trust are viewed as being at the heart of the innovation process. This approach leads to the concept of *social capital*, understood as networks, norms and trust that facilitate cooperation for mutual benefit. Social capital increases, supports and explains the benefits of investment in physical and human capital.

At regional level, this concept leads to the notion of learning region. Learning regions as a phrase is accredited to Richard Florida (FLORIDA, 1995). After his introducing the notion many authors have taken it up, although from various perspectives. An interesting idea is to refer to the learning region as a tool. To explain this, the definition of learning region by ASHEIM (2001) is borrowed; it is “increasingly organized co-operation with a broader set of civil organizations and public authorities that are embedded in social and regional structures.” Thus as an appropriate tool a network of institutions based on a partnership is considered that fosters

development strategies. By using networks the learning region turns to be flexible and creative in adopting new ideas that were approved by open-minded institutions and are to be carried out by leaders who possess the spirit of entrepreneurs. The learning region is based on the understanding that economic growth is at present dependent on innovation and at the same time, innovation is dependent on the creation, dissemination and application of knowledge.

Since economic development can be understood as a process of innovation activities, innovation emerges as the engine of growth and the role of institutions is an essential variable, “the national innovation system became an important part of national industrial policies” (LUNDVALL, 1992). As the conditions of regions in the regionalisation process are gradually changing over the time, what brings – in accordance with learning regions concept - new challenges such as change of the regional governance system toward more networking structure, embedding together cooperation and competition, away from hierarchical structures. Regionalisation accompanied by decentralization of power and resources leads to a situation when regional (innovation) policies started to play more important role. Innovation as a means of competitiveness for firms has a new form of means of regional development, and the main difference is in its added emphasis on networking among regional actors. National innovation systems in their nature are not primarily built to take into consideration regional aspects RIS, and networking is possible only on a base of geographic proximity of actors. The first research works on regional innovation systems are conceived under the influence of empirical studies on developed regions.

There is a question if regional innovation systems should be seen and assessed as policy tools for achieving regional growth generally, including less developed regions and to be adopted e.g. into European regional policy. Along with the theoretical studies, European Commission built up broad institutional and information support on innovation and launched regional innovation strategy projects in several waves, enabling to get empirical results. The Cohesion Policy intends to contribute to increasing growth, competitiveness and employment by incorporating the objectives of the Lisbon Strategy and the words “innovation” and “knowledge” are probably the most frequently used terms in European policy. Regional innovation strategies, operational programmes and measures in favour of research, technological development and innovation (RTD&I) or more generally ‘competitiveness’ have been designed and funded with the support of the Structural Funds since the early 1990s.

In spite of many efforts on regional, national or European level, the technology gap remains extensive. European regions are expected to gain a competitive advantage based on innovation, rather than cost. This means, as written above, to promote tough and close partnerships among the public sector, academic sector, agencies dealing with RTD&I and innovation, and the private sector. Establishing of networks and clusters should develop the exchange of knowledge and facilitate integration of innovation into production and services, resulting in the creation of well functioning regional innovative systems. As regards innovation performance, there exist vivid regional disparities. Among innovation leaders there are Nordic regions and regions with high economic performance such as in Germany, United Kingdom, Netherlands, etc. Also, metropolitan regions are among those with high innovation performance, including some new acceded countries. Economic domination of the metropolitan urban regions is typical for the new acceded countries in general.

## **2. Regional innovation strategies as a means of change**

Although there have been success stories in strategies to better structure innovation policies in some regions, (CHARLES et al, 2000) showed the difficulties in achieving success in regions where some form of successful innovation system had not been established. This is a particular problem in the post-communist countries, where the process of decentralisation and

regionalisation was launched only in the beginning of the first decade of the 21<sup>st</sup> century. Since 1994, more than 120 European regions have received grants to create a regional innovation strategy in the frame of the EU projects.



*Figure 1: RIS regions.*

Source: <http://www.innovating-regions.org>

There has been a condition that the projects are implemented by the regional authorities in co-operation with the universities, regional development agencies and experts, and according to the general methodology. A coordination body of the programme is The Innovating Regions in Europe (IRE) Network (<http://www.innovating-regions.org>) with an aim “to facilitate the exchange of experience between regions interested in regional innovation policies, strategies and schemes, and to improve access to good practice”.

The main objective of the RIS projects is to create a strategy for the period of 10 years focused to development of technologies and infrastructure such as technology and innovation centres, technology industrial parks, incubators, spin-in and spin-off processes, financing systems of innovation entrepreneurship, etc. Target group or users of the RIS project results are mostly technology-oriented innovative companies active in the region and RTD organisations. Regional innovation strategy projects have been implemented in four basic waves and covered almost the whole European Union and some of the regions of associated countries (the highest number of uncovered “white areas” are located in France):

Table 1: Four waves of RIS projects. Based on sources of IRE Network.

| EU Programme   | Characteristics   | Countries and number of projects (in brackets)  |
|--|---|---|
| <b>RIS:</b> Regional Innovation Strategies<br>1994 – 2001  | 34 plus 71 projects implemented in the framework of RIS/RITTS.  | Austria (1), Belgium (2), Finland (1), France (2), Germany (3), Greece (5), Ireland (1), Italy (3), Netherlands (1), Portugal (2), Spain (8), Sweden (1), United Kingdom (4).   |
| <b>RITTS:</b> Regional Innovation and Technology Transfer Strategies<br>1994 – 2001                        | 25 RIS+ projects were launched to support regions in the implementation of specific measures and projects stemming from their RITTS/RIS strategies.                       | Austria (3), Belgium (1), Denmark (2), Finland (3), France (6), Germany (10), Greece (4), Iceland (1), Ireland (1), Italy (8), Netherlands (5), Norway (2), Portugal (1), Spain (8), Sweden (6), United Kingdom (10). |
| <b>RIS-NAC</b> – Regional Innovation Strategies in Newly Associate Countries<br>2001 – 2004                | 19 projects, first RIS projects in Central and Eastern Europe,<br><br>Each region was accompanied by at least one other region that had already undertaken a RIS project. | Bulgaria (1), Cyprus (1), Czech Republic (3), Estonia (1), Hungary (4), Latvia (1), Poland (5), Romania (1), Slovakia (1), Slovenia (1).  |
| <b>New RIS</b> – Regional Innovation Strategies in new Member States and Associated Countries<br>2005–2008 | 34 projects in the new Member States and Associated Countries,<br><br>Each region partnered with at least one other region that has already undertaken RIS project.       | Bulgaria (4), the Czech Republic (1), Estonia (1), Hungary (1), Israel (2), Lithuania (2), Malta (1), Norway (1), Poland (7), Romania (5), Slovakia (6), Switzerland (2) and Turkey (1).                              |

The creation of RIS has to be done by utilisation of the special methodology that is derived from the RIS project preparation methodology but includes also all specifics that emerges from its cross border character. In general RIS methodology consists of three main stages. The methodology can be illustrated by the following picture:

It is interesting that in many new accession countries, regions have only recently been established as political and administrative units. In two cases, projects involved a cross-border region RIS (the Czech Republic/Poland and Hungary/ Slovakia. The crucial and critical is the period just after the formal end of a RIS project, when the implementation phase of the innovation strategy is to be launched. Regional authorities have no more any support for implementation from EU sources and there is a challenge to utilise the potential of knowledge, visions and ideas, regional networking, strategic intelligence and enthusiasm, which have been developed in the region during the project.

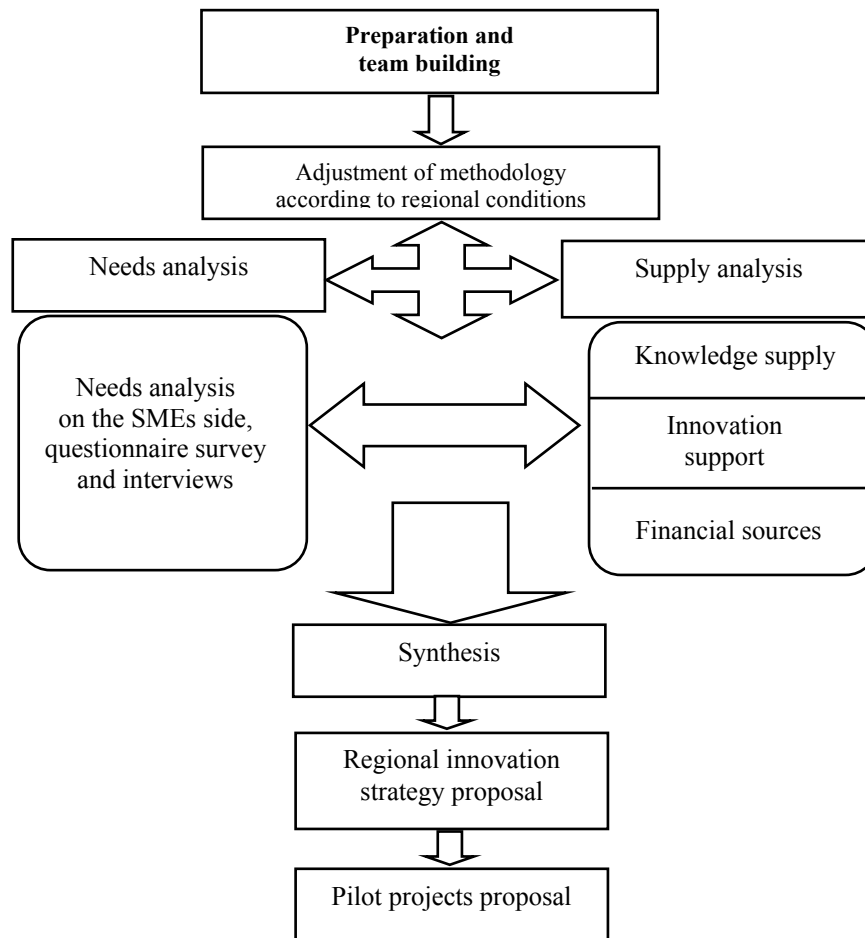


Figure 2: Methodology of RIS. HUDEC, 2007.

RIS projects have an impact on changes of innovation system in Slovakia, the creation of RIS in all the regions resulted in revolutionary reconstruction of the fully centralised national system of innovation to a new structure including regional innovation centres (RIC) in each of the NUTS-3 regions. Four main innovation policy tools are going to be supported in the new model:

- innovation centres
- technology platforms
- computerisation
- knowledge bases

Each of the regions has a chance to draw up a policy mix corresponding to regional specific needs, business environment, strategic priorities and situation in creation, application and diffusion of innovations. Thus, RIS projects may have a progressive “rolling stone” impact on changing regional strategic priorities, regional networks and cluster building, as well on regionalisation of innovation systems. All of the effects mentioned are building stones of the regional competitiveness concept.

The regionalised model of innovation system is shown in the following picture:



Figure 4: The new concept of National Innovation System in Slovakia.

### 3. North Hungary and Eastern Slovakia and regional innovation

Essential factors of regional disparities in the Central Europe can be recognised as proximity to western borders (poles of growth), urbanisation, diversification, quality of infrastructure, the level of human and social capital, entrepreneurial tradition, and their historic-cultural background (KOCZISZKY, 2006; HUDEC - URBANČIKOVA, 2007; KOCZISZKY, KUTTOR, 2006). It is not surprising that during the transition period, capital cities and western regions have been generally much more successful, while eastern and rural regions are lagging behind. Regions with higher innovation and proximity to poles of growth have much better chance to adapt to the new circumstances of the EU market as those regions marked with „the signs“ of peripherality. The difference between the regions of interest and corresponding capital regions seems to be huge although the regional disparities can barely be measured just using one and very questionable indicator as the GDP per capita. Before the year 2007, both Eastern Slovakia and Northern Hungary were in ranking of the NUTS-2 regions ranked among the ten lowest regions. Optically their position improved, as the change from EU25 to EU27 in 2007 caused that the fifteen lowest regions in the ranking are all in Bulgaria, Poland and Romania (EUROSTAT News Release, 2007). In spite of many initiatives in this area on regional, national or European level, the technology gap remains substantial, what can be illustrated by the GDP comparison:

Table 2: Regional GDP per capita. Source: Eurostat 2007

| Region NUTS-2 level                             | GDP per capita in 2004 of the EU27 average |
|---|--|
| Eastern Slovakia (Východoslovenský kraj)        | 42,3 %                                     |
| Bratislavský kraj<br>capital region of Slovakia | 129,3 %                                    |
| Northern Hungary<br>(Észak-Magyarország)        | 42,5 %                                     |
| Közép Magyarország<br>capital region of Hungary | 101,6 %                                    |

It is vital to help Europe's regions to gain a competitive advantage based on innovation, rather than cost. To do so, innovative actions have to encourage strong and close partnerships between the public sector, agencies dealing with RTD&I and innovation and the private sector. This partnership should improve the exchange of know-how and facilitate integration of innovation into the production practice, utilising the creation of regional innovative systems. Cross-border strategic innovation planning might be a supporting factor for low economic interconnection. There are several open questions in respect of the integration influence on cross-border regions. Optimistic economic opinion would expect integration benefits at a regional level, including regional integration. Nevertheless, there are a number of other factors and barriers respectively, hindering integration at regional level between two border states. There are number of studies suggesting that trade liberalisation might strongly affect the economy of border regions. But integration and liberalisation of the trade does not necessarily lead to economic prosperity of a border region – the situation of comparatively small Mexican economy that get used the potential U.S. market is sure different to Northern Hungary and Eastern Slovakia border regions. The recent studies based on the New Economic Geography models (KRUGMAN – HANSON, 1993; NIEBUHR - STILLER, 2004), show some general conclusions for the border regions connected with integration and liberalisation: reduction of international trade costs as well as liberalisation of cross-border labour movement affect the distribution of population, production factors and firms both among and within countries. How important is the phenomenon of country border in the Central European countries, or Slovakia respectively? There are several papers dealing specifically with the Northern Hungary and Eastern Slovakia border regions (FRUNZARU, 2005, HUDEC - KOEVEKOVA, 2007) explaining some of the barriers for a closer cross-regional integration. A part of the recent studies is dealing with a positive experience of cross-border regional innovation systems building (BERGMAN 2006, PERKMANN 2005). But it does not describe the situation, if there is no intense knowledge flow between the border regions and economic relations are not developed enough because of low development of the knowledge sources at the both sides of the border, informal cultural or historic barriers for cooperation are strong, and the national phenomenon is strong and prevalent. In this respect, cross-border regional innovation strategy as a tool for development of cross-border economic relations has a good chance to utilise regional integration effects in conditions of non-cooperating border regions and in enhancement of the interregional and international cooperation and competitiveness. The bilateral RIS is expected to help to strengthen transnational and regional co-operation in the field of R&D and innovation in order to open new areas of transnational activities and to exploit the existing capacities on a more efficient, integrated way. The bilateral RIS was under the preparation in the frame of „North Hungary and Košice Bilateral Regional Innovation Strategy Project - NORRIS” funded

by EC within the 6th FP. An original survey methodology had to be prepared in order to get the cross-border innovation activities as close as possible. Selection of the economic branches for the questionnaire survey in Košice region has been made according to following rules:

1. The branch's share in total employment.
2. The branch's location quotient.
3. Regional priorities
4. Assumption of innovation potential
5. Location and size (geographical and size principle, different size and location following representativeness principle as much as possible.

Specialisation of the border regions has been derived from the location quotients:

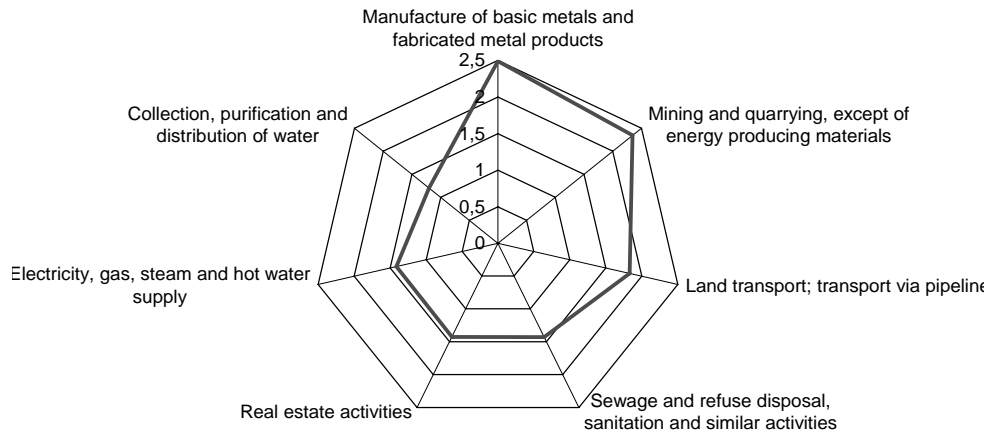
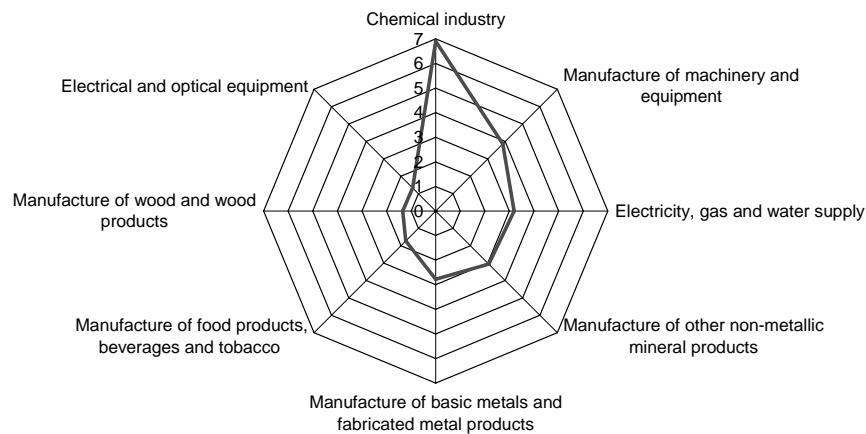


Figure 5: Branches in the Eastern Slovakia - Košice Region according to the location quotient

Based on the analysis, following economic branches have been proposed:

| Eastern Slovakia -Košice region  | Northern Hungary region   |
|----------------------------------|---|
| Machine industry                 | Food industry   |
| Electrical and optical equipment | Chemical industry   |
| Wood industry                    | Machine industry  |
| Food industry                    | Electrical and optical equipment                                  |
| Recycling                        | Metallurgy  |
| Material production              | Machine-, spare parts-, automotive industry based on mechatronics |
| Computer and related activities  | Chemical industry and the associated plastic industry             |
| Tourism services                 | Environment industry  |
| Construction industry            | Nanotechnology  |
| Mining and quarrying             |   |



*Figure 6: Branches in the Northern Hungary Region according to the location quotient*

According to the survey methodology, the sample design resulted in 5 common branches of interest:

1. Machine industry
2. Electrical and optical equipment
3. Food industry
4. Material production
5. Environment Industry

After identification of the branches of common interest, a company survey has been realised leading to comparison of business environments, encouraging trans-regional learning and exploiting the existing capacities. Also, within the cross-regional innovation strategy, two joint projects have been chosen for financing.

#### **4. Conclusion**

The cross-regional innovation strategy has been shown as an important tool for development of cross-border cooperation between two regions with no intense knowledge flow between the border regions and underdeveloped economic relations and strong national economic orientation. There is a good chance in the current regionalisation process of innovation system in both countries and to use an advantage of cross-border knowledge networking. Eastern Slovakia and Northern Hungary have much in common. They have a tradition of heavy industry, located on the peripheries of their countries, inflow of investments is lower than desired. The positive economic development of the western parts and metropolitan regions in Hungary and Slovakia has at the same time a negative side caused by continuing deflection of the centre of economic gravity to its geographic western part. The border can be considered as a strong barrier, multiplying the real geographical distance by a high coefficient. Political and financial support is on the side of cross-border intertwining – there exist programmes such as Hungary-Slovakia Territorial Co-operation Programme 2007- 2013 and there exist positive development reached by the creation and implementation of cross-border regional innovation strategy, that has started a number of vital movements and activities within both regions and cross them as well.

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György Kocziszky

## Measurement methodology of regional innovation potential

### 1. Concept of regional innovation potential, justification of its investigation

As opposed to neo-classical and Keynesian economic theory striving for balance (and not counting with technical changes), the oeuvre of Schumpeter (1939) put technical development, research (R), development (D) and innovation (I) into a new perspective.

Following the recognition of the significance of technical progress and creating the related fundamental concepts (R+D+I) and the first analyses, the attention of researchers focused on the exploration of methodology relations. As a result, in the 1950s and 1960s a series of investigations proved the relation between R+D and economic growth. In the 1960s and 1970s research was given a new impetus by the emergence of what were called science-policy objectives, resulting in the state taking an active role in the R+D processes. In harmony with that, the attention of analysts was directed towards a better understanding of the impact mechanisms of research-development-innovation, and the impact of scientific-technical inputs on the national economy.

#### *The concept of innovation*

Concerning the conceptual definition, in general the definition by Schumpeter is taken as a starting point, who regarded “the introduction of new products, the technical changes in the production of products in use, the exploration of new markets or new sources of supply, the automation of labour, the improvement in logistics, the establishment of new type of business enterprises” as innovation (SCHUMPETER, 1939. p.81.). According to Schumpeter’s view, innovation cannot be limited to invention; in the approach it is not the technical, but the economic side that is essential: to what extent a solution differing from the customary can bring benefits.

Naturally not all inventions or technical innovation bring economic benefits, that is a new technical solution is not necessarily innovation, which means that the new idea has to be proved to be marketable. That is why Schumpeter made a sharp division between invention and innovation (although in a considerable number of cases both activities are carried out by the same person).

Thus the process of innovation ranges from the emergence of the idea through research – and experimental development – and the elaboration of the finished product and technology to its application.<sup>1/</sup>

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<sup>1/</sup> According to the Fraschetti Manual definition (OECD, 1993): *research and experimental development* mean the creative work carried out on a regular basis with the objective of widening knowledge including that about man, culture and society, and the use of this knowledge for elaborating new applications. The three fundamental types of R+D: basic research, applied research and experimental development.

*Basic research* is experimental and theoretical work with the primary objective of gaining new knowledge on the fundamental essence of phenomena and observable facts without any concrete application or utilisation objective. *Applied research* is also original investigation carried out for obtaining new knowledge. It is, however, carried out primarily for some concrete practical objective. *Experimental development* is regular work based on existing knowledge gained from research and practical experience with the objective of creating new materials, products and structures, introducing new processes, systems and services or substantially improving already existing and established ones.

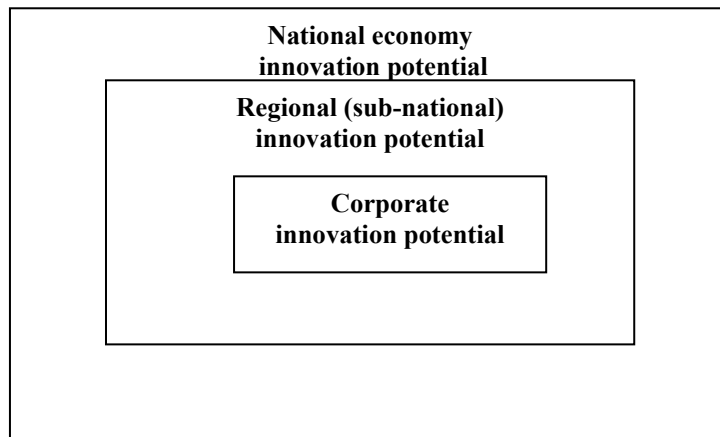
The following cannot be regarded as R+D activities: education and training, other related scientific and technical activities (e.g. coding, translation, general-purpose data collection, routine testing, writing feasibility studies – if they rely on applying existing techniques or are directed at studying the social-economic characteristics of concrete situations), routine software development, administration and legal activities concerning patents and licences, production and related technical activities (OECD 1993.).

### ***The concept of regional innovation potencial***

In the past two decades, new points of gravity appeared in the research into innovation (as proved by the large number of related publications). In addition to micro- and macro-economy, interest has been steadily growing in studying mezo-economic relations. As part of spatial investigations, more emphasis is granted to the examination of innovation potential, i.e. determining all the capabilities that can generate economic growth in a given region through new solutions (products, services, market segments, etc.).

Three levels of innovation potential (national, regional and corporate) can be differentiated (Figure 1).

Macro-economic innovation ability characterises the entirety of the national economy, while the regional level (sub-national) characterises a given, geographically well delineated region (forming part of the national economy) (e.g. a region, province, county, etc.). (National level data have been published since the early 1990s, regional ones since the late 1990s by researchers, statistics offices and research institutes.)



*Figure* : Possible levels of measuring innovation potential

*Source*: author's own work

Regional (mezo) level investigations demonstrate that there is a significant relation between the economic growth of a given region and its innovation potential. The outputs, added value, income relations of more innovative regions are better than those of regions lacking in innovation (WEIBERT, 1999). This assertion is true in a different way as well: regions with higher labour costs are only competitive if they can develop and market products and services with a high added value (CLAR/CORKAPIS/LANDABASO, 2001). It is evident today that innovation performance plays a decisive role also in the development of regional, social and economic disparities; and that regions that have drifted to the periphery can hardly change their positions without improving their innovation abilities (EVERS/BRENCK, 1992; WEIBER, 1999).

Thus the objective of measuring regional innovation potential is:

- to determine the given innovation performance of a given region, to measure its impact on the economic growth of the region,
- to analyse the individual factors determining its innovation potential, determine the possibilities for improving them, and to provide a foundation for the elaboration of regional innovation strategies.

## 2. Indicators determining the regional innovation potential

The innovation potential of a given region is determined by the national innovation policy (objectives, instruments and funds), the local potentials as well as the impact mechanism through which the results appear on the output side (Figure 2).

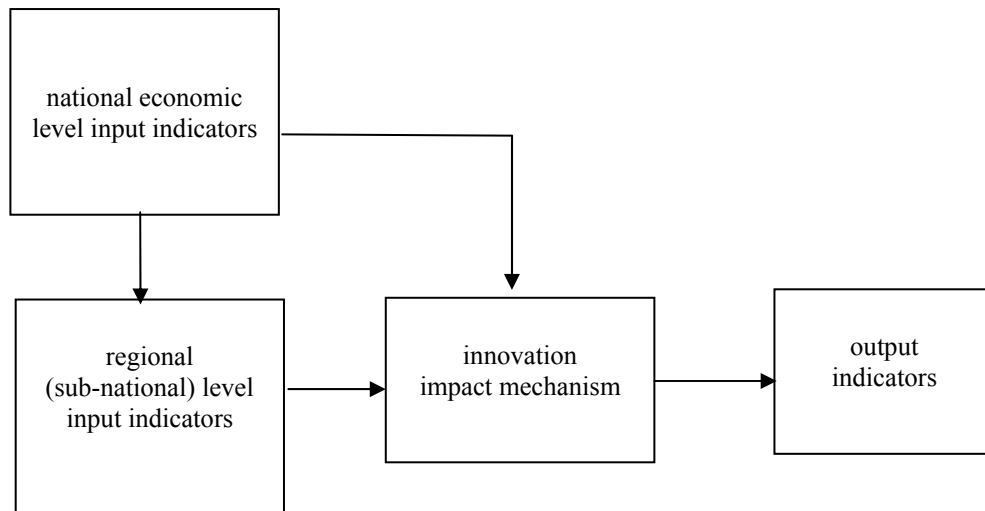


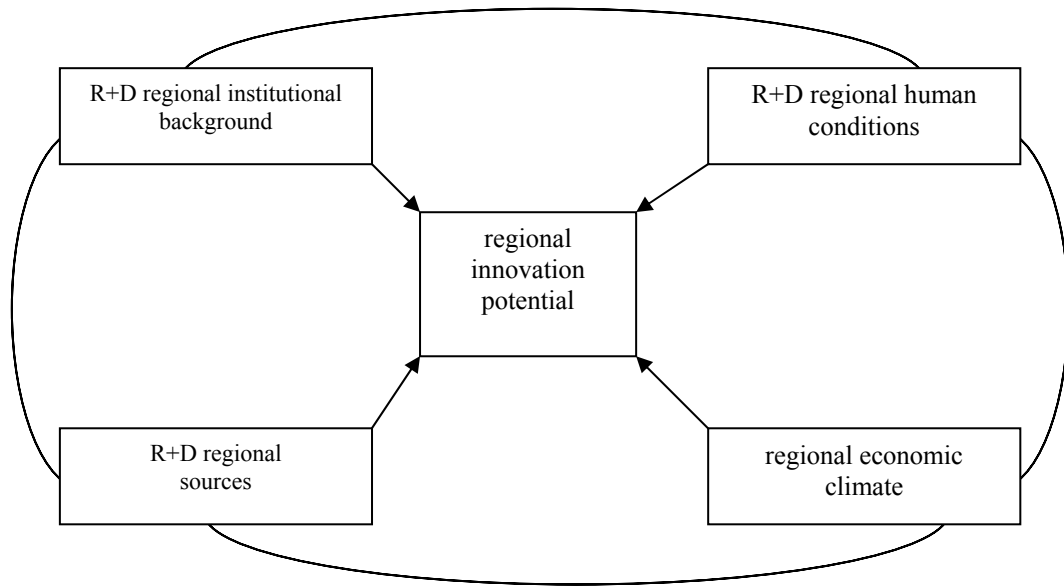
Figure 2: Relations of indicators determining regional innovation potentials  
Source: author's own work

There exist correlation relations of differing extents and signs between the innovation potential and the innovations working in the region. Certain input side impacts strengthen, others reduce the resultant impact and/or the dimensions of the indicators measured on the output side.

### ***Input side indicators***

The regional innovation potential is thus influenced on the input side by the national innovation climate as well as by the regional potentials (the institutional background of innovation, its human conditions, site factors, further regional sources) (Figure 3).

It is obvious that all factors have an influence on all the components, but to differing extents. That is the final outcome (the region's innovation potential) is influenced by all of them, the extent of the impact depending on the combination of the factors exerting their influence. The lack of one or the other, or its low standard vitiates (may vitiate) the surplus emerging in another factor. Therefore it is not expedient to highlight any single factor (and to state that e.g. increasing the sources will certainly improve the innovation climate and thus the result appearing on the output side will also be greater).



*Figure 3: Factors influencing the regional innovation potential*  
*Source: author's own work*

#### *Indicators of the macro-economic environment*

The macro-economic environment exerts an influence on the innovators and knowledge transfer on the one hand, and, on the other, on the demand and supply of innovation (Figure 4).

Fundamental tasks of the state:

- defining the system of objectives of innovation (e.g. increasing added value, sector preference, etc.);
- creating the legal regulation conditions related to innovation (e.g. legal protection of intellectual property, regulation of procedures, etc.);
- regulating the cooperation between the state and the private sphere;
- supporting international R+D transfer;
- developing and innovation monitoring system;
- generating R+D commissions, operating a system of innovation project proposals, providing sources/funding,
- developing the regional system of innovation.

The macro-economic level exerts a decisive influence on the demand for and supply of innovation through the R+D sources and policy (1).

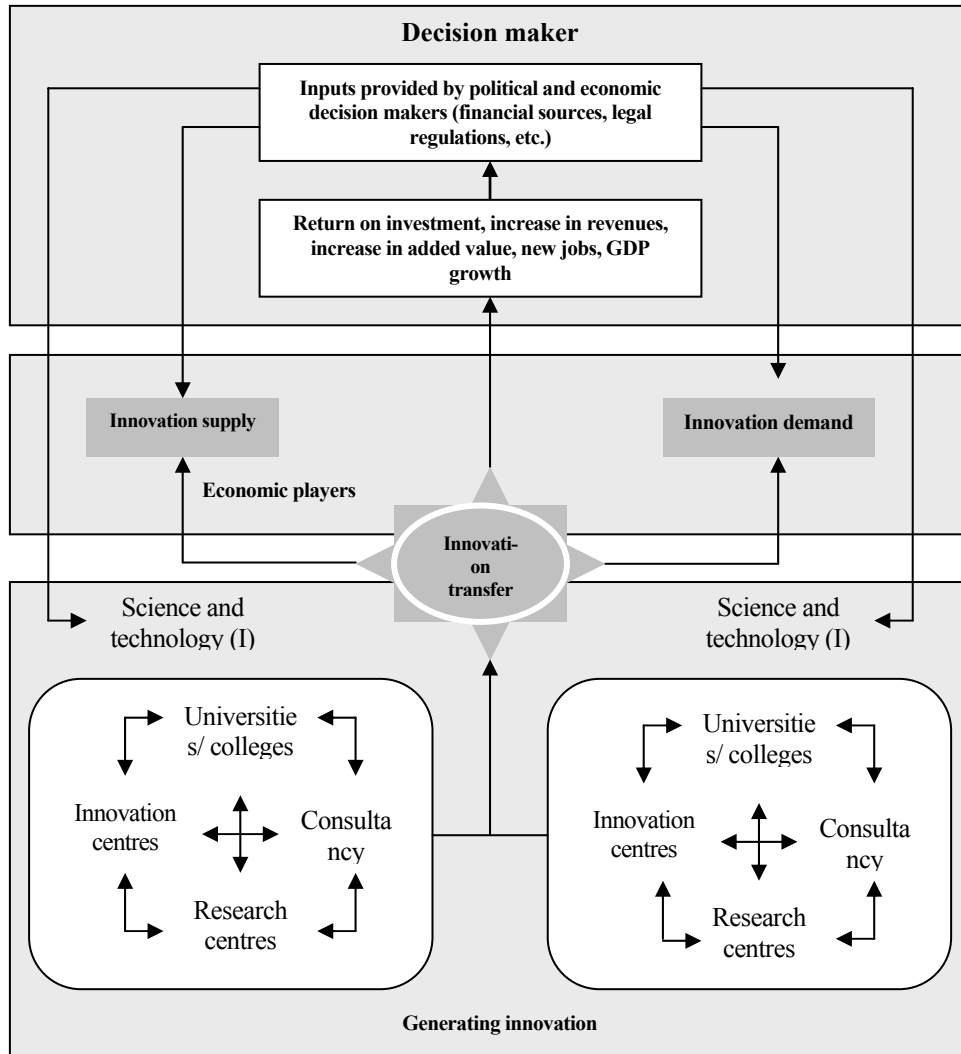


Figure 4: Relations between the players in innovation  
 Source: author's own work

Table 1: National economy level indicators

| No | Indicators    | Indices |  |
|----|---------------|---------|--|
| 1. | R+D+I sources | 1.1     | Share of government R+D commissions in GDP percentage (%)                          |
|    |               | 1.2     | Support of R+D activities within all government support (%)                        |
|    |               | 1.3     | Tax benefits of those pursuing R+D activities as a share of total tax benefits (%) |
|    |               | 1.4     | Annual growth rate of government R+D commissions (%)                               |
|    |               | 1.5     | Tax benefits of R+D type enterprises as a share of total tax benefits (%)          |
| 2. | R+D+I policy  | 2.1     | R+D share in driving sectors in GDP percentage (%)                                 |
|    |               | 2.2     | Annual growth rate of R+D in driving sectors (%)                                   |

*Regional indicators*

The regional innovation performance is primarily affected by the institutional background of innovation, its human conditions, the regional innovation climate and the regional sources.

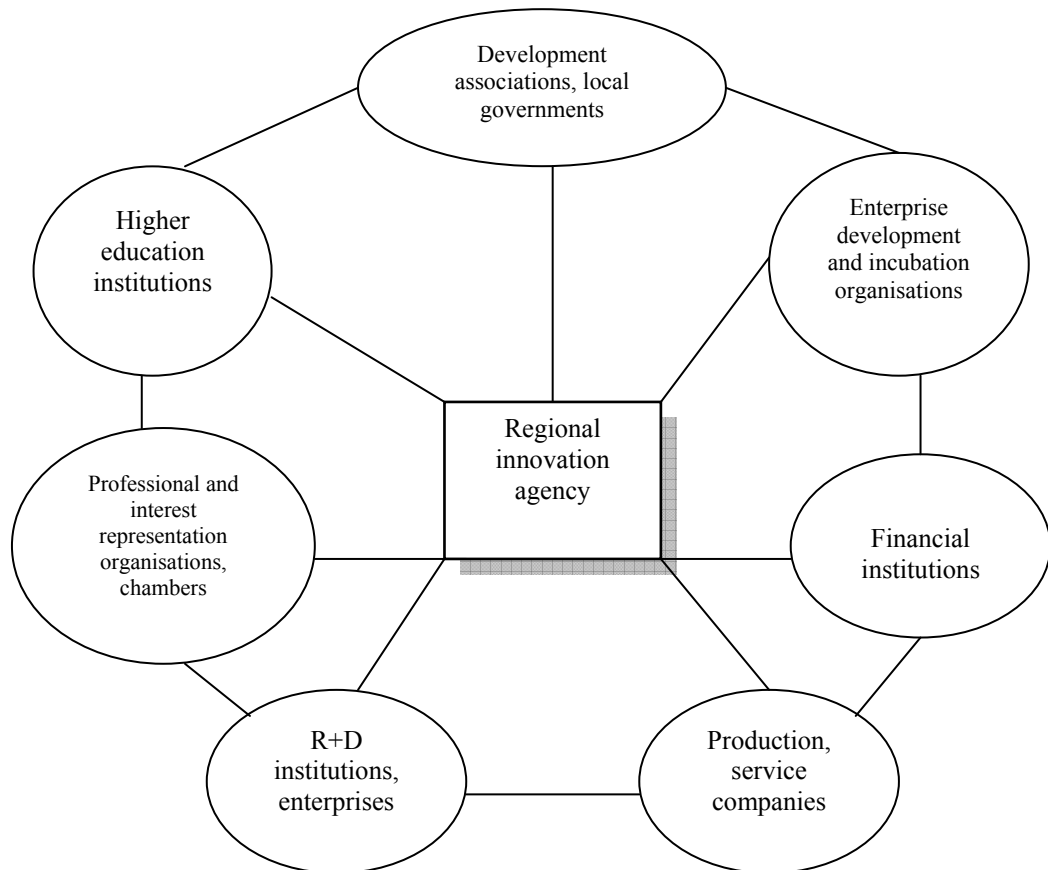
Regional institutional background of innovation

The innovation process has multiple players with tasks going to (Figure 5):

- research and innovation institutions and organisations which generate innovation;
- higher education institutions which lay the foundations of knowledge and provide for the development of human conditions;
- financial institutions which are involved in creating the financing background;
- enterprises which utilise and commission innovation;
- regional innovation agencies which promote building relations between the players and are the transmissions of government sources.

*Table 2:* Indicators of the regional institutional conditions of the regional innovation potential

| No. | Indicators                      | Indices |   |
|-----|---------------------------------|---------|---|
| 1.  | Number of R+D+I places          | 1.1     | Number of higher education R+D places as a share in the region's all R+D+I places (%)           |
|     |                                 | 1.2     | Number of research institute R+D places as a share in the region's all R+D+I places (%)         |
|     |                                 | 1.3     | Number of corporate R+D places as a share in the region's all R+D+I places (%)                  |
| 2.  | Supply side of R+D+I            | 2.1     | Product development supply as a share in sector revenue (%)                                     |
|     |                                 | 2.2     | Technology development supply as a share in sector revenue (%)                                  |
|     |                                 | 2.3     | Basic research supply as a share in sector revenue (%)  |
| 3.  | Networking connections of R+D+I | 3.1     | Number of R+D+I tasks implemented in domestic cooperation as a share in total tasks (%)         |
|     |                                 | 3.2     | Number of R+D+I tasks implemented in international cooperation as a share in total tasks (%)    |
|     |                                 | 3.3     | Revenue of R+D+I tasks implemented in domestic cooperation as a share in total revenue (%)      |
|     |                                 | 3.4     | Revenue of R+D+I tasks implemented in international cooperation as a share in total revenue (%) |



*Figure 5: Regional innovation network model*

*Source:* author's own work The institutional background can first of all be expressed in terms of the number of R+D places, their offer and networking connections (Table 2).

#### Human conditions of innovation

In the decades to come, the positions of the regions will be determined by the knowledge surplus and results of the application of knowledge included in the products and services as opposed to the former competitive advantages (e.g. cheap labour, energy, raw materials, etc.). In this an important role is played by the human factor designed to introduce knowledge into the products and services.

Creating a new idea depends partly on the education, partly on the human conditions (Table 3). It is obvious that these two indicator groups are interrelated: in the vicinity of high standard higher education institutions the research centres are concentrated, and the efficiency of education increases close to high standard research centres.

Table 3: Regional indicators of the human conditions

| No. | Indicators           | Indices |   |
|-----|----------------------|---------|---|
| 1.  | Education conditions | 1.1     | Ratio of those involved in scientific (PhD) programmes (in percentage of the age-group 20-29)             |
|     |                      | 1.2     | Number those in higher education within the age-group as a ratio of all employed (%)                      |
|     |                      | 1.3     | Number of those in life-long learning as a ratio of all employed (%)                                      |
| 2.  | Personnel conditions | 2.1     | Innovation age ratio (ratio of the age-group of 18-59 within the regular population of the region (%))    |
|     |                      | 2.2     | Ratio of those with higher education qualifications within the economically active population (%)         |
|     |                      | 2.3     | Ratio of those speaking foreign languages within those with higher education qualifications (%)           |
|     |                      | 2.4     | Number of those with higher education qualifications employed in R+D places within all those employed (%) |
|     |                      | 2.5     | Number of those with secondary education employed in R+D places within all those employed (%)             |

#### Regional economic climate

Through examining the relation between the economic situation (climate) of a particular region and its innovation potential, the literature highlights two relations: regions with considerable economic potentials (because the amount of added value and the resultant depreciation is higher) provide more favourable conditions for innovation (there are larger sources available, etc.); regions of a favourable economic situation also have a higher attraction for the human potential, which gives a further chance for innovators to get established.

This means that the 'snowball effect' prevails; the effect of mutual strengthening (inducing). (Obviously the opposite is also true; an unfavourable economic environment may render R+D areas lacking in sources, which vitiates the ability of the region to retain or attract professionals, reduces the demand for R+D and narrows the supply of this type of sources. The economic climate is fundamentally determined by (4):

- the demand for R+D+I,
- the expenditure on R+D+I and
- the entrepreneurial climate.

Table 4: Regional indicators of the economic climate

| No. | Indicators              | Indices |   |
|-----|-------------------------|---------|---|
| 1.  | Demand for R+D+I        | 1.1     | Demand for developing new products as a ratio of the sector's revenue (%)             |
|     |                         | 1.2     | Demand for developing new technologies as a ratio of the sector's revenue (%)         |
|     |                         | 1.3     | Demand for basic research as a ratio of the sector's revenue (%)                      |
| 2.  | R+D+I expenditure       | 2.1     | R+D expenditure as a ratio of regional GDP (%)  |
|     |                         | 2.2     | R+D expenditure as a ratio of national GDP (%)  |
|     |                         | 2.3     | R+D expenditure /costs of the business sphere as a ratio of total expenditure (%)     |
|     |                         | 2.4     | R+D expenditure of the public sphere as a ratio of total expenditure (%)              |
| 3.  | Entrepreneurial climate | 3.1     | Enterprise density (pcs/km <sup>2</sup> )   |
|     |                         | 3.2     | Ratio of migration of those employed in R+D against total migration of the region (%) |
|     |                         | 3.3     | Migration index of those with higher education qualifications                         |
|     |                         | 3.4     | Those employed as a ratio of the age-group 18-65 (%)                                  |
|     |                         | 3.5     | Unemployed as a ratio of those employed (%)   |

#### Regional sources

The amount of sources available at regional level ( $K$ ) may be made up of four components: from international sources (e.g. European Union, etc.) ( $K_{EU}$ ), from support connected to sector-level R+D policy ( $K_A$ ), from sources connected to regional innovation policy ( $K_R$ ) and from the own sources of organisations (business, research institutes) pursuing R+D activities as well as foreign sources ( $K_S$ ).

$$K = K_{EU} + K_N + K_A + K_S$$

The indices develop accordingly (Table 5).

Table 5: Indices of regional sources

| No. | Indicators | Indices |  |
|-----|------------|---------|--|
| 1.  | R+D source | 1.1     | Ratio of R+D+I implemented from the sources of the sector against regional GDP (%) |
|     |            | 1.2     | Ratio of R+D+I financed by the customer against regional GDP (%)                   |
|     |            | 1.3     | Ratio of R+D+I financed by venture capital company against regional GDP (%)        |
|     |            | 1.4     | Ratio of regional R+D+I sources against regional GDP (%)                           |
|     |            | 1.5     | Ratio of EU R+D+I sources (in a given sector) against total R+D (%)                |

The R+D+I source may be personnel ( $K_{SZ}$ ), real ( $K_D$ ) and investment costs ( $K_B$ ).

The personnel type expenditure ( $K_{SZ}$ ) includes the wages costs of all the personnel involved in research activities, other personnel payments (e.g. bonuses, paid holidays, contributions to pension funds and other insurance-type payments), as well as the contributions and taxes imposed on wages and other payments (in determining the wages that can be accounted for as R+D+I costs, wages are usually corrected in proportion to the time spent on research, development and innovation tasks).

Real costs ( $K_D$ ) cover the amounts spent on materials and supplies not coming under the heading investment for the R+D+I performed by the R+D+I organisation in the given year (e.g. water and fuel, gas and electricity, the costs of books, journals and other information material, library membership fees, membership fees in scientific societies, etc. Calculated or actual costs of smaller prototypes, models made outside the research centre, the costs of laboratory materials and supplies, chemicals, experimental animals, etc. belong here. The costs of indirect services have to be grouped here, irrespective of whether the service was provided within the given organisation, or bought or leased from an outside entity or supplier.).

The costs of scientific services include the costs of activities that the institute performs by commission for external entities and which are routine task not requiring scientific research (e.g. materials testing, instrumental measurements, data collection, calculations, processing, complex suitability and quality testing, expert opinions, studies, IT services, etc., as well as other technical development services such as standardisation, typifying, industrial design, production organisation).<sup>2/</sup>

R+D+I investment (accumulation expenditure) is the value of purchasing new and second-hand physical assets and computer software directly supporting research and experimental development and serving as its tool, incurred in the given year ( $K_B$ ).

Purchasing, producing and implementing in own work of physical assets and computer software, the activities for the installation of the physical assets purchased until installation and delivery into the warehouse as well as all the activities connected directly or indirectly to the discrete physical assets, including the use of credit and insurance qualify as investment. The related costs incurred form part of the actual costs.

Construction investment includes the lands purchased for the purpose of R+D+I activities (experimental site, laboratory and pilot plant sites) and the purchasing or manufacturing costs of the buildings constructed or bought for this purpose, including substantial enlargements, reconstruction and repairs. (*Machinery and instrument investment*: includes the costs of purchasing instruments and research equipment, new or second-hand equipment of substantial value for the purpose of performing R+D+I activities, including the software for operating the equipment).<sup>3/</sup>

### ***Output side indicators***

The results of regional innovation can be basically put into two indicator groups (6).

a) Indicators of scientific achievements

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<sup>2/</sup> In European Union statements the costs of production activities and not those of scientific services include the costs connected with the production of single or small series products generally produced on commission or intended for marketing and requiring specialist knowledge and/or equipment as well as costs related to industrial and economic services. The costs of zero-series manufacturing, and the operation of pilot plants and experimental structures also belong here.

<sup>3/</sup> Computer software: the purchase of discrete identifiable computer software used in the R+D+I work, including program descriptions and other auxiliary materials, such as system and application programmes as well as the annual licence fees for the software necessary for using the computers purchased.

- The number of scientific publications written in the region (scientific publications is the umbrella term for the works publishing the new results of a discipline or discussing some knowledge in a scientific system).
- The number of patents born in a region (inventions and patents registered domestically and internationally).<sup>4/</sup>

Table 6: Output side regional indicators

| No. | Indicators            | Indices |  |
|-----|-----------------------|---------|--|
| 1.  | Scientific indicators | 1.1     | Number of scientific publications per 100 thousand inhabitants in the region (pcs/person)                |
|     |                       | 1.2     | Number of registered national patents per 100 thousand inhabitants in the region (pcs/person)            |
|     |                       | 1.3     | Number of patents registered in the EU countries per 100 thousand inhabitants in the region (pcs/person) |
|     |                       | 1.4     | Number of patents registered in the USA per 100 thousand inhabitants in the region (pcs/person)          |
| 2.  | Financial indicators  | 2.1     | R+D+I revenue as a ratio of total revenues (%)   |
|     |                       | 2.2     | R+D+I added value as a ratio of total added value (%)  |

The research topic, experimental development project is the basic unit of R+D+I activities.

A successfully completed research topic and experimental development project has the following conditions<sup>5/</sup>

- acceptance of the final report of the topic (project),
- recognition of the performance of a research or experimental development contract,
- in the case of applied research topics or experimental development projects verification of the possibility of implementation.

### 3. Quantification method of the regional innovation potential

The regional innovation potential (as can be seen from the above) can only be expressed through several, closely interrelated indices (Table 7).<sup>6/</sup>

<sup>4/</sup> Ongoing research topic and development project included in the programme for the given year and which incurred costs. All the research work and experimental development projects in progress are the aggregate of the research topics and experimental development projects registered at the research centres of the government (budgetary) and higher education and entrepreneurial sector. (This register may include smaller accumulations due to the division of labour between the research and development centres and the sectors (e.g. parts of a research topic or development project are performed by a different research-development centre or sector under contract or by commission.)

<sup>5/</sup> According to EU statistics a research topic (project) cannot be regarded as successfully completed if it has been continuously worked on for two or more years and with only part tasks completed and the rest still to be done. Recognition of the completion of the contracts for the solution of the sub-tasks does not mean the successful completion of the entire work. Such projects do not count as successfully completed research topics or development projects in the statistics.

<sup>6/</sup> The numerous indices (42 pieces) can naturally be further extended and made more accurate.

Table 7: Regional indicators of innovation potential

| No. | Indicators  | Indices |                              | Number of possible indices (pcs) |
|-----|---|---------|------------------------------|----------------------------------|
| 1.  | National innovation climate                               | 1.1     | National level R+D+I sources | 4                                |
|     |   | 1.2     | National level R+D+I policy  | 2                                |
| 2.  | Regional institutional conditions of innovation potential | 2.1     | Number of R+D+I centres      | 3                                |
|     |   | 2.2     | R+D+I supply side            | 3                                |
|     |   | 2.3     | R+D+I networking relations   | 4                                |
| 3.  | Regional human conditions                                 | 3.1     | Educational conditions       | 3                                |
|     |   | 3.2     | Human conditions             | 5                                |
| 4.  | Regional economic climate                                 | 4.1     | Demand for R+D+I             | 3                                |
|     |   | 4.2     | R+D+I expenditure            | 4                                |
|     |   | 4.3     | Entrepreneurial climate      | 5                                |
| 5.  | Output side regional indicators                           | 5.1     | Scientific indicators        | 4                                |
|     |   | 5.2     | Financial indicators         | 2                                |

Beyond the dimensions of the indicator groups and indices, an understanding of the interrelations of causal connections requires a computation method that <sup>7/</sup>

- does not differentiate between what are called result and explanatory variables;
- reflects not only the relations between the in advance and arbitrarily chosen causal variable and the factors influencing it, but expresses all the relations actually existing between the phenomena observed and (or the partial elements of a given phenomenon).

The method of factor analysis satisfies the dual criteria mentioned above.

The *objective of the procedure* is to express the variables described above as a linear combination of common factors which can explain the majority of the variance of the original variables. Then *the ranking order of the factors* can be established, which makes it possible to divide the variables into significant and insignificant ones.

The factor weights belonging to the variables can be used to interpret the factors (they can be identified with a group of variables or with individual variables). <sup>8/</sup>

The innovation potential is a complex concept, which is compound and cannot be directly measured. Although a great number of factors (criteria, variables, characteristics, active components, etc.) can be given that are more or less closely related to it (and at the same time these can be measured), none of them can be fully identified with it.

<sup>7/</sup> Naturally it is possible to use a simpler method (e.g. the use of weighted arithmetical mean), but then the impact of the individual factors cannot be assumed.

<sup>8/</sup> The basis of calculating factor weights is the matrix of simple correlation coefficients, on the basis of whose own values and vectors the factor weights are to be determined.

Thus the model has been expanded with a new variable, the factors <sup>9/</sup>, as compared to the regression models. The variables observed in the factor scheme can be used to conclude on the variable observed, the factors transmitting the relations between them; therefore they have an information carrier role. (They do not have a meaning of their own, but, on the other hand, densify the information contents of the original variables with which they are in connection. Naturally a single factor is not necessarily in connection with all the variables, and then the corresponding  $c_{ij}$  values in the factor scheme – called factor weights – are equal to 0.)

### *The essence of factor analysis*

The method consisting of probability calculus and mathematics-statistics relations is essentially a procedure for reducing dimensions, the essence of which can be readily illustrated in a two-dimension case (Figure 6).

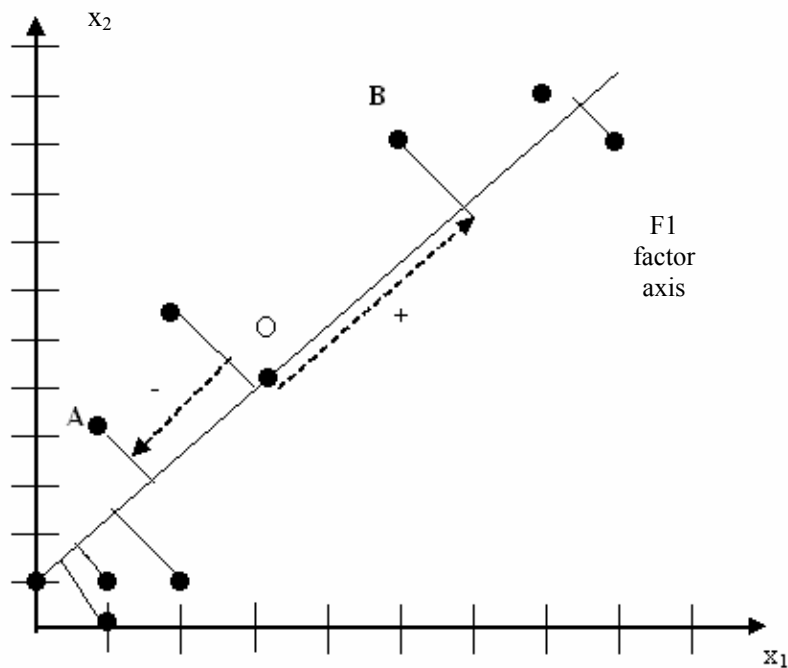


Figure 6: The logics of dimension reduction

Let us assume that we wish to measure the innovation potential with two series of data ( $x_1$  and  $x_2$ ) in a given spatial observation system. Since both series of data are connected to the same phenomenon, they will probably correlate with each other. If they are plotted in a coordinate system, it is possible not only to determine the correlation between the two variables, but it is

<sup>9/</sup> A traditional regression equation has the following form:

$$y = b_1 x_1 + b_2 x_2 + b_3 x_3 + b_0.$$

By contrast, the factor analytical way of writing it is as follows:

$$y = c_{01} f_1 + c_{02} f_2 + c_{00}.$$

$$x_1 = c_{11} f_1 + c_{12} f_2 + c_{10}.$$

$$x_2 = c_{21} f_1 + c_{22} f_2 + c_{20}.$$

$$x_3 = c_{31} f_1 + c_{32} f_2 + c_{30}.$$

possible to draw the regression line. This goes through point 'O' corresponding to the mean of the data series  $x_1$  and  $x_2$ . This straight line will be the new dimension axis, along which the situations of each original unit area (in the Figure points A and B are the examples) can be measured with the length of the signed projection of the points to the new axis giving the new values.

The negative projection length (marked with an arrow in the Figure) to the left side of point O on the factor axis belongs to point A, while the positive axis projection (this is what is called factor value) belongs to the more favourable B area unit <sup>10/</sup>. The calculation based on the above principle can be performed in practically five steps (Figure 7).

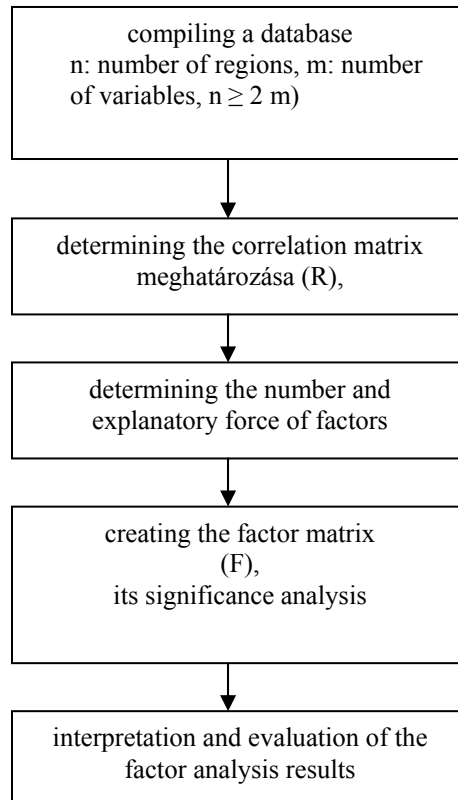


Figure 7: Logical process of factor analysis

<sup>10/</sup> Since the relative positions of variables  $x_1$  and  $x_2$  cannot be evaluated accurately with one data, a loss of information occurs, which can be shown in the Figure by the sections indicating the distances of the two points from the factor axes. This loss of information is the 'price' of a simpler measurement using one data instead of two. It is also easy to see in the Figure that the numerical values corresponding to the positions measured along the new axis also definitely correlate with the values of both  $x_1$  and  $x_2$  (if  $x_1$  or  $x_2$  increases, the factor value belonging to them also increases). This relation verifies the fact that the new data series (the factor) is related with the level of development, for it correlates with the two indices chosen as its initial values.

- a) The first task is to compile the data matrix describing the innovation potential. In doing so, it is a requirement that the number of observation units – in our case regional – should be higher than the number of variables (Table 8).

Table 8: Data matrix structure

| Individual variables | Regions  |          |     |          |
|----------------------|----------|----------|-----|----------|
|                      | 1        | 2        | ... | n        |
| 1                    | $x_{11}$ | $x_{12}$ | ... | $x_{1n}$ |
| 2                    | $x_{21}$ | $x_{22}$ | ... | $x_{2n}$ |
| .                    | .        | .        | .   | .        |
| .                    | .        | .        | .   | .        |
| .                    | .        | .        | .   | .        |
| I                    | $x_{i1}$ | $x_{i2}$ | ... | $x_{in}$ |
| .                    | .        | .        | .   | .        |
| .                    | .        | .        | .   | .        |
| ..                   | .        | .        | .   | .        |
| N                    | $x_{N1}$ | $x_{N2}$ | ... | $x_{Nn}$ |

The measurement results are denoted by  $x_{ij}$ , where points 'i', 'j' of the variables are the numbers of the regions. The Table can be written as the  $(N \times n)$  matrix of X, where each region corresponds to one column. The (stochastic) interdependence of the variables can be explained by the fact that each of the variables (or part of them) depends on a common generating active components unknown to us yet, which are from now on called common factors (and denoted by  $f_1, f_2, \dots, f_n$ ). The common factors are therefore hypothetical variables that can be quantified only indirectly (after analysing the observations on the variables under examination) and their presence can only be concluded from the interdependence of the variables studied.

- b) Determining the correlation matrix (R)

The interdependence of the variables can be expressed and measured by the (total or complete) correlation coefficients.

In a multi-variable relation naturally we can talk about correlation in several senses. The closeness of the correlation can be examined for each pair, on the one hand between the 'result variable' and the individual factor variables, and, on the other, between any two factor variables.

In this examination the multi-variable relation per se does not play a role, and the pair-wise correlation coefficients can be calculated by the well-known method. That is:

$$r = \frac{\frac{1}{N} \sum (x - \bar{x}) \cdot (y - \bar{y})}{\delta_x \cdot \delta_y},$$

where  $\bar{x}$  and  $\bar{y}$  are the empirical means of all the (observed) x and y values, respectively, and  $\delta_x \cdot \delta_y$  are equal to their empirical variance. (The product in the numerator is the covariance of x and y, the arithmetical average of the product sums of the deviations  $d_x, d_y$ ,

with the approximate meaning of 'joint variance'.) It shows whether in the whole of the population the value pairs typical of a positive or a negative relation dominate or not. (Thus it is characteristic of the direction of the relation.) It is generally not used in the analyses, but is an important component of other indices. Using it, the above formula of the product momentum correlation coefficient can be written as:

$$r = \frac{\text{covariance of x and y}}{\sqrt{[\text{variance}(x)] \cdot [\text{variance}(y)]}} = \frac{C}{\delta_x \cdot \delta_y}$$

The correlation coefficients  $r$  can be arranged in a matrix  $R$ , where  $r_{ii}$  are diagonal elements (showing self-correlation) with a value of 1 (Table 9).

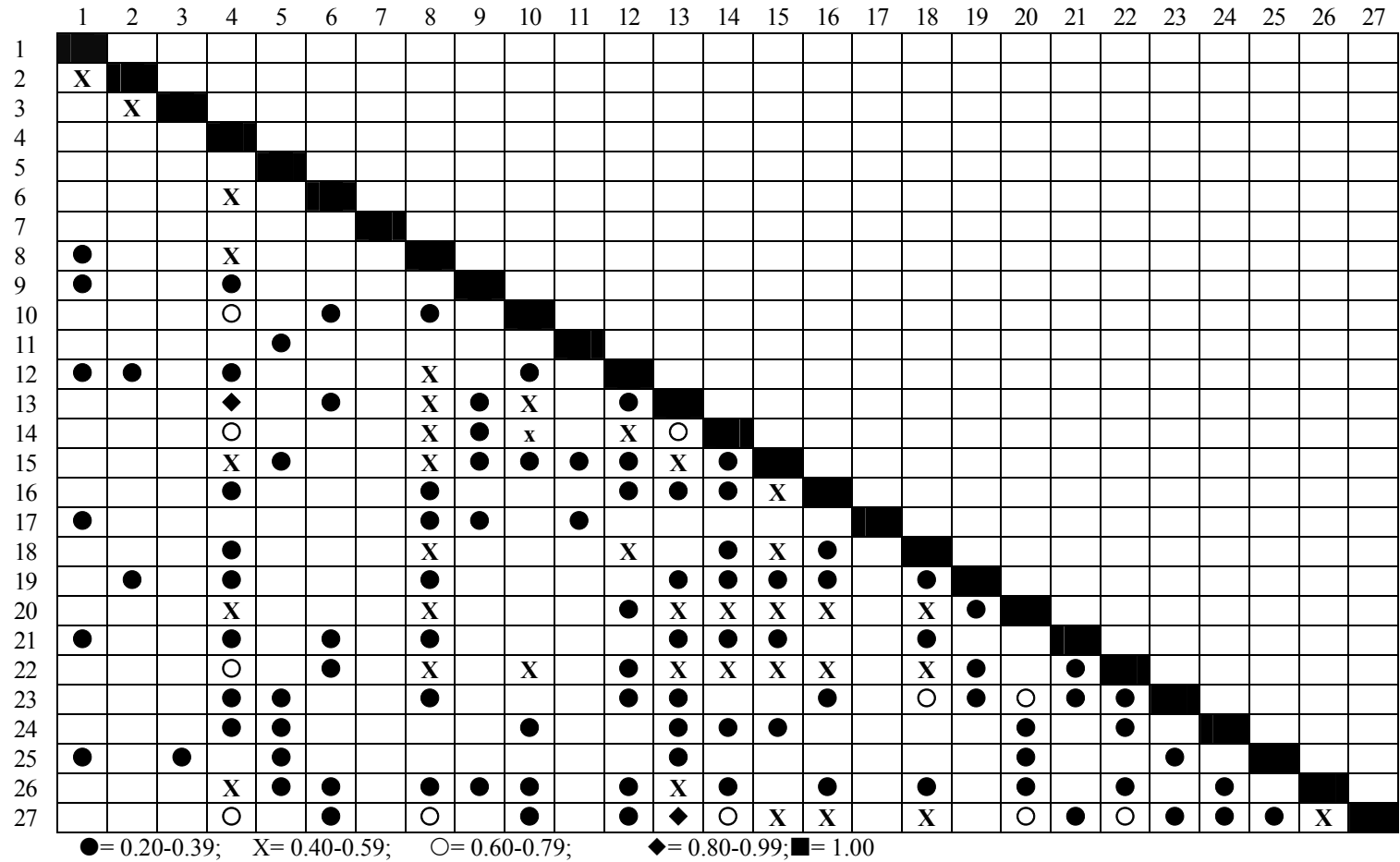
- c) The correlation matrix can be used to determine the new variables and factors.<sup>11/</sup> The factors gather those of the basic data that are in close correlation with each other (the factors are the linear combinations of the original standardised variables). The factors are uncorrelated with each other, but are in correlation with the original basic data they have gathered (these correlations are the factor weights), and these can be used to identify their contents and name them. In the calculations it can be determined what proportion of the information gathered in the original data matrix the new variables (factors) cover (this is indicated by the eigenvalues of the factors and the variance expounded by them (Figure 8).

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<sup>11/</sup> Three types of factors can be differentiated:

- a) Factors in which several features observed appear, common factors ( $F_1, \dots, F_m$ ).  
These factors assume that  $Z$  is in correlation with other probability variables.
- b) Factors which emerge only for one variable (special factors,  $s_j$ ).
- c) Factors which do not contain determinant components ( $E_j$ ).

Table 8: An example for a correlation matrix



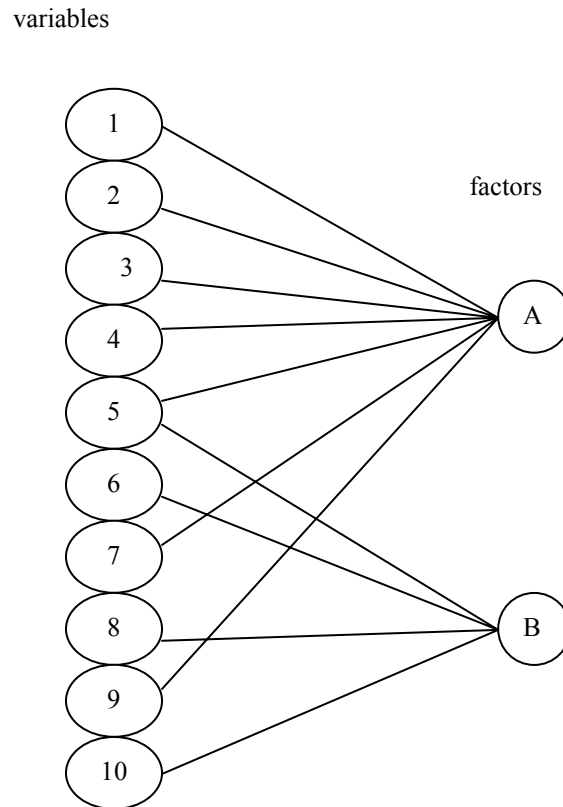


Figure 8: An example for the relation between the original variables and factors

- d) Each observation unit carries as the result of the computation  $k$  pieces of factor value, these are the data that can be interpreted, mapped and explained in the regional investigations.
- e) Assigning the variables to different factors results in different factor weights (Table 9).

Table 9: An example for a factor element and its three versions

| Factor          | Version 1 | Factor weight | Version 2 | Factor weight | Version 3 | Factor weight |
|-----------------|-----------|---------------|-----------|---------------|-----------|---------------|
| F <sub>1</sub>  | 21.       | 0.84          | 1.        | 0.84          | 1.4.      | 0.86          |
|                 | 1.        | 0.83          | 4.        | 0.82          | 21.       | 0.83          |
|                 | 27.       | 0.78          | 21.       | 0.81          | 15.       | 0.80          |
|                 | 15.       | 0.78          | 27.       | 0.78          | 27.       | 0.77          |
|                 | 4.        | 0.78          | 15.       | 0.73          | 17.       | 0.75          |
|                 | 8.        | 0.70          | 8.        | 0.71          | 26.       | 0.69          |
|                 | 26.       | 0.68          | 26.       | 0.67          | 8.        | 0.65          |
|                 |           |               | 17.       | 0.63          |           | 0.63          |
| F <sub>2</sub>  | 24.       | - 0.85        | 24.       | 0.84          | 19.       | 0.77          |
|                 | 22.       | - 0.62        | 22.       | 0.71          | 23.       | 0.57          |
|                 |           |               |           |               | 13.       | - 0.75        |
| F <sub>3</sub>  |           |               | 19.       | 0.79          |           |               |
|                 | 19.       | - 0.83        | 13.       | 0.74          | 22.       | - 0.78        |
|                 | 13.       | 0.66          | 23.       | 0.57          | 24.       | - 0.75        |
| F <sub>4</sub>  | 14.       | 0.79          | 14.       | 0.81          | 14.       | 0.81          |
|                 |           |               |           |               | 10.       | 0.78          |
|                 | 10.       | 0.74          | 10.       | 0.75          | 5.        | 0.56          |
|                 |           |               |           |               | 6.        | 0.52          |
|                 |           |               |           |               | 16.       | 0.49          |
| F <sub>5</sub>  | 2.        | 0.91          | 2.        | 0.89          | 2.        | 0.77          |
|                 |           |               |           |               | 12.       | - 0.59        |
| F <sub>6</sub>  | 3.        | - 0.85        | 9.        | 0.81          | 3.        | - 0.80        |
|                 |           |               | 18.       | 0.63          |           |               |
| F <sub>7</sub>  | 20.       | -0.90         | 20.       | - 0.89        | 20.       | - 0.79        |
|                 | 18.       | - 0.49        | 18.       | - 0.44        | 18.       | 0.71          |
| F <sub>8</sub>  | 20.       | - 0.89        | 7.        | - 0.84        | 7.        | 0.93          |
| F <sub>9</sub>  | 9.        | - 0.89        | 3.        | - 0.84        | 20.       | 0.90          |
| F <sub>10</sub> |           |               | 25.       | - 0.56        | 11.       | 0.55          |
|                 | 25.       | 0.85          | 11.       | - 0.46        | 25.       | 0.51          |
| F <sub>11</sub> | 12.       | 0.91          | 6.        | - 0.73        | -         | -             |
|                 |           |               | 5.        | - 0.56        |           |               |
| F <sub>12</sub> | 6.        | 0.75          |           |               |           |               |
|                 | 5.        | 0.56          | 12.       | 0.90          | -         | -             |
| F <sub>13</sub> | 16.       | 0.80          | -         | -             | -         | -             |
| F <sub>14</sub> | 23.       | 0.85          | -         | -             | -         | -             |

To choose the optimum version is the task for the analyst.

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**Dezső Szakály**

### **Technology transfer: an efficient means of knowledge flow**

#### **1. Role of technology transfer in the economy**

The factor to what extent a country can join the more and more intensive international technology transfers is one that has a decisive impact on the development of the national economy.

In the past few years it has been possible to observe two characteristic phenomena in the efforts of the countries undertaking dominant roles in the transfers completed for making the knowledge flow more intensive. One is the result of globalisation and company activities becoming more international, which can be shown in the steady growth of transfer traffic. The other is an effort manifested in the countries taking specific steps to balance their transfer balance and to ensure that it is in the black.<sup>1</sup>

An OMFB study (1998) relying on an analysis of OECD statistics highlights some important tendencies in this context:

- Technology supply is much more concentrated than demand. The largest users are the service industries, while the majority of R+D expenditures are concentrated on narrow industrial fields.
- In evaluating technology diffusion, the expenditure on technology purchase is to be taken into account beyond direct R+D expenditures.
- The significance of imported technology has steadily increased in the past one and a half decades. In smaller, moderately developed countries like Hungary, its extent is over 50%.
- Global, relatively barrier-free technology diffusion played a decisive role in the global increase in the efficiency of Information Communication Technology (ICT) sectors.
- Technology diffusion has an efficient supporter in strengthening the transfer processes and their methodology and infrastructure support. This is of particular importance for small countries and for countries conducting intensive international trade.

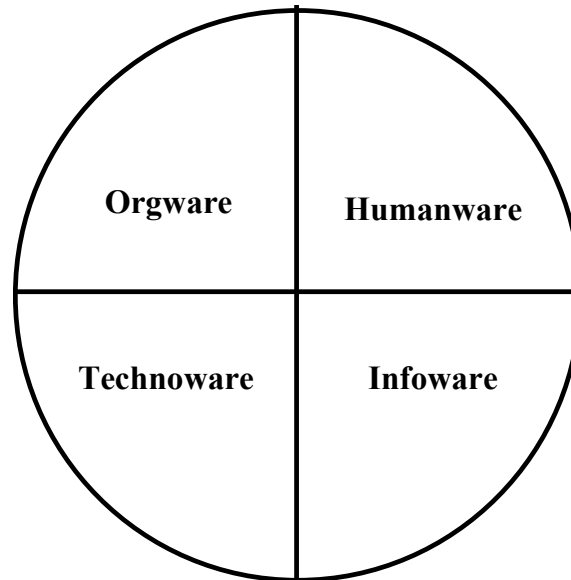
#### **2. The concept of technology transfer**

The term technology is derived from the Greek language. The word used today is made up by connecting the words 'techne' and 'logos'. The word 'techne' was used to mean manual skills or, in a more general sense, skills and ability. The word 'logos' corresponds to the content knowledge, science. And accordingly, the word made up of the two corresponds to skills, competence, aptitude for something in a broad sense of the word, and the knowledge required for it. (SHANE, 1982)

In a more general sense in today's interpretation technology is a result of the synergic combination of four factors (knowledge elements) (Figure 1).

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<sup>1</sup> The international flow of knowledge is surveyed by OECD primarily using the data of the technological balance of payments quantifying the foreign trade in brands, licences, know-how, patents, and intellectual services. Some analyses also study the data of investment capital including technology transfer. /Papanek, 2002/



*Figure 1: Components of technology*

The four knowledge carriers identified above can at the same time be regarded as the objects of technology transfer. In a general sense the concept technology is used to mean the elements of knowledge concerning the implementation of something, which includes the product and/or service to be created, the process of implementation (production – distribution) and the related additional knowledge (management, experience, competence). And technology transfer means the flow of all these technical and knowledge components between the various organisations and persons.

Today technology is defined in a broader sense as a specific ‘know-how’, a sum of knowledge (SHANE, 1982). This interpretation has the essential feature that it does not narrow the concept down to the level of knowledge concerning specific production processes or manufacturing technology, but treats it as a complex set of knowledge necessary for creating an enterprise, organising and operating the systems of production and distribution.

If the term technology is used as an attribute of a transfer process, then we can accept the interpretation that it is indeed nothing else but a sum of the technical competences and immaterial knowledge that makes people and organisations capable of:

- perceiving new problems,*
- elaborating new conceptions,*
- elaborating new solutions,*
- creating a new division of labour for people and organisations,*

as a result of which a new product and/or service is created. Transfer is passing on knowledge to those who do not have it (national economy, companies, organisations, and individuals). This new, ideal technology transfer also includes innovation, namely the innovation of the new, adapted system, which obviously satisfies a market demand on the side of end users, while it renews several social and economic potentials of the receiving party.

Transfer is always implemented in connection with some direct or indirect economic activity. It results in a special, targeted re-distribution of the outputs of the general development process. Today its clearly presentable feature is the effort aimed at imparting systemised knowledge.

Technology transfer and adoption is not simply imitation of a particular idea (knowledge), but adaptation of the original so that it can best suit the typical sociological, political, technology, climatic, economic and education environment of the receiving party (Figure 2).

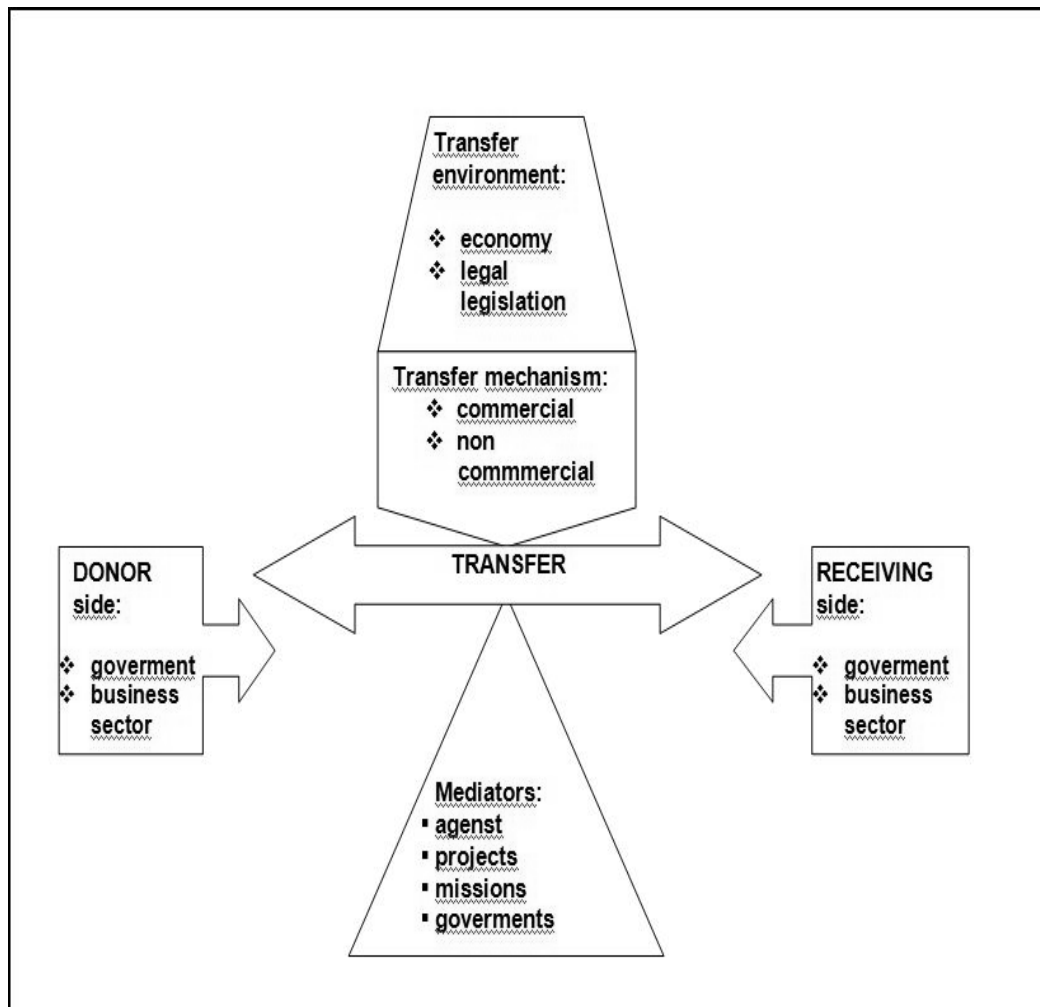


Figure 2: Process and players of technology transfer

Technology transfer is implemented in various fields of production and services through the imparting and takeover of innovations and development results.

Technology transfer makes it possible that:

*the receiver starts using the R+D results of others fast,  
the donor who has taken on the risky investments of R+D requiring large expenditures is able to share the burdens with others through the rapid economic exploitation of the results.*

The technology gap and the resulting asymmetry (difference in knowledge) is the starting impulse and driving force of technology transfers. The reason for this is that scientific and technical resources show a highly concentrated distribution in terms of the world or individual

countries. The imbalance activates and keeps the potential players in action who are trying to solve the imbalance. It is technology transfer through which – in the various moments of the innovation processes – the division of labour is also achieved, both on sector scale and at international level.

Concerning its content, technology transfer also includes the passing on and taking over of free knowledge as well as that owned by the proprietor (confidential – restricted). Free and thus public information generally ensures access to scientific research results. On the other hand, protected information contains specialist elements of technological knowledge and can be learned by methods controlled by its owners (patent, licence, etc.). Their extents and proportions are essential for the receiving side, for the decision makers stating their opinions here are frequently faced with tasks that can often hardly be solved. This general problem is referred to in the professional literature as ‘transfer paradox’ or ‘knowledge controller’.

The essence is that

„the technology that we want to obtain is basically the information that would be necessary in order to make reasonable decisions on the issues of purchasing or rejecting”. (AMBROSIO, 1995)

Decisions concerning transfer carry perceivably high risks, particularly when public information is available to a limited extent. This is a frequently repeated basic situation in defence areas and in actions with an economic initiative. It is a well-known fact that innovative companies consciously raise the barriers to entering the market to a high level. One means of doing so is making the information on the novelty confidential, providing legal protection for it and embedding it in a way that allows movement only in a complete form (complete know-how.)

### ***Transfer models***

The processes of delivery and reception take place in highly different structures according to the intentions, interest enforcement methods and the integration extent of the cooperation of the players involved in the transfer, the donors and the recipients. In the following some models comprising the relations between the players and demonstrating specialist transfer strategies will be presented (Figure 3 and Table 2). Familiarisation with the models is essential because initial transfers are always established in the frameworks of the simpler models, and after a successful cooperation the adoption of more complex forms can begin. The experience gained in the transfers can provide a solid foundation for the conscious development of the embedding potentials of the receiving side, and through that for awakening the force of attraction. This may result in the establishment of cooperation according to more complex models, which may provide a sound framework for more intensive interest enforcement by the receiving party, and for the development of the active position. The models to be presented also represent a historical development series, which may serve as an informative framework for the evaluation of transfers in Hungary in the past ten years.

Five types of the models describing the behaviour of the players of the process can be differentiated:

#### *‘Contact building model:*

It highlights the role of bridge-forming institutions ensuring information flow between the sources and the utilisers. These institutions bring about the connection between the demand and supply sides through enabling the potential partners to find each other while orientating them – through offering custom-made programs – in order to find the expedient mechanism.

*'Diffusion model':*

It concentrates on connecting appropriate technologies and diffusion potentials. It finds the players interested in an expedient division of labour for the various moments of research, development and adaptation. Regarding its character, it is also able to embrace more complex mechanisms and makes it possible for the receiving side to utilise its diffusion potentials more efficiently. The contact-building model is first of all useful for starting or occasional transfers, for it ensures cooperation between a small number of players in a transparent system. The diffusion model is the expedient model for mass, fast, spatially widely spread diffusion, where the presence and coordinated cooperation of a great number of players can be ensured on the recipient side.

*'Problem solving model':*

It starts from clarifying the requirements accurately. It looks at the requirements as technology deficiencies to be solved and from this starts a problem solving process. In its framework it comes to the final solution through determining the directions of adaptation from the potential solutions. It is an important element of this logical system that it is not satisfied with a simple examination and qualification of the supply, but in the course of selection also qualifies the adaptation willingness of the donor. This way of thinking does not simplify transfer through a simple putting over of the possible technologies offered, but regards the optimum possible satisfaction of the fundamental demand as its main objective. In formulating the problem and searching for a solution it relies on the active participation of the prospective recipient organisation. Regarding its character, the model exceeds simple commercial transactions and fits supplementary developments ensuring the complete satisfaction of the demand on the recipient side into the system. This latter feature may ensure the development of products and technologies meeting the specialist demand of the local markets.

*'Action-oriented model':*

It combines the elements of the process on the basis of economically established utility. This thinking starts from the fact that a decisive moment of active marketing arrives in the lifecycle of every novelty. This occurs under competitive conditions. The innovative diffuser enjoys an advantage in this competition if he can cooperate in the early stages of diffusion with adaptors who are prepared and forced to loyalty by contracts. This adaptation does not mean simply passing over and increasing mass, but improvement matching the local requirements also appears in it. It is not by chance that this model is well-spread in the practice of international companies primarily when the parent company (donor) has to cooperate with a recipient country and target market with a culture very different from the culture of the donor's country (e.g. the European projects of Japanese companies, large US companies in African countries). Each of the companies thinking in terms of a global strategy has applied similar solutions in the early stages of its internationalisation.

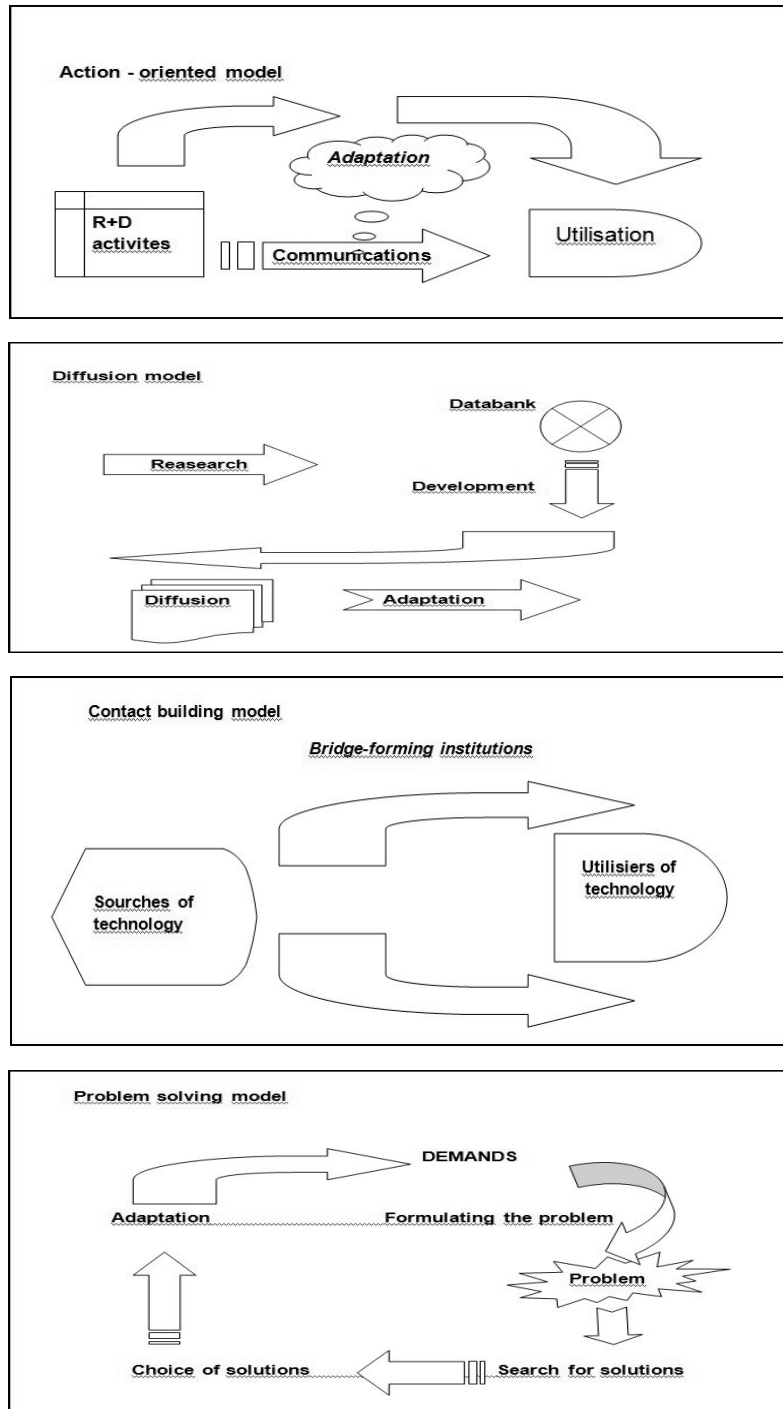


Figure 3: Technology transfers models

Table : Comparison of technology transfer models

| <b>FEATURE</b>                        | <b>CONTACT BUILDING MODEL</b>   | <b>DIFFUSION MODEL</b>  | <b>PROBLEM SOLVING MODEL</b>  | <b>ACTION ORIENTED MODEL</b>   | <b>MODEL BUILT ON KNOWLEDGE EXCHANGE</b>   |
|---------------------------------------|---|---|---|--|--|
| <b>1. Basic idea of the model</b>     | Connecting supply and demand  | Creating the conditions for rapid diffusion   | Eliminating technology problems   | Preparing many channels of utilisation   | Exploiting the advantages of mutual learning   |
| <b>2. Key players</b>                 | Bridge-forming institutions   | Communicators   | Requirement-oriented adaptors   | Specialist adaptors  | Developing recipients  |
| <b>3. Crucial process elements</b>    | <ul style="list-style-type: none"> <li>– finding supply-demand</li> <li>– partner mediation</li> </ul>        | <ul style="list-style-type: none"> <li>– loading a databank</li> <li>– surveying diffusion potentials</li> <li>– communication</li> </ul> | <ul style="list-style-type: none"> <li>– exploring requirements</li> <li>– formulating problems</li> <li>– searching for solution methods</li> <li>– setting adaptation directions</li> </ul> | <ul style="list-style-type: none"> <li>– predicting utilisation directions</li> <li>– searching for partners</li> <li>– building adaptation bases</li> </ul> | <ul style="list-style-type: none"> <li>– developing embedding programs</li> <li>– building bases for improvement</li> <li>– analysing knowledge content</li> </ul>                     |
| <b>4. Typical transfer mechanisms</b> | <ul style="list-style-type: none"> <li>– building turnkey systems</li> <li>– wedging in technology</li> </ul> | <ul style="list-style-type: none"> <li>– licence trade</li> <li>– embedded technology trade</li> <li>– training programs</li> </ul>       | <ul style="list-style-type: none"> <li>– patent transfer</li> <li>– know-how transfer</li> <li>– technology service purchase</li> </ul>   | <ul style="list-style-type: none"> <li>– joint ventures</li> <li>– internal techno partition</li> <li>– affiliated companies</li> </ul>                      | <ul style="list-style-type: none"> <li>– external techno partition</li> <li>– reciprocate and cross licence transfer</li> <li>– Joint venture</li> <li>– joint R+D programs</li> </ul> |

(based on Mogavero-Shane, 1982)

The model based on Knowledge exchange including feedback as well is today becoming more and more prevalent (Figure 4).

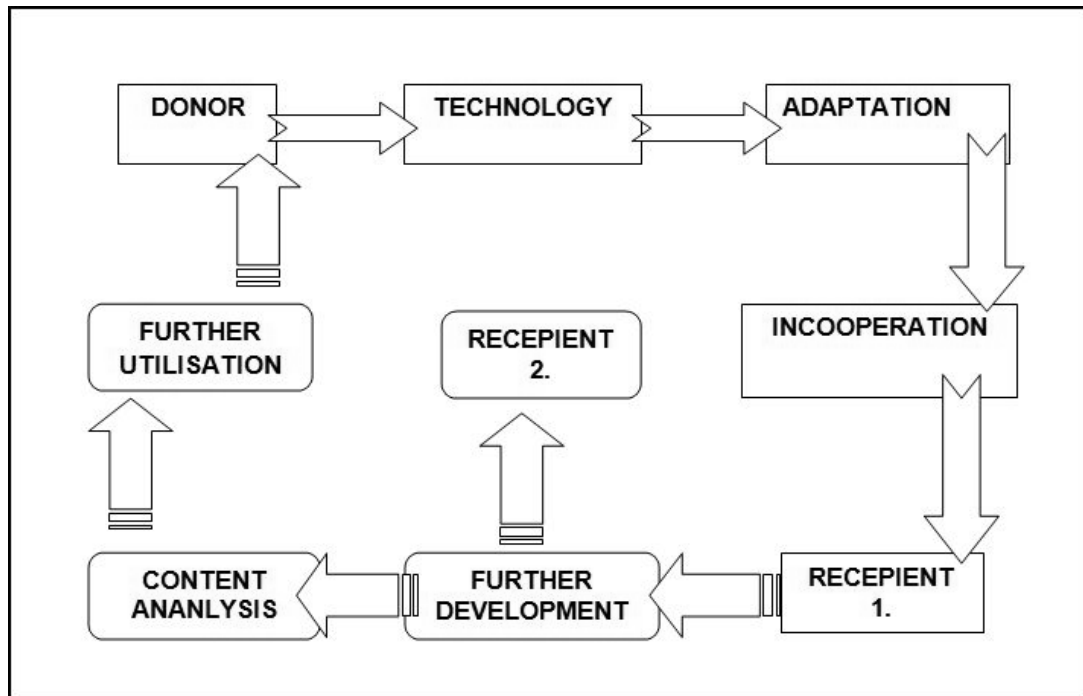


Figure 4 : Model built on knowledge exchange

*'Model built on knowledge exchange':*

The model is closed in one direction through the donor party monitoring consciously in a pre-planned manner and, in many cases, encouraging and assisting the improvement efforts of the recipient party. In order to compensate for the efforts and expenditure in this, it supports transfer towards a third party as well. In addition, it takes over these development results and after appropriate analysis, builds them into its own new programs. In the new transfer cycles then it becomes possible to disseminate these novelties globally. This model is clearly observable in transfers within international companies and in projects aimed at the transfer of production means and methods. In the first case the interpersonal relations within the companies and the off-site R+D departments are the driving forces of the process. In the second area it is primarily the customer service organisations that do the necessary information collecting through their monitoring system. The model is actually an efficient means for implementing external and internal 'techno partition', which is nothing but a conscious sharing and moving of knowledge, technology and resources between the appropriate transfer players while maintaining mutual benefits.

### 3. Technology transfer as a means of creating knowledge

When creating technical knowledge, the transfer of knowledge can be performed at different levels. One extreme is when the process is simplified to the physical takeover of a machine, equipment, or device, while the other is when technology is learned to be operated with the best degree of efficiency in a process of up to several years (von HIPPEL, 1988; RAY, 1969) and in

the meantime significant adaptive modifications are implemented on the original system. The events and outputs of this process also depend on the extent the innovation can be regarded as competence destroying or competence enhancing. In such a complex technology transfer program both individual and corporate learning is required. Individual learning begins with collecting experience related to the technology and the understanding of this experience creates the individual knowledge modifying individual abilities and knowledge. Corporate knowledge is a sum of the individual knowledge of persons. Here synergic effects prevail on the one hand, and, on the other, the organisation learns only to the extent that the persons are able to change the results of individual learning to corporate routine (elements building the culture).

In the transfer process of complex systems the exchange of knowledge takes place at two levels:

*Level one: A knowledge package summed up by the creators of the technology and connected to the operation foreseen. This assists the widening of the knowledge of the recipient directly.*

*Level two: A knowledge package created at the recipient of the technology in the course of use and adaptation. This may have very intensive creative and innovative elements (reinvention). The knowledge created by the user also moves in the reverse direction and the information important for the innovator may provide initial impulses for planning the next generation or concrete solutions.*

Four levels of the transfer of technology competences can be differentiated:

- Level 1: copying the activity;
- Level 2: complex adaptation of the activity;
- Level 3: transfer of the scientific knowledge behind the technology;
- Level 4: interactive cooperation between donor and recipient.

The levels denoted here also mark in general the development stages in the cooperation of the lasting transfer partners and represent the borders of the frameworks that can be gradually developed.

Limits and characteristics of knowledge transfer:

1. Technical knowledge is highly differentiated and immobile, for it also includes user experience. This experience also carries in itself innovative elements, for taking over a technology involves the incorporation of new inventions.
2. The central task of the potential donors and recipients of advanced technology is to deconstruct the limits of knowledge. This cannot be an isolated activity, but presupposes a specialist cooperation network of the various participants.
3. Mediating institutions are wedged in between the donor and the recipients. The tasks of these institutions are diverse:
  - mediating know-how from the donor to the recipient;
  - flowing back user knowledge from the recipients to the donor;
  - providing methodologies for accelerating individual learning processes;
  - documenting experience gained in the course of individual learning, formulating it in a way suitable for passing on;
  - methodological support for corporate learning, accelerating it and initiating the changes required for this purpose.
4. The work of mediating institutions is efficient because the benefits resulting from an economy of scale appear in them. Each of the recipients experiences every moment of receiving and incorporation as an individual event. They cannot draw generalisable conclusions from these phenomena that appear to them as individual. The mediator on the other hand obtains unique experience and institutionalisable knowledge bases through synthesising the 'individual' phenomena and evaluating the repetitions.

#### 4. Knowledge centres – knowledge regions

With the exception of the simplest cases, transfer means both imparting and taking over knowledge and experience. Imparting the knowledge accumulated in the course of R+D can only be successful if the previous qualifications of the receiving party make it possible to implement organised transfer of knowledge.

Under the conditions of the global competition every company is looking for the innovative receiving medium supporting its activities all over the world. Regions, which develop within countries and across borders partly in a self-organising way and partly as a result of conscious development, in turn look for investors that help in increasing the economic potential of a particular area. Looking at it from an industry policy aspect, a region is nothing else but a specialist, active network of economic players where the participants are implementing a very close and intensive collaboration concentrating on supporting each other. The central core of the network is a production company forming a closed professional culture surrounded with suppliers, institutions providing financial and consulting services, government and private laboratories embodying R+D moments.

In operating the network, a central role is played by regional governance leaders who can deliberately support the learning process as a result of which regional networking organisations are brought about. Technology transfer and the diffusion of information cannot be successful in international and national frameworks if the local channels ensuring final distribution and directing it to the target are not created.

What are called Knowledge Creation Fields (KCF) – or innovative regions – have been organised in order to complete these efforts fully. KCFs have deliberately developed development policies, infrastructure and networks of institutions for supporting diffusion, intensifying international technology transfer and receiving the relevant learning processes. Such Knowledge Creation Fields are today the province Baden-Württemberg in Germany, the Centro-region in Portugal, Toscana in Italy, Steiermark in Austria and the port cities in Ireland.

According to international experience, there are ten significant factors which enable creating an innovative region and its intensive connection to international technology transfers:

- Concentration on the requirements of the global market, in choosing the technologies it is not meeting the local requirements that is crucial, but exports.
- Creating the possibility for getting involved in international commerce.
- Efforts at integration through networking with local, national and international partners.
- Intense cooperation, concentration on strengthening own competences. In the framework of project organisations, there is a stronger chance for the small and medium-sized enterprises to grow than in isolated activities.
- Systematic strengthening and widening of the knowledge base. Openness to receive novelties.
- Plotting a vision taking into account long-term perspectives and including preparation with foresight.
- Continuous learning both at organisational and at individual levels. Building connections with sources of knowledge.
- Looking for opportunities to get involved in knowledge transfer not only as a recipient, but as a donor as well.
- A supportive local innovation network of institutions.
- Generating the establishment of new enterprises.
- Building monitoring systems to predict changes in the environment.

### 5. New tendencies in choosing transfer objectives

It is a tendency that can be increasingly observed in the choice of international companies looking for transfer partners that they move towards knowledge centres. The range of comparative advantages has come to include parameters that can be connected to knowledge creation and knowledge diffusion. They have become the aspects of comparing and selecting the recipient side (see Table 3).

In the decade to come, global competition will basically concentrate on renewable human capital and the knowledge resulting from it. Knowledge-based industries will be able to create the products and services with the high added value enforced by the competition. These companies will develop their networking systems so that they move towards the knowledge centres that are today only being formed but will intensively multiply later. The reason for this is that this is the way to obtain and take advantage of competitive advantages. Knowledge / Learning Regions will be created where valuable, well-qualified workers (knowledge workers) are concentrated and there is an appropriate, flexible local infrastructure available, partially for their employment and partially for operating the information and communication infrastructure necessary for implementing the tasks.

Knowledge-intensive regions (centres) will be prepared for the 'just-in-time' movement of information, persons and knowledge. National, local and government organisations, global companies and local enterprises will be organised into networks built on mutual benefits that are open and become accessible to everyone. Their joint objective is to create and propagate jointly technologies carrying new, competitive advantages.

#### ***Knowledge centres and regionalisation***

Looking at it from an industry policy aspect, a region is nothing else but a specialist, active network of economic players where the participants are implementing a very close and intensive collaboration concentrating on supporting each other. The central core of the network is a production company forming a closed professional culture surrounded with suppliers, institutions providing financial and consulting services, government and private laboratories embodying R+D moments.

Knowledge centres are a new type of innovation institutions in the economy and society getting globalised and localised. As compared to the former types of institutions built on the classic linear innovation model, their structure and operation show typical differences.

Problems of *knowledge production, knowledge transfer and knowledge utilisation* have come to be in the focal point of the innovation model. Within that, priority issues are as follows:

- opportunities for exploiting knowledge advantages,*
- dynamics of equalising knowledge,*
- methods of sharing knowledge,*
- supporting learning processes.*

New tasks of innovation institutions, in line with the above:

- creating and updating the knowledge base,*
- ensuring intensive and efficient possibilities for using the knowledge base,*
- ensuring the accessibility of the knowledge base.*

Main areas of sharing the knowledge:

- Sharing between the players in the creation of knowledge (problem of comprehension and codification).*
- Sharing between the producers and users of knowledge (problem of transfer).*
- Ensuring multiple use of the knowledge (learning problem).*
- Ensuring the spatial distribution of knowledge (problem of centre –decentre).*

*Ensuring the even distribution of knowledge (diffusion problem).*

Accordingly, the institutions of knowledge distribution are organisations built on high level information technology, or their formal and virtual networks. Examples include the following organisations developing both from government and private sources:

- service providers offering information technology,*
- service providers offering network system services,*
- service providers offering network content services,*
- service providers operating network search systems,*
- service providers offering regular information selections,*
- service providers supporting e-mail and communication groups.*

Knowledge centres exert their influence in connection with the innovation basic institutions of the surrounding environment and influence their further development as deviating from the traditional.

The structures of regional innovation systems and the networking possibilities of the regional knowledge centres are thus closely interrelated with each other. Knowledge centres play an important role in organising, establishing and operating the networking systems covering the world /cooperation networks, strategic alliances, service providing networks, R+D networks, etc./.

Networking can be regarded as a new form of development. A crucial moment in the establishment of networks is the widening of market competition, where the competition also between industries and regions became intensified. In this situation, medium-sized companies, international companies, government and private research and development laboratories were all forced to apply cooperative strategies (what is called pre-competitive cooperation). Here government-level cooperation projects have resulted in a cohesion effect in addition to private initiatives.

Today cooperation exceeds the moments of R+D and production – marketing, and is increasingly widened with project-specific phases of training – as well as advanced training, which induces intentions of cooperation in an increasingly wider range of professionals. This enlargement tendency also indicates that the practice is beginning to exceed the transfer mechanisms built on the simple linear innovation model and the networks are aiming at inducing direct synergic effects.

Altogether knowledge centres with various orientations generate favourable effects in the following fields (in general according to stressed priorities):

*a) Concentrating intellectual capital:*

The intellectual capital concentration is created in space and time, which recreates the information-interest relations between the activities of the innovation process that often break away from each other.

They reduce in a proven way the uncertainties and risks of R+D. They provide room for individual initiatives to develop that are rejected in a different medium. They develop a partnership or alliance relation between different professional cultures that do not frequently meet.

*b) Concentrating relevant information:*

By providing the intellectual and infrastructural framework of open information flow, they find connections between the separated participants of the innovation process.

In many cases they take over the costly, time-consuming and knowledge-intensive tasks of selection through their specialists, thus offering a fast and secure way of obtaining knowledge to their 'lay' partners.

- c) *Concentrating equipment:*  
They create an up-to-date technical, informatics and service infrastructure also for those who would have to go without it in lack of investment funds.
- d) *Concentrating services:*  
The range of services may extend from a technical character to complex management consulting. They offer alternative opportunities for use. These provide a safe professional background primarily for beginning and small enterprises.
- e) *Providing opportunities for supplying industry activities:*  
Beyond R+D moments, they ensure the starting conditions for the fast start-up of production.
- f) *Creating a favourable atmosphere for personal contact building:*  
They can maintain the effect of direct personal contacts improving the psychic climate.
- g) *Increasing economic efficiency:*  
Major elements of the improvement of economic efficiency:
- reducing the critical R+D and investment capital requirements,
  - better utilisation of capacity due to the joint use of equipment,
  - fast running-in,
  - financial benefits,
  - lower specific expenditure requirement of joint services.
- h) *Stimulating the entrepreneurial spirit:*  
Favourable conditions and successful examples that can be presented assist in a bolder entrepreneurial decision making. The benefits that can be offered can be mitigated by the starting barriers.
- i) *Improving the employment situation:*  
Wide-reaching demand for labour appears primarily in the final production stages. The quality factor that appears in the regional binding of the 'qualified elite' is not negligible either.
- j) *Increasing the attraction of the regions:*  
They attract enterprises looking for new locations through the secondary networks arising in the surroundings of the institutions.

### ***Functions of the KNOWLEDGE CENTRE***

In establishing knowledge centres, conscious efforts should be made at developing a varied and easy-to-diversify activity structure and infrastructure, mixing the advantages and service structures of science parks, technology transfer institutions, technopoles, competence /excellence/ centres, incubator houses and industrial parks.

The KNOWLEDGE CENTRE is

- an explorer of the available local and the accessible global knowledge,
- an arranging, frameworking and storing agent of the potential knowledge,
- a mediator of demand for knowledge and a generator of demand for knowledge,
- a leading adaptor and innovator, an active player in venture capital mediation,
- a builder of connections between the large and SMEs level economic players,
- an organiser of the innovation network and supporter of cluster initiatives as the economic and public administration centre of the region.

*The main mission of the knowledge centre:*

1. The KNOWLEDGE CENTRE as *the cradle of innovation*: R+F activities, creating innovations, creating knowledge:

- ensuring the accessibility of innovative technologies
- active transfer partnership

2. The KNOWLEDGE CENTRE as *the driving force of diffusion, a basis of sharing knowledge*: diffusion, reception and redistribution of knowledge, knowledge flow:

- mediating information,
- mediating partners.

3. The KNOWLEDGE CENTRE as *a cluster centre*: collector of specialists, a polarisation centre of expertise:

- new critical resource masses and personnel conditions,
- providing technical and technology services,
- providing infrastructure,
- providing incubation services.

4. The KNOWLEDGE CENTRE as *generator and mentor of regional development*:

- mixing global and local knowledge,
- ensuring knowledge flow in regional dimensions,
- maintaining an international relation network.

5. The KNOWLEDGE CENTRE as *a regional technical service providing centre*:

As compared to those of large companies, it is a differentiating feature of the innovation activities of SMEs that they are built on using continuous external expert involvement and services in all its stages. Typical areas are:

- technical services /measurements, validation, experiments, leasing laboratory equipment, etc./,
- expert services /interpreting, document translation, business administration services, business and legal counselling/,
- business organisation counselling /marketing, technology, production organising/,
- technology services /leasing labour, renting workshop space, rapid prototyping services/ ,
- logistic services, R+D services,
- technology transfer services /partner search, project writing, licence trade, capital organisation, organising venture companies/.

Table 3: From a mass production region to a knowledge region

| ASPECTS   | MASS PRODUCTION REGION   | KNOWLEDGE REGION  |
|---|--|---|
| <ul style="list-style-type: none"> <li>Sources of competitiveness</li> </ul>  | Sources of comparative advantages <ul style="list-style-type: none"> <li>availability of natural resources</li> <li>relatively inexpensive labour</li> </ul> | Sources of renewable advantages: <ul style="list-style-type: none"> <li>creative-innovative medium</li> <li>continuous development</li> </ul>                 |
| <ul style="list-style-type: none"> <li>Products-services</li> </ul>           | Mass production: <ul style="list-style-type: none"> <li>cost advantages</li> <li>division between R+D and production</li> </ul>                              | Knowledge-based production and services: <ul style="list-style-type: none"> <li>high added value</li> <li>combination of production and innovation</li> </ul> |
| <ul style="list-style-type: none"> <li>Production infrastructure</li> </ul>   | Centralised plant with a local range of suppliers, and reduced task division   | Innovation chain built on supplier network  |
| <ul style="list-style-type: none"> <li>Human resources</li> </ul>             | <ul style="list-style-type: none"> <li>low qualifications, low wages</li> <li>narrow training</li> <li>target-oriented trainings</li> </ul>                  | <ul style="list-style-type: none"> <li>knowledge workers</li> <li>life-long learning</li> <li>induced corporate learning projects</li> </ul>                  |
| <ul style="list-style-type: none"> <li>Technical background</li> </ul>        | Strong reliance on local infrastructures   | Global communication and IT infrastructure  |
| <ul style="list-style-type: none"> <li>Corporate management system</li> </ul> | <ul style="list-style-type: none"> <li>division of authority ensuring the dominance of the parent company</li> <li>top-down control</li> </ul>               | <ul style="list-style-type: none"> <li>mutually beneficial relations</li> <li>networking organisations</li> </ul>   |

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**Nataša Urbančíková**

## **Innovation and Human Resource Development**

### **1. Introduction**

The localization of the economical activities and related human recourse development cannot be fully understood without understanding of the wider socio-economical aspects. The knowledge production and utilization are crucial factors for the additional value creation. This new step in market-oriented economy has strong roots in the creation, distribution and utilizations of the knowledge as it was never before. The knowledge creation and distribution are the key economical forces and knowledge itself is the economical source that has privileged right to be placed altogether with other sources in spite of the fact that knowledge itself does not contribute to economical growth but it has to be included to product. The innovation, ability to apply the RTD results into the form of competitive products and services are the key drivers of competitiveness enhancement.

### **2. Innovation and regional development**

The economical theories and empirical research put the emphasis on the key role of the accumulation of the human capital, RTD and innovation processes result to the economical growth achievement, competitiveness enhancement, the quality of life improvement and based on this also the improvement of overall economical development. The investment into the education, research and development bring the effect after certain time period but their benefit for the society is indisputable (GRILICHES, 1994; ROGERS, 1995).

The advanced regional policy aims are focused on the regional competitiveness promotion that is connected to four main factors:

- structure of the economical activities,
- level of innovation,
- level of region accessibility,
- level of the labour forces education.

The growth of the regional competitiveness is significantly conditioned by its innovation capacity rise. The innovation potential is determined to certain extend by insufficient financing, the decrease of number of RTD staff, the low share of private sector and differentiate qualification structure of the regions. That is why the emphasis must be put on education, the higher expenditures to R&D, support of the activities enhancing creation and transfer of knowledge as a results of research into the practice and new technologies. The EC pay attention to innovation potential measurements.

The measurement methodology and results are published on the web portal „European Innovation Scoreboard“ using the indicators from the following areas:

- Innovation Drivers,
- Knowledge Creation,
- Innovation and Entrepreneurship,
- Application,
- Intellectual Property.

The innovation support has become the key issue for the EU long-term strategic aims and the importance of this orientation constantly increases. In this connection in EU relevant documents the following aspects are highlighted:

- The necessity of the complex system approach to the creation of required pro innovation environment, relevant innovation policies, specification and effective utilisation of its tools,
- The necessity of the mutual connection and harmonisation with other governmental policies and building of the effective institutional and legislative framework,
- The sectional character of innovation that requires cooperation of all stakeholders,

The accent on regional dimension of adequate innovation policy.

According to Peter DRUCKER (2001), innovation is a set of tools to create a new business. These tools can be learned and practiced. Gary HAMEL (1998) redefines innovation as strategic innovation -- the capacity to reconceive the existing business model in ways that create new value for customers and stakeholders and advantage over the competition. The innovation process has to be market oriented. If it is technologically oriented sometimes “the technological miracle” can be created but without required benefit. Drucker stated that from the top management point of view only two basic roles exist: marketing and innovation. As long as function of the marketing is to satisfy the actual customer needs, the innovations are going further – they try to satisfy the future customers needs. Without the ability to permanently innovate the company will decline in the moment when the customer needs, technology and competitors will change.

Based on the EC definition the innovations are renewal or extension of product and service range and associated markets. Innovations mean creation of the new production, delivery and distribution methods and introduction of the changes in management, workflow, work conditions and human resource skills.

The company ability to innovate is influenced also by human resources that create its part and the qualified workers can be considered as key company assets. The company has to employ not only researchers but also engineers who are able to manage the production, the sellers who are able to understand the technical part of their products and managers who understand the technical problems. Besides the employee structure (especially from the qualification point of view) the ability of company to innovate is influenced also by company marketing strategy, competition, relationship to universities and research institutions etc. (HUDEC, 2007).

The technological changes and innovations are the base for dynamic knowledge economy. The differences regarding innovation perception and institutional base for them can partly explain the differences in the economical performance. The strategic behaviour of the companies and alliances creation as well as their mutual influence and knowledge exchange between companies, research centres, universities and other institutions are the core of the innovation process. The researchers in the area of innovation and innovation policy creators focus their attention to efficiency of innovation creation, dissemination and utilisation. At the last several years the theory of competitiveness goes further to the role of the human capital and introduce the term competitiveness based on creativity in connection to education and conditions for innovation creation and dissemination. The importance lays in the high additional value creation as a result of creative process. Unlike of research and development that is mostly based on highly qualified labour force and infrastructure, the creativity infrastructure is based on connection of human capital and concrete environment (URBANČÍKOVÁ, 2007). The creative sector consists of creative industry and services that work on the profit creation principles but also consist of non-profit arts. Just this combination leads to high additional value creation in the branches as architecture, design and entertainment industry. It limits the competitiveness advantage appreciation that is based on the innovation profile of companies, regions or countries

(FLORIDA, 2002; BENEŠ, 2005). The level of the human capital is comparative advantage or on the contrary disadvantage for the enhancement or weakening of the regional position in the global competition. The human capital that is necessary for the innovation development is closely bound with social capital that exists altogether and with close relationship to human capital. Another possibility is to utilise or build the human capital altogether with social networks and to exploit the social networks potential in connection to community or relative relationships and other traditional institutions. In contrary to political, ethnical, social and religious sub cultures these relationships are characterised by strong and concentrated relationships. The existing networks cannot be ignored but in reverse have to be active in the regional development benefit. The practise of the social capital activation can be called as a partnership e.g. public-private partnership. The investments into social capital enable the regional policy realisation that is based on the consensus and which offer possibility effectively promote human capital, enable effective public services and infrastructure functioning, offer the satisfaction and high life quality for their citizens etc. (HUDEC, URBANČÍKOVÁ, 2007).

### **3. Innovation and human resources planning.**

The globalisation and discussion about economy based on the knowledge increase the interest about the role of the knowledge in the economical development. That is why the human resource development becomes one of the key themes at the national or regional level. The human capital level is seen as a comparative advantage.

The term development can be understood in the several ways and is a mixture of the different meanings and nuances. From the public sector point of view the development usually means an income increasing, higher number of labour positions, decreasing of unemployment or higher productivity. From the strategic and development point of view the development can be understood as improvement in the following areas (MALIZIA a FESER, 1999):

- Labour force (education and training, availability, cost);
- Infrastructure (availability, capacity, transport, telecommunication, etc.);
- Economical and social services and facilities (availability, capacity, university and other educational institutions, business incubators, industrial and scientific, sport and outdoor facilities, etc.);
- Environment (natural, business, cultural, etc.);
- Economical structure (structure of the economical base, diversification, etc.);
- Institutional capacity (management, knowledge, skills) for the economical development support.

At present the role of innovation is highlighted in many researches regarding regional development. The ability create innovation in the area of products, processes and organisation is understood as a determinant of business competitiveness whereas the spatial level of the region shows to be ideal for the innovation and cluster activities. The innovations as a key force orient the organisations to ambitious aims, leads to industrial renewal and contribute to development of the new economical branches. From the process point of view innovations have a character of system of interactions and changes between different functions and actors. Their experiences, knowledge and know how are mutually enhanced and the role of the human and social capital is strengthen. Some theories include into the innovation also the new forms of organisations (institutional innovations) and from the sociological point of view the interactive learning can be considered as basic aspect of the innovation process (LUNDVALL, 1992, 1994). The role of the change management is crucial for the concept of the global knowledge economy and also for the learning regions. The rapidly changing environment requires flexibility, fast reaction and versatility that is why the innovation capacity of the regions and the institution located in the region is very important.

The high quality labour force is an inevitable condition for the economical growth in the region. The level of the education does not automatically means economical growth, the graduation from the certain study branch, its utilisation in the work place and many other factors are strongly important as well (ZGODAVOVÁ and URBANČIKOVÁ, 2002). There are many study branches and even more job positions and that is why the everyday tasks at the regional labour market is to ensure harmony between two sides of the labour market:

- offer side and
- demand side.

The mutual connection between labour offer and demand can be characterised by two phenomena (Nekkers a kol., 2000):

- The problems of quantitative interconnections caused by unbalance between the number of labour force and required education and skills that are available at the labour market and the number of suitable working places.
- The problems of qualitative interconnection that arise as an unbalance between level and type of knowledge and skills of the labour force at the labour market and requirements on their quality and type at the demand side.

This differentiation is very important for the planning of the educational, re qualification and training programmes by the separate groups at the labour market. The optimization of the benefit of the education to economical growth is extra-complicated assignment problem. The different types of employer's preferences must be taken into account and they must be synchronised with the information about employees in order to harmonise the labour market. Of course it is almost impossible and one of the typical problem is the labour market transparency for both sides, labour force entering the labour market and employers. The creation of at least static regional system of labour market information is the rule in every country. It functioning and results are strongly dependent on the employability trend predictions, which represents very difficult process (HUDEC a URBANČIKOVÁ, 2004).

The strategy has to emphasis three human resource development aspects:

- to assure that education at all type of schools will be oriented to real needs in practice,
- to identify the main regional problems as a deficit in the competences and not offer,
- to put attention to all types of learning, not only education and training.

These three areas of strategy point out:

- competitiveness (the development of the relevant skills and competences in the area of regional labour force),
- employability (the support of all employees in order to take part in education and personal development) and
- social inclusion (support and encouragement of the disadvantage groups development).

The human resource development strategy should settle the aims not only for young people but also for the whole population in the region with regard to national strategic goals. The special attention should be devoted to young people who attend the labour market for the first time and they have strong will to learn. It is necessary to develop such abilities that will support the ability to overcome problems and challenges and to offer them such a knowledge and training that will help them to adapt to new conditions and to be flexible.

In order to implement the human resource development strategy, the tools at the offer and demand side should be defined. The measures at the demand side have to offer a lot of suggestions how to increase the demand for the partner institution that work at the sub regional level. The measures at the offer side should be aimed to increase effectiveness of individual and collaborative learning.

#### 4. Human Resources in the knowledge economy.

The ability to add value by knowledge creation and application become more important in the knowledge economy than access to traditional factors of capital, material and work. The education and development processes play the crucial role in this process. The ability to create and utilise the knowledge for ongoing improvement and radical innovations in the labour processes, goods and services is substantial for the regional progress. In the knowledge economy the several types of knowledge can be found (Tab. 1.):

Table 1: The type of knowledge

| Knowledge      | The knowledge description   | The main transfer channel  |
|----------------|---|--|
| „to know what“ | Describes facts and information.  | Educational institutions of all types  |
| „to know why“  | Includes rules, norms and acts that are necessary to correct potential mistakes.  | Educational institutions of all types  |
| „to know how“  | Describes skills and abilities to do something concrete, the type of knowledge that is usually gained in the work process.  | Depends on practical experience gained through tangible learning at the work place and by networks between industrial and business partners              |
| „to know who“  | Information about who knows something concrete and social ability to build the relationship connected to learning for the special groups or individuals and build on their professional expert knowledge. | Gains by understanding and learning from wide social interaction using professional contacts, customers, suppliers and other agencies and organisations. |

Source: adjusted by author based on (Atalik and Fischer, 2002).

In connection to knowledge economy it is necessary to understand how the region perceives its human resources. They can be understood only as a work force that carry out in advance defined and planned activities but also as problem solvers, the flexible receivers of the information and potential innovators. It is necessary to define and understand the range of possibilities that are available for the institutions that influence the regional development because to understand them means to help make decision regarding regional development in the area of education where the education, work and innovation are very closely mutually connected (BROWN A DUGUID, 1991). The less educated people have a difficult position in the labour market in the knowledge economy society (GODDARD, 1999). The knowledge workers create the vitally important part of knowledge economy. It can be expected that they will pay attention to their own employability and economical attractiveness and that they will be aware of their market value. They will probably make effort to institutions in order to enable them education that will satisfy their needs (URBANČÍKOVÁ and ZUBALOVÁ, 2005).

The systematic development of the human resources is important area for national politicians in all over the world. It is reflected in increasing emphasis given to further education, equality, social inclusion, and employability and knowledge economy. In the knowledge economy the regions cannot effort to vast one third of their potential labour force as a results of their inadequate education and social inclusion (HUDEC, URBANČÍKOVÁ and ZUBALOVÁ, 2005).

The successful modern economies are built on the ability of people because their knowledge and skills are key factors for regional economies success. The people are the new ideas sources. In the fast changing world economy the skills have to be permanently up dated. If

not, the regional competitiveness will be significantly falling down. The lack of skills slow down innovation and hinder investments. This problem is very significant especially for the small institutions and regions that have a problem to recruit the high quality graduates or they cannot afford to invest into education and training. But unfortunately in many institutions or regions the top managers underestimate the value of skills very often. It includes the area of managerial skills as well.

Especially in the regions that have a high price of production factors, the long term sustainable development is connected to ability increase the institutional performance by ongoing innovations, knowledge creation and learning. Both, the individual learning as well as institutional learning is inevitable but not sufficient condition for innovation. The individual learning includes the adoption of information and knowledge, understanding by formal and non-formal education and learning-by-doing. The institutional learning depends on individual learning. It can be understood as a process in which institution raise knowledge gained by individuals and transfer them into the group knowledge form using dialog, discussions, knowledge sharing and observations. This process undergoes through internal and external networks. The result of institutional learning is such a type of the knowledge capital that can be utilised in the institution for the very long time (FUCHSOVÁ a KRAVČÁKOVÁ, 2004).

The knowledge becomes more and more important in the process where material sources are replaced as a predominant source of prosperity. Besides the non tangible assets of the region become more mobile, the existence of spatially immobile clusters in which the activities for additional value creation are carried out influence the production location especially its tangible elements. The final effect is that production is in large extend locally bind. The proximity and location play key role in the process of knowledge transfer. It comes from non-tangible character of knowledge and from the interactive character of innovation process.

## 5. Conclusion

The new information technologies and increasing demand on knowledge and skills bring the high interest of human resource managers regarding human resource development activities and strategies. The human resource development becomes to be considered as a crucial for further success. The values and principles supported by economical theories and theories of human and social capital have to adopt in practise by human resource managers and decision makers.

The progress in the area of human resources in the knowledge economy is quite often slow down by different individual or group interests, the old way of thinking that hinder critical thinking and change. At present there is a high need for the new approaches to strategy creation. The strategic thinking influence the human resource theories and vice versa. The support of the labour force creativity and their integration into institutional changes can bring the significant competitive advantage. The knowledge creation and their utilisation for improvement and innovation of the work processes become unique characteristics of institutions. The social capital quality, trust, respect, ethic, meaningful work and practical wisdom gain important at all managerial level.

It is important to realise that current changes do not touch only private sector but also the public sectors and especially regional self governance. The regions become very important level of strategic planning and fulfil strategic tasks. A lot of very theoretical but also practical reasons exist for it. Many of them are known as regional policy principles and have their economical and social dimensions. The level of human capital is seen as competitive advantage. There is no doubt that human capital and its quality are the decisive factor whether region will innovate or not.

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## Innovations in Micro-regional and Local Development

### 1. The interpretation of innovation in small regional/local development

In the original sense of the innovation concept, the introduction of any new phenomenon or the new phenomenon itself can be regarded as innovation. (JOHNSTON, (ed) 1986) New phenomena can be activities, products, organisations or new human and community ways of behaviour. (RECHNITZER, 1994. p. 119) Like all conscious human activities, regional development offers a large scope of new and original phenomena. In this way innovations can be examined from the following two aspects in the development on local levels: 1. as *the appearance and diffusion of technical and technological innovations* promoting local development, 2. as *the innovation of development activities*, including new, locally realised intervention that facilitate technical innovations.

The interpretation of the content and scope of the innovation concept is in close connection with the interpretation of development. Most interpretations of micro-regional and local development focus on “human being”-oriented development theories. The development strategies that are rooted in the model based on the participation of local people, the utilisation of local resources and the local control of development processes are completely different from top-down development models that focus on economic growth. By extending the development concept new elements appear in the interpretation of innovation, too. As long as regional development is interpreted as a top-down phenomenon materialising in economic growth, innovation is also related mainly to the modernisation of production and the appearance and diffusion of the new products, technologies, and work-organisational, controlling and marketing procedures that are necessary to it. If, however, by regional development we mean the ever increasing satisfaction of the needs of a more complex and wider group of people and as a result of subsidiarity, bottom-up processes may be gaining ground, the concept of innovation will expand, too. In this case, the new needs of the given community, the ways of recognising and satisfying them, the new groups of the population involved and the techniques increasing social expansion and ensuring sustainability are to be interpreted as innovations in the development process, too.

### 2. Birth of innovations in local or micro-regional development

In the traditional interpretation of regional development the core areas of development could emerge where the driving force typical of a certain period could appear first or to the largest extent. Also the other way round: as long as such driving forces kept working, the core area was the hotbed of the innovations that made the perfection of any branch possible, since it is in very few places that the significant demands for means and intellectual as well as financial capital of research and development make their introduction possible. Besides, in the centre, invention is stronger, economic climate is more stimulating, the terms of settlement are more favourable, there is more comprehensive information available, i.e. the innovative milieu is much more favourable. (CAMAGNI, 1992) According to the growth pole theory, development spreads from such centres to more distant areas. (PERROUX, 1964)

The above-mentioned model of the appearance and diffusion of innovations is based on some fundamental presuppositions affecting the essence of development. They were summed up by Walter STÖHR as follows:

- development can only be initiated by some selected (white, urban, intellectual) actors
- the rest of the population is considered incapable of initiating development and it is the responsibility of just few people to do their best for them
- the few selected actors want, and within certain frame of time and rules, make it possible for others to take part in the development process
- this other group wants and is capable of accepting the development that has been initiated in their interest
- the development initiated by the few is the most suitable for everybody else
- the socially and culturally new things are better at the same time and other layers of society also need them. (STÖHR, 1981)

It needs not be specially proven that the above presuppositions are less and less tenable. Humanistic development and especially its local-development version are closer to people in space, too. Innovations appear not only in centres but also close to the place of the action.

Considering the results of more than 2000 local development projects, and reading their summarizing evaluations, some characteristic features of the innovations related to local and micro-regional development could be recognised.<sup>1</sup> These are as follows:

One of the most important motivating factors is awareness of *regional backwardness or the crisis situation*, recognition of the necessity to act when this necessity is forced by the challenges of globalisation. Communities that are in a relatively good and satisfactory situation and that do not wish anything more do not really intend to make any changes, or to carry out such changes there is no real need for the community forms of intervention, because the enterprises are able to meet the new needs with their usual procedures automatically.

The recognition of the lack of balance and the intention to prevent it induce regional innovation ambitions. Most case studies come from crisis regions. It seemingly contradicts to this that richer regions in the US provide better opportunities for initiatives and innovations of self-funded development, because the local purchasing power there offers a safer background for innovating activities targeting on the internal market. On the basis of case studies, however, only a part of the local development initiatives can be regarded as self-funded development focusing on the internal market, and experience proves that, due to the stronger effects of globalisation, there is a relatively lower demand for local products in richer regions.

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<sup>1</sup> Local development projects launched in the developing countries in the 60ies, in the US in the 70ies, in Western Europe in the 80ies and in Hungary in the 90ies have resulted in thousands of case studies. Unfortunately, a characteristic feature of local development is that documentation is insufficient, only a fraction of the implemented development can be monitored in the form of case studies and there are even fewer writings trying to give a synthesis of their general features. We have examined about 2200 local development projects on the basis of the sources listed in the bibliography below to back up the statements of the present paper. 700 of them have detailed (at least 1-2 pages long) descriptions, but we know only few parameters of the rest from other analyses. Hungary belongs to the latter type, too, where we can only find out the 'genre', supporter and the expenses of the 834 projects of 110 small regional organisations. About 2/3 of the projects in the database are micro-regional, the rest remains within one settlement. In spite of the high variety of the examined projects, they have a lot in common, too. Their most important common feature is local participation and initiative. As far as the aim and the object of the development and innovations are concerned, we cannot make a clear-cut distinction between micro-regional and settlement projects, so we use the concepts micro-regional and local development together since they can be regarded as local in regional development.

The *size of the region* also plays an important part in innovations aiming at local development. The region cannot be too small, because, on the one hand, there may be lack of skills and expertise which would be necessary for innovations, on the other hand there may be some too close connections, family relations, which may hinder initiatives. The region cannot be too big, either, because big communities lack human relations which would also be necessary for local development.

The creative human actor, an indispensable factor in launching innovations, may come from both *inside* and *outside* the region. It is a requirement for her or him to be familiar with the professional terminology and have a strong sense of locality and commitment. Consequently, innovators of local development are mainly intellectuals filled with local patriotism. However, local development is always a community process. Besides creative individuals, the target group also takes part in developing the idea, which requires special abilities from the developer. Team work makes it possible to incorporate and reproduce traditional culture adjusting it to the demands of the age as well as reforming it if necessary.

Besides the planner, people with appropriate competencies and implementers also have to be involved in implementing the idea. The successful local development depends on *the concerted cooperation of the innovator, the politician and the implementer*. The most obvious way to achieve it, i.e. to concentrate the three roles in one person, is very difficult to apply because of the different personality needs of the three roles.

*Experience in this field* and the documentation of previous innovations promote the realization of the innovation. It is easier to invent and launch a new product or technology where people already have experience and the necessary expertise. Where innovative projects have already been carried out, further new projects can be found in which elements of previous innovations can be recognized.

The experience gained from other people's initiatives and similar technical innovations and the *general information background* play a key-role in developing an idea to solve a local problem. The library, a collection of documents and the equipment for logging on the Internet and making modern data processing possible are indispensable parts of R+D infrastructure in case of local development, too.

In the model regions of local development *the development resources* are typically tight, which requires less capital-intensive solutions and a high degree of commitment from the innovator, who can only count on moderate payment for his innovation. The competition for external resources increases the requirement of new and original ideas and urges the competitors to overbid.

*Appreciation, reputation* and the success of previous innovations have strong motivation to develop further innovations.

R+D activities are carried out in close cooperation with local development organisations and *not in traditional research institutions*. Such organisations ensure the information background, provide a framework for the community development of ideas, have competencies to implement them and inspire individuals with trainings and recognition to carry out innovating work.

The issues of innovative solutions of local development and the applied technological innovations diverge, but at the same time, they strengthen each other. It can also be an innovation when a technology that is already being applied somewhere else is adapted to the given regional and local conditions.

An *intensive connection with the traditional R+D institution*, rather than its actual presence is necessary.

### 3. The diffusion of innovations of local and micro- regional development

The diffusion of innovations can be traced back to information transmission. (HÄGERSTRAND, 1952) The route of innovation diffusion follows information networks. In the information society, such networks make up an ever thicker net, in which the interactive character is getting stronger rather than the previously typical hierarchical and one-way flow.

In the top-down model, which focuses on economic growth, information flows through hierarchical connections, whereas in the man-oriented model it mostly happens through neighbourly relations. (RECHNITZER, 1994)

*Hierarchical diffusion* assumes highly developed information and communication systems. The innovations initiated in the centres spread in a hierarchical order towards the peripheries. The innovation achieves its purpose in a guided way. The number of appliers and the dynamism of application depend on the end points and permeability of the technical systems.

*In case of diffusion based on the influence of the neighbourhood* personal relations play a decisive role. Spreading takes place in a similar way to that of certain epidemics, i.e. the people living close to each other take over knowledge, objects, equipment from each other depending on the frequency of communication between individuals. The numbers of people that get to know and apply the innovation as well as the size of the regions that receive it are increasing steadily. It may also occur that innovations disappear from their original place and randomly appear somewhere else again.

The two effects are in close connection with each other, in reality they mostly appear in some kind of combination.

The diffusion of local development innovations is largely dependent on the various *support systems*. The fact that local development depends on external resources encourages the application of the innovations that are preferred by the supporters. Such programmes having far-reaching effects on local development are OECD, USAID and the programmes of the European Union. Access to the support offered by them is very often subject to the adaptation of some tested development technique, and the procedural rules of the support system mediate new procedures for the management. These big systems also play a decisive role in the hierarchical diffusion of the innovations emerged from the programme through monitoring and the publication of project results.

Another way of propagating new ideas and experience widely is *direct communication between local developers*. Meetings, trainings and establishment of information systems that promote communication are often encouraged by external organisations. At the same time the voluntary organisation of local developers has also begun. Both in the USA and in Western Europe associations of local developers have been set up and are working to ensure a methodological basis and communication opportunities for their members. Besides worldwide organisations such as the European ECOVAST, VIRGIL, (French, Spanish, German, Belgian, Dutch), EDEN, (Spanish, French, Italian, Portuguese, Greek), 'Hela Sverige Ska Leva', (Swedish, Danish, Norwegian) and PREPARE, (with large Central European participation), global organisation has been started, as well. With newsletters, homepages and meetings, these organisations help propagate innovations beyond the borders. A common feature of their methods is that they give priority to personal relations and neighbourhood-type diffusion. They develop their channels in a way that they should strengthen these aspects.

The hierarchical diffusion of the innovations of local development can be promoted by *special research and technological centres*. Although there are research institutes that deal with rural development, small-size enterprise development or local governments, they and traditional R+D institutions can only find their way to local development through mediators. Such mediators can be the so-called resource centres. *Resource centres* are regional innovation institutions that provide the actors of development with both information of the external market,

technology, methodology and finance, and the regional database, which characterizes the internal situation of the region and is suitable for following the changes. They provide their services through the diffusion of information materials, access to the database, professional counselling, training and by ensuring opportunities for exchange of experience.

The key to the *innovations spreading inside the region* is the existence of strong networks and receiving stations. The main conditions of the innovation becoming an everyday issue, coming out from the traditional R+D workshops and spreading in an ever bigger segment of society are the high level of development of the regional innovation potential, the widespread diffusion of innovative and network abilities and the wide availability of the technical equipment of the information flow.

**4. Components of the small regional innovation potential**

Hägerstrand’s innovation-diffusion model takes the diverse innovation capacity of potential users into consideration. (HÄGERSTRAND, 1952) The further you move away from the starter, the smaller the chance of gaining the information. The chance of receiving the information, however, is influenced by several further factors. These factors together make up the innovation potential of the region.

The innovation potential is determined by innovation and network qualities. (COOKE, 1995) Its components are as follows:

| <b>A. Innovation abilities:</b>   | <b>B. Network abilities:</b>   |
|---|--|
| <ul style="list-style-type: none"> <li>• openness to novelties</li> <li>• creativity</li> <li>• enthusiasm</li> <li>• learning ability</li> <li>• organizing ability</li> <li>• persuasive ability</li> <li>• initiative</li> <li>• national and international relations</li> </ul> | <ul style="list-style-type: none"> <li>• reciprocity</li> <li>• reliance on others</li> <li>• partnership cooperation</li> <li>• the ability of confirmation (also confirming other people’s self-esteem)</li> </ul> |

The usually available data, such as the expertise of the population, their level of education, employment experience and social characteristic features, i.e. age, ethnicity and composition according to sex and migration, do not usually give a comprehensive picture of the above abilities concerning the human resources of the region. *The available demographical data* admit of innovative ability, however in a highly indirect and uncertain way. This information is not enough to judge the regional innovation potential and does not make a clear-cut interpretation possible, either.

The direct measurement of the above abilities at a micro-regional level is very difficult and is only possible by a *survey with a large sample*. It is much simpler to *focus on* organisations that play a key-role in small regional development, particularly on the analysis of the survey concerning *managers that determine organisational behaviour*.

Further indirect information can be obtained by accepting the fact that besides demographical composition and the attitude of developing organisations, abilities are also influenced by *the institutional system of culture*, which forms the innovative abilities and attitude of individuals. The development degree of the conditions and level of training inside and outside the school system and self-education, and transmitted values basically determine the innovative ability of the population. The examination of the individual training institutions and their relations with each other gives us insight into the accordance between known and expected skills and the ones to be developed.

So that the innovative ability of individuals can manifest itself, a further element of social infrastructure, i.e. highly developed *social networks* is also necessary. The social networks combining the innovative abilities of individuals make the local community capable of mobilizing local resources and combining them with external expertise and information.

In another approach, according to Antal BÓHM, the main elements of the adaptation ability are the *degree of integration of the population, internal identity, regional location and the composition of the population*. From this aspect, small villages are in the most backward position, since they have aging population, the quality composition of their local societies have deteriorated and replacement has decreased tremendously. Even among settlements with unfavourable potentials and regional location, there are also some that have managed to break out of their blighted situation. In such cases inventiveness, situation recognition and adaptation to the new conditions have played a decisive role. (BÓHM, 1998)

The structures serving innovations, their diffusion and reception are based on the above-mentioned innovative abilities. (RECHNITZER, 1994) They are as follows:

- academic and technological bases
- technological centres
- expert system
- network information services
- highly developed telecommunication equipment
- 'gate services' necessary to appear on the international scene

The innovation structures of local and micro-regional development are different from traditional technical innovation structures, both in their form and in their content. There are differences in the goal, subject, object, financing and geographical frame of the innovation, as well as in the above issues.

*The academic and technological bases of micro-regional development* can be found outside and, to a smaller extent, inside the region. The existence of these bases depends on the size and development level of the region. Instead of institutionalized research organisations, individuals or small research groups, which otherwise work in an institute with a different function, appear on micro-regional level. Agencies employing experts of micro-regional development may develop new technologies themselves, so they can also work as technological bases.

The initiators and implementers of researches in the region may also come from both outside and inside the region. Research promoting local development – in accordance with the aim and subject of the development – affects the whole of life. Depending on the strategic development of the region and on the chosen methods, anything may occur, from ecological through anthropological, pedagogical and local historical to chemical researches.

The presence of academic and technological bases on micro-regional level can mostly be discovered in publications on the region. Of course, it is not easy to find them in library files, because they are usually not published in independent book-form but rather as case studies or background studies, or as parts of some more comprehensive work.

The other possibility is the attempt to discover potential authors, which, by asking certain key-persons, may be a simple solution, but in case of bigger or several settlements, it may be rather difficult.

*Micro-regional technological centres* can be micro-regional resource centres, where developers can work with databases that meet the information requirements based on the strategic trends of local/small regional development. The role of a technological centre can be played by a school of the region, as long as its infrastructure is used besides school education for mediating innovations, too. The office of the small regional development organisation can also carry out such tasks. In any case, the resource centre has intensive relations with academic and technological bases.

In order to get an insight into the institutions working as resource centres, we have to examine the activities of the basis institutions of small regional development, i.e. those of small regional associations and societies, local offices of job centres and chambers, enterprise development offices, civil offices, information centres and schools.

*The small regional expert system* includes both external and internal experts. Its professional composition is also adjusted to the strategic ways of development and the character of local development community. Owing to the specific features of local development, besides economic and technical experts, experts of local societies, communities and psychology also play an important part. Apart from excellent expertise, thorough local knowledge and permanent dialogues to make the individual regions aware of the interaction between them are needed to achieve success. An expert system can only be set up by the concerted activities of individual experts. Further important aspects are permanence and continuity. Due to the nature of micro-regional activity, results can only be achieved by a series of actions based on each other, and the knowledge of precedents and other intervention are also important factors. The finance system focusing on projects, however, does not allow the continuous employment of experts, so long-term, continuous expertise can only be available if the expert is firmly committed.

Setting up and operating a local expert system is the task of local development organisations. Expert lists and indicators of intensity, extension and efficiency of the activity can be collected from the organisations simultaneously with the examination of resource centres.

The existence and the level of operation of micro-regional information network is, to a lesser extent, a question of technical equipment and to a larger extent, that of social background. The systems determined by network infrastructure are the easiest to describe, these, however, do not explore actual information relations within the region. They can only be explored by the methods of the network research of sociology. Sooner or later all micro-regional organisations try to establish their own information systems. The reason why, as it can be shown by Hungarian examples, they are only rarely successful is the fact that they only focus on ensuring technical conditions and do not bother with the social incorporation of the system. Only units that have common interests and priorities and speak the same language can be organized into networks. The content and form of the information system have to be formed in accordance with them. Owing to the nature of micro-regional work, interactivity, the common enlargement of the database and dialogue based on horizontal partner relations are necessary. The information system is qualified not only by its mere existence but also by its extension and the frequency of application by individual users.

*The telecommunication equipment of the micro-region* affects both the operation of the internal information system and its connection to other external information systems. Heading for the information society, the wired and mobile phone, the satellite and cable television, the possibility, speed, quality and price of access to the Internet are highly important factors. Besides available services, the innovative power of the region is also qualified by the size and composition of customers using the services.

*The gate services* of the micro-region not only involve border stations but also informing foreigners and providing services to forward and distribute information in the target area. For international appearance, a high level of foreign language communication skills is also needed.

The qualification of gate services is possible by examining the quality and the quantity of regional PR-publications, the presence of the media, electronic homepages, and the information system for those arriving in the region.

Consequently, the regional innovation potential can be evaluated by the indicators of innovative abilities and innovation structures. The comparison of micro-regions according to innovation potential can be done by narrowing down István Kiss' system of the comparison of settlement units (KISS, 1996) to innovative power and thinking it on. The general survey of the

innovation situation of micro-regions can be drawn up with the basic indicators of the micro-regional innovation potential calculated on the basis of the above-mentioned system and with the combined indicators calculated from them. The general survey is suitable for comparing individual regions and the situations of the same region in different points of time. The latter makes it possible to indicate the changes resulting from the development, which gains special importance in monitoring regional innovation strategies.

### 5. Working out micro-regional innovation strategies

The *main aim* of mapping out micro-regional innovation strategies is to strengthen the innovation ability of the micro-region. A highly developed innovation ability may mean the only guarantee of adjustment to globalization processes and the only way of meeting the challenges of global processes at a local level.

The issues mentioned in the previous paragraph underline the fact that the innovative power of small regions can not only be strengthened by encouraging the establishment of a well-balanced demographical structure and forming organisational behaviour but also by developing cultural institutions, social networks and structures of innovation.

Steps of working out the strategy:

#### A. Preparation of the strategy

- *Reaching regional consensus*  
At meetings where consensus should be reached, the representatives of the institutions that play a key-role in the development of the region should agree on how they interpret innovation, what they think its central issues, most important characteristics and components are.
- *Needs analysis*  
In the active phase of the consultation, conditions necessary for the expansion of the innovative activity of enterprises in the region, as well as the factors that hinder them, are to be discovered. Meanwhile, suggestions are put forward to reduce obstacles, e.g. by brainstorming.
- *Trend analysis*  
The analysis of the regional, national and international innovation environment and the examination of the most important technological and industrial trends can be carried out by experts (possibly those of the region) in sectoral horizontal committees in charge of the individual issues. Team work is also the frame of developing relations between educational and other public institutions of the region and the private sector. The outlined trends can serve as a basis for further suggestions.
- *Supply analysis*  
Among activities promoting innovation, the conditions and strong and weak points of financing, research, education and vocational training, infrastructure, information provision and counselling have to be subject to thorough analysis.

#### B. Working out the strategy

Working out the strategy and implementing it are the most difficult parts of the programme. Working out the strategy can be preceded by several practices. The person in charge may participate in brainstorming meetings. The organisations involved in the programme may hold forums where they can react to the programme activities that affect them or are carried out by them. The representatives of the organisations involved in the programme may discuss its most important intervention areas.

- Image of the future and priorities

The team in charge of working out the strategy outlines the aims which serve as a basis for the strategy and the guidelines for the strategy that crystallized in the preparation phase in a short and concise form.

- Definition of the strategic fields

The most important suggestions concerning intervention are selected from those turned up in the preparation stage in accordance with the set guidelines. They affect some fields listed in the paragraph about supply analysis.

The targeted measures may include the following (depending on local conditions):

- encouraging population settlement to stop aging and improve the level of education
- comprehensive reformation of the school system
- ensuring and improving the institutional conditions of life-long learning
- launching attitude-forming trainings
- setting up academic and technological bases in charge of the strategic issues of the small region either inside or outside the region to maintain continuous relations with local actors
- setting up resource centres (technological centres) to develop small regions
- setting up and operating the small regional expert system
- developing and operating an information network
- encouraging the diffusion of highly-developed telecommunication equipment in the small region
- developing 'gate services' (information, PR) necessary for entering the international scene.

## **6. The most important conditions of working out and implementing bottom-up innovation strategies**

- *Accepting bottom-up development and the determining the order of value*

Even if an ever increasing number of theoretical experts of regional development think it desirable to follow bottom-up development strategies, people involved in the day-to-day routine of regional development may give priority to the development theory that focuses on economic growth. Several local actors of development follow the order of values typical of previous eras and prefer big projects conducted externally which can be implemented by state redistribution and introduce high technology, although, in words, they would like local decision-making to gain more ground and emphasize the importance of taking local special features into consideration. It is especially true to backward regions, where they would not like to change the special features of development but they would 'only' like to become its beneficiaries.

- *Common motivation to make changes and carry out common action*

The spontaneous development of small regional development organisations show that the communities of the poorest regions were the first to recognize the necessity of making changes. More developed regions, however, where there were better opportunities for individuals to get on in life, had less motivation to common action.

The inhabitants of poor regions often choose passive resistance or resignation or they leave the region and choose to escape. In spite of bigger motivation, it is hard work in underdeveloped regions to find the proper people who are willing to be involved and organize their activities. After all, as it happens in several regions, a part of the citizens are willing to participate in the development process actively, what is more, they are ready to conduct it, as well. This active core can be enlarged like a snowball with community development techniques. There are huge human reserves even in the most backward regions inflicted with mass migration of the population.

- *Knowledge: to know what to do and how to do it*

The biggest problem of the communities that have already started the development process is the lack of information and knowledge. A fundamental characteristic feature of bottom-up development is that it takes different forms in the individual communities. Communities always have to find out the solutions that are the most suitable for their own situation. In this way, all local initiatives can be regarded as independent innovations. The innovative ability of the community can be developed with training, familiarizing its members with the examples and experience of other regions and involving external experts.

- *Solidarity*

In the poorest regions where people have nothing to lose, nothing to envy, there is a comparatively high degree of solidarity. Quarrels and jealousy between neighbours hinder the day-to-day work of a lot of development organisations and endanger the success of development.

- *General features of the government control system*

It is difficult to break through the control frames of a traditionally centralized state. The place and role of civil organisations in clearing up Hungarian development processes are still ambiguous. However, relatively independent local governments have appeared in the regional control system. No doubt, the municipality principle is favourable for bottom-up development but because money is tight and the budget is rather redistributive and because its distribution system focuses on performing basic functions, the freedom of municipality development and the possibility of implementing strategies based on local resources are rather limited. It is only more developed settlements that could achieve such goals. Others may obtain complementary sources by tenders. The tender system, however, assumes a certain degree of readiness, local financial and mental resources. Without these, the role of personal relationships will be stronger, which may distract attention from other local resources.

- *Inspiring and consistent regional policy of the government*

The act on regional development of 1996 allows bottom-up development and regional development based on local initiatives. In practice, however, during the application of the act, several trends seem to prevent desirable processes from getting stronger. Among other things, the central governmental spur to establish development associations of local governments by statistically determined micro-regions blocked the emergence of spontaneous micro-regional organisations built on organic regional and multi-sector basis, as well as the fact that the organisation of multi-purpose micro-regional associations is controlled from above. If the associations are regarded as an element of the institutional system of regional policy, the fact that the establishment of associations is controlled from above, would not mean a problem in itself. A problem arises, when such organisations are considered to be the only way and exclusive forms for initiatives to be carried out, making in this way the bottom-up organisation of development communities impossible.

There are further problems concerning regional planning, partly because this activity broke up during the change of regime, and partly because reorganisation cannot take place according to the previous models. Recognition of the planning freedom of local communities means a severe methodological challenge for planners. Besides, the checking mechanism of the plans of different levels and the appearance of bottom-up initiatives in them has not been worked out, either.

- *Acceptance of the interest of companies*

As the key-actor of former development strategies, the sector of large companies plays an important role. One of the most important characteristic features of underdeveloped regions is

however, that large-size enterprises are not present, so no direct conflict situation emerges. If it is not possible to have the interests in the identification and sustainable utilization of local attractive forces accepted at a regional level, problems arise from conflicts of interests and the different interest enforcement abilities.

- *Chances of setting up national networks*

Local development cannot be isolated. Strengthening the above-mentioned interest enforcement ability, ensuring competence, the chances of spreading innovations and realizing larger regional programmes require the establishment of the networks of local and micro-regional development organisations on regional, national and international levels.

A fundamental condition of the operation of the national network is solidarity between organisations and regions. Dependence of development organisations on central resources and the strengthening competition for development resources between them hinders their partnerships.

- *Changes in the attitude of external facilitators*

The competence and accessibility of external facilitators are very important in the process. This way of development, however, requires a different kind of knowledge and a different kind of task interpretation from them. In their work, team building, community development, communication and the ability of identification with the region gain importance.

*As a summary*, we may emphasize that after complex strategies of rural development or micro-regional strategies of economy development that were worked out before, closer attention should be devoted to working out local and micro-regional innovation strategies that focus on human factors much more than ever before. This requires a new attitude from experts that have previously dealt with innovation and taken mainly its technical aspects into consideration, from planners that focus mostly on sector problems rather than on the continuously reviving ability, and from those in charge of providing governmental support that has been narrowed down on the mere development of the assets of micro-regional development. The fundamental elements of the new approach extend the innovation concept, widen the circle of innovators and, because the process has become an 'everyday' one, bring the places of emergence and the application of the innovation as close to each other as possible.

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Dániel Kuttor<sup>1</sup>

## Creating Innovation Strategy in Bilateral Environment Innovation without border!

### 1. Introduction

Due to the European Union (EU) accession of our countries the trans-regional collaborations become more and more fashionable way of networking. Those factors like the significant financial assistances of the EU (through the Territorial Cooperation Actions: INTERREG; and the Joint Research Programmes: FP6 and 7) and the decreasing political, economic importance of the borders (as Schengen Agreement came in to force) jointly result in more and more trans-regional and even trans-national programmes in Central Europe as well.

The cooperation in the field of regional development and innovation among regions is essential in such a part of the EU as Central Europe. In the NORRIS Project North Hungary and Košice region collaborated with the financial and methodological assistance of the EU in order to create Regional Innovation Strategies (RIS) both separately and jointly. In this paper the methods and process of the strategy building and experiences of the almost completed project have been summarized.

This project represents a unique opportunity to test and implement the RIS process in a cross border environment, which greatly assist the construction of a European area of research and development where cross border linkages between SMEs and research structures are greatly facilitated. The conclusions of many RIS projects frequently comment on the lack of regional linkages, the difficulties of internationalization etc, the NORRIS project will therefore provide the EU with a pilot project that tackles head on some of the most important issues confronting the EU today, using innovation and technology as a means of breaking down these barriers.

### 2. Target area of the project

The NORRIS Project and the created strategies concern two neighbouring regions: North Hungary and Košice region, which is the Southern part of the larger Eastern Slovakia region.



Figure 1: Target area

Source: MapInfo, own compilation.

<sup>1</sup> I would like to express my special thanks to Viktória Józsa-Búzás and Kornél Kalocsai for their valuable collaborations by coordinating the NORRIS Project and writing this paper.

*Table 1: main indicators of the participating regions with the national data*

| Units            | Number of population (2005) | Millions of Purchasing Power Parities (2005) | Purchasing Power Parities per inhabitant (2005) | Purchasing Power Parities per inhabitant in percentage of the EU average (2005) |
|------------------|-----------------------------|--|---|---|
| Hungary          | 10097549                    | 145181,8                                     | 14392,9   | 64,3  |
| North Hungary    | 1271111                     | 12009,0                                      | 9483,6  | 42,3  |
| Slovakia         | 5384522                     | 73067,1                                      | 13563,3   | 60,6  |
| Eastern Slovakia | 1567253                     | 15160,4                                      | 9662,9  | 43,1  |

Source: EUROSTAT, own compilation.

As regards the innovation it can be said that North Hungary and Košice region are less-favoured regions with limited research & development (R&D) capacities, however with significant potentials especially in some selected economical sectors (chemical industry, machinery and IT branch) and in the field of renewable energy resources. The two regions have very strong economic, social and geographical links and a common historical background. Besides they are facing the same challenges in the field of competitiveness and innovation as well and have the intention to cooperate with the aim of accelerated economic development.

*Table 2: R&D capacities and potentials*

| Units            | R&D expenditure per GDP, % (2005) | R&D staff per total employees, % (2005) | Number of patents per 1 million inhabitants (2004) |
|------------------|-----------------------------------|---|--|
| European Union   | 1,90                              | 1,49                                    | -  |
| Hungary          | 0,94                              | 1,27                                    | 21,25  |
| North Hungary    | 0,27                              | 0,56                                    | 5,19   |
| Slovakia         | 0,58                              | 1,02                                    | 7,04   |
| Eastern Slovakia | 0,28                              | 0,68                                    | 5,17   |

Source: EUROSTAT, own compilation.

### 3. Goals of the project

The main aim of the project is to create an authentic programming and implementing basis for the regional innovation support activities and the absorption of EU funds by transnational co-operation and partnership of the regional actors.

The further goals were defined:

- Strategic objectives:
  - foster regional and economic cohesion within and between the participating regions and improve their competitiveness by handling innovation as a key economic priority.
- Direct objectives:
  - develop the absorption capacity of EU funds by improving the regional programming and implementing capabilities

- strengthen transnational and regional co-operation in the field of R&D and innovation in order to open new areas of transnational activities and to exploit the existing capacities in a more efficient, integrated way
- create an enabling environment for existing SMEs and innovative start-ups, spin-offs, investors and R&D centers by determining the most important stimulating and attractive factors
- identify strategic key areas of innovation support activities and flagship projects
- transfer experience and knowledge from the supporting partner region and connect to the EC networks and programs, the European innovation bloodstream.

The NORRIS project contributes to consolidate a European platform for exchange of experience and dissemination of good practice on research and innovation-related themes among actors in regional structures and stimulates regional policy-making as regards research and innovation strategies by means of promoting cooperation, breaking down barriers and encouraging transregional learning, furthermore opening new areas of transnational activities and exploiting the existing capacities on a more efficient, integrated way. For the sake of encouraging a more innovation friendly environment throughout the EU, and stimulating technological innovation and the setting up of innovative technology business by strengthening transnational and regional co-operation in the field of R&D and innovation the project aims experience and knowledge transfer from the supporting regions and to connect to the EC networks and programmes, the European bloodstream. With the help of the determination of the most important stimulating and attractive factors, the NORRIS project directly contributes to the creation of an enabling innovation friendly environment for existing SMEs and innovative start-ups, spin-offs, investors and R&D centres.

The determination of players of the innovation flow and innovation key areas in the relevant regions in accordance with RIS methodologies can facilitate the regions to connect to the functioning EU innovation network, hence innovation experience gained in the regions of the consortium can properly be linked to this network. New approaches and tools can be investigated and tested, lessons from the experiences of FP research projects can be extracted as well. Knowledge transfer will offer proper services that need to be provided on a European scale, and will assist the creation of a Europe-wide innovation system. Moreover a number of services that support the partnering regions will be operated in order to contribute to the flow of information, hereby to connect them to EC networks and programmes. As a result, high quality proposals assisted by the NORRIS consortium will be submitted to FP6, thus fostering the participation of researchers of the regions in the consortium in all relevant areas of the Framework Programme. Last but not least the NORRIS project will provide the EU with a pilot project that tackles head on some of the most important issues confronting the EU today (lack of regional linkages, the difficulties of internationalization, etc.), using innovation and technology as a means of breaking down these barriers.

#### **4. Potential impact of the project**

On the basis of the objectives, potential impacts are as follows:

- increased absorption capacity of EU funds due to the improved regional programming and implementing capabilities and the higher amount of national and private co-financing in innovation related projects
- innovation and R&D form a key factor in the National Development Plans (2007-13) and in other national and regional development documents, thus the participating regions are characterized by stimulated economic growth

- efficient and active transnational and regional co-operation in the field of R&D and innovation, defined common research areas, growing investments and expenditures on innovation
- better exploitation of the existing capacities on a more effective, integrated way, a growing amount of university-industry research projects, well-prepared flagship projects and proposals for the next programming period
- enabling environment for existing SMEs and innovative start-ups, spin-offs, investors and R&D centres, due to the clear understanding of the most important stimulating and attractive factors
- the regions are characterized with positive economic images and great possibilities, therefore the young and well-educated population stay in the regions
- cross-border cohesion among the regional actors, mainly SMEs is strengthened to comply with the challenges of the enlarged EU market, modernised SMEs due to technology transfer activities and EU support
- stimulated transnational connections (flow of the “goods” like capital, products, human resources, services) and due to the active co-operation, the traditional role and economic weight of the Miskolc-Košice axis will be restaurated and modernised with new areas in transnational activities
- the regions are successfully connected into European innovation bloodstream as active participants of EC networks and programmes.

The RIS is however not perceived as a project but as a process. This clearly means that the partners in the RIS intended to establish the mechanisms and partnerships that continually ensure the creation of new initiatives as well as the strategic economic development tools beyond the end of the programme.

### 5. Project management and exploitation

The management structure of the project had the following elements:

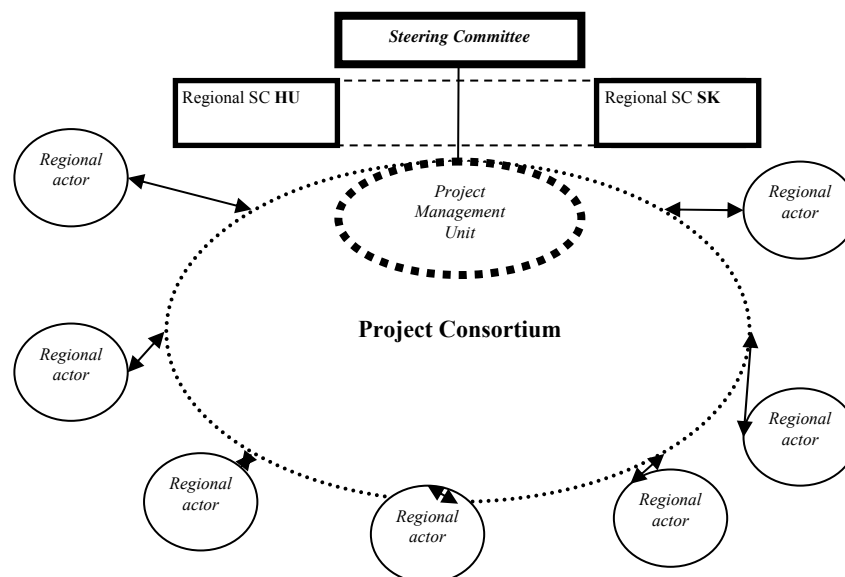


Figure 2: bodies and working structure

Source: own compilation.

### *I. Transnational Project Steering committee (SC)*

The SC supervised the whole process; it represented a really high level decision making and delegated body with the most influential policy makers in order to promote that the RIS becomes part of the sustainable regional policy framework. The members (5-5) were delegated from the two Regional Steering Committees (RSC) which were formed both on the Hungarian and the Slovakian sides. The SC ensured the transnational co-ordination of the project and the consensus during the whole process as well. The main function of the committee was to make certain that all regional decision makers sit around the same table and exchange their ideas regarding the RIS process. The SC was chaired by a senior figure who could command respect and ensure the participation of key figures. The chairing of the SC was organised in a yearly rotating system beginning with a chairman from the coordinator's side. The SC first met and was established after the creation of the RSCs. It met one time per year to supervise the project. The Project Steering Committee members will be the representatives of the RSCs delegated with consensus. *The Project Steering Committee (SC)* was planned to consist of the following stake holders, 5-5 members from both sides:

Regional Development Council/Regional Government; Ministry of Education/other relevant institute on ministerial level; Higher educational and research institutes; Chambers of Commerce and Industry, Major Agriculture and Industrial actors.

### *II. Regional Steering Committees (RSCs)*

Every partner was responsible for the establishment of RSC. The principle was to find the similar actors and organisations on both sides. The main actors of the regions will be represented here. The Regional Steering Committees had a role by helping the partners and the co-ordinator to access the various organisations that were involved during the process. The members were invited to use their own networks to help the dissemination of the RIS findings (Stage 1) and recommendations (Stage 2).

Each Regional SC met first by the official launch of the programme in order to be established and to prepare the beginning of the scheme and facilitate the start-up of the process. These events were held in the two regional capitals, Košice and Miskolc. By these first events, all organisations represented will be informed about the goals and expected results of the project and their possible role in the process. The RSCs are planned to consist of 20-20 stakeholders from both sides, altogether 40 representatives.

The Regional Steering Committees (RSCs) consisted of the following stakeholders on both sides (respecting the differences of organisational structure and names of the organisations of course!):

#### *Voting members:*

Regional Development Council or Regional Government; County Councils; Chambers of Commerce; Chambers of Agriculture; Major Municipalities of the region; Ministry of Education; Prime Minister's Office; Regional Branch of Academy Sciences; Higher education; Research Institutes; Major Industries; SMEs.

### *III. Associated members*

Košice-Miskolc Euro Region, Representative of the Employers' Association, Industrial Parks and Innovation Centres, Incubators, Ministry of Economic Affairs, representatives of the financial sector.

### *IV. Project Management Unit (PMU)*

Members of the PMU were as follows:

- North Hungarian Regional Development Agency (NORDA, Hungary);
- Košice Self-Governing Region (KSR, Slovakia)
- Technical University of Košice (TUKE, Slovakia)
- Agency for the Support of Regional Development (ASRD, Slovakia)

- Bay Zoltán Foundation for Applied Research (BZF, Hungary)
- University of Miskolc (UoM, Hungary)
- B-A-Z County Government (BAZ, Hungary)
- Hungarian Investment and Trade Development Agency (ITDH, Hungary)
- Centro de Automatización, Robótica y Tecnologías de la Información y de la Fabricación (CARTIF, Spain)
- JOANNEUM RESEARCH, Institute of Technology and Regional Policy (JR-InTeReg, Austria).

The delegated employees from the nominated partner-institutions represented the core working team of the NORRIS project and were directly responsible for the successful progress of the project according to the work plan.

## **6. Communication flow and progress monitoring**

The PMU guaranteed continuous improvement monitoring and communication flow by performing the following activities:

- Reports to the SC and the RSCs
- Ensures effective implementation, monitoring and evaluation of the performance of the project, as well as sound management of the project activities and budget:
- co-ordinates the implementation of the project on a day-to-day basis
- organises public events, video conferences and workshops for continuous information flow
- provides secretariat to the project
- Ensures effective co-ordination with all involved parties, such as:
- the macro-level government organisations and with direct interest in the issues being addressed by the project; (Ministry of Education, National Regional Development Agency);
- a number of meso-level enterprise support organisations, including membership organisations, SME support and financial institutions; (economic chambers, local enterprise agencies) and also civil organisations
- the business community directly (the micro-level), including SMEs, entrepreneurs, R&D community, larger companies which might benefit from improvement in the SME sector;
- other representatives and NGOs involved in SME development in the regions and the countries (Scientific Association for Technology, Innovation Association, etc.)

The key instruments for project administration:

- Regular workplan, which comprised a detailed budget for each activity
- Accounting, which was held in accordance with EU procedures,
- Controlling, which was done on a quarterly basis by comparing budgeted expenditure with actual disbursement (so to be able to promptly detect any deviation).

SC and RSCs had meetings one time per year and will decide and form opinion in every important questions and milestone before starting the next phase. It could be seen as a crucial factor that the SC and RSC members share common views on these issues. In case of lacking consensus, the decision of the Project Steering Committee is always prior. RSC meetings had to be held before the SC meetings. Both will happen one a year, thus 3 occasions during the implementation of the project. They were in line with the workshops and the conferences, exactly in the same time and WP to enhance the involvement and participation of RSC and SC members in the project seminars as active partners (chairman, lecturer, etc.).

The assessment of the resources to perform the tasks was the role of project management. Experienced EU partners performed a consultative capacity to the project management as participation and mentoring in the day-to-day work. They participated in the workshops and seminars regarding EU experience transfer and consensus building, transfer the best practices in technology foresight, they ensured consultancy in the preparation of qualitative and quantitative methodology, regional innovation model creation, grant scheme for innovation support, and tools for technology transfer and coordination of financial resources for innovation projects.

### 7. Work plan of the project

The project lasts 32 months in total. The work comprised three stages. Stages were built up of work packages (WPs) and tasks are specified and developed chronologically in the workplan. WPs followed the logical phases of the project.

*Table 3: main phases of the project*

| # | Tasks   | Intervals                      | Outcomes  |
|---|---|--------------------------------|---|
| 1 | Establishment of project management (and cross-border) structures, updating and refining of a project methodology and a detailed work programme<br>Building regional and interregional consensus in the North Hungarian and Košice regions in the field of innovation | 2005 June - September          | Establishment of Project Management Unit and Steering Committees (workshops, conferences)         |
| 2 | Designing a communication strategy and awareness-raising action plan<br>Preparatory work, including analysis of the regional economies and environment for technological advance and innovation   | 2005 October – 2006 May        | Communication tools, regional studies (technology SWOT), questionnaires and interview guidelines  |
| 3 | Secondary analysis of the relevant EU, national, regional development plans and other documents, background analysis of international and transnational dimension   | 2006 June - August             | Study on the economic structure of the regions, European Best Practice, list of related documents |
| 4 | An analysis of the regional supply; Identification of regional firms' needs; Assessment of gap, development of the strategic framework and concrete actions (SME focus groups, catalogue of regional priorities)  | 2006 September . – 2007 April  | Filled and recorded questionnaires and interviews, statistical analyses (SPSS)                    |
| 5 | Design and selection of the pilot projects; Implementation of the pilot projects  | 2007 May - August              | Focus Group sessions, selected Pilot Projects   |
| 6 | Compilation of the strategies, Evaluation, a second regional consensus building on strategy finalisation  | 2007 September – 2007 December | Regional and Interregional Innovation Strategies, Workshops                                       |
| 7 | Closing the project, dissemination  | 2008 January                   | Info-materials and close conference   |

*Source:* own compilation based on NORRIS Project.

### *Stage 0 – Definition Stage*

Stage 0 was the definition stage which last approximately 12 months. This period was used to set up the organisational structure of the project, to select national and international experts to involve, to build regional consensus in the field of innovation, to develop tools and strategy of communication and to fine-tune the work programme for the further stages. Project methodology was defined and agreed, tasks actions and deliverables were modified. This stage contained the preparatory phase for Stage 1 as well, i.e. analysis of the regional economy and environment for technological advance and innovation with the aim of fulfilling as much analysis and preparatory work in this stage as possible.

Experiences from former pre-projects showed that a lot of emphasis should be taken on consensus building to reach and commit all key regional actors. Financial means, precise timing and continuous involvement should be ensured for the purpose.

### *Stage 1 - Analysis*

Stage 1 was the information gathering and assessment phase. Refining of the existing SWOT analysis, the identification of regional firms needs, an analysis of the regional supply and of the transfer and support structure were included. Analysis of the results had to be comparable with the findings in the other implementing region and the partner region(s) so it had to include nearly the same elements. Existing analyses had to be actualised. By the end of this stage the first conclusions can be developed to draft the strategic framework and action plan. Estimated length of the stage: 12 months.

### *Stage 2 - Implementation*

Stage 2 included conclusions from the analysis, preparation of the strategic framework and concrete actions, design and implementation of pilot projects, and also evaluation of the implementation. Moreover, a second regional consensus building were organised on the final regional strategy, as well as a final conference, which made certain to present the strategy also at national level. Estimated duration was 8 months.

The main resources to realise the project came from the implementing regions. In the North Hungarian Region some pre-projects had been already realised, like a preliminary RIS project funded by national resources, or a Phare Hungarian-Slovakian cross-border co-operation project to establish a Bilateral Innovation Cluster which had been under realisation. This project will build upon the results and also lessons of the pre-projects and can use the existing partnerships as core elements. As an end result, a Bilateral RIS was developed with region specific parts (objectives, priorities, measures, actions, projects) and also with interregional priorities, actions and pilot projects.

## **8. Conclusions**

We faced many challenges during the execution of the project nevertheless I am sure that this “struggle” had many lessons and benefits for both sides. To highlight the most important issues I can say that the coordination of such a huge consortium (more than forty people in ten partners); the significant fluctuation within the consortium during the 32 months; the communication barriers because of the lack of sufficient language knowledge; the demand on the constant consensus building on both sides of the border; the lacking knowledge and experience in the field of EU projects are representing the main difficulties we have faced. Since our project was not only a “simple” trans-regional but also a trans-national one, more efforts had to be made on the consensus building and the communication among the partners. Most cases the decision making systems, the economic mechanisms are different in Hungary than in Slovakia, therefore

at the beginning of the project the political, economic and social background had to be introduced in order to create a common starting point.

The collaboration in the frame of the project proved very profitable for all of the partners. It contributed to a deeper and more efficient cooperation between Hungarian-Slovak regional authorities, governments and universities. During the project's period we got to know the goals, mechanism, and experience of the other parties. The two regional development agencies, universities and business support organisations handed over, shared the practises and theories related to innovation, technology transfer and R&D.

Most of the previous regional development and innovation strategies concerned just either the Hungarian or the Slovak territory and their ranges "stopped" at the border. Thus they slightly generated transregional cooperation and projects. In the case of the current transregional strategy it is totally different, the continuous, two-sided strategy-building process resulted a new aspect, way of thinking which treats the two regions as a unit. By this means it offers opportunity for the coordinated, synchronized development. We hope that the proceeds of this common strategy help the closing up of the border areas which are the least developed parts in both regions.

"Innovation without border!" was the title of the mid-conference of NORRIS Project held in Košice in May 2007. Later this slogan became a confession of the whole consortium. All of the consortium members worked on the project to show a good example for cooperation and prove that it will be easier if we join our forces. I hope that we could bring the idea of innovation closer to the people and companies and draw attention to the importance of cross-border cooperation. The prepared strategies guarantee that these kinds of initiatives continue and even deepen.

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Tomáš Želinský, - Miriam Šebová

### Analysis of the regional economy and environment for innovation in Eastern Slovakia

#### 1. Basic Characteristics of the Region of Eastern Slovakia

The region of Eastern Slovakia is located in the east of the country. Its area extends over approximately one third (32%) of the territory of Slovakia counting 29% of the total number of inhabitants of the country, thus representing a market for nearly 1.6 millions of citizens.

From the point of view of administration, the regional self-government of Eastern Slovakia is exercised by two self-governing regions: the Prešov Region and the Košice Region. In the past the area used to be divided into a number of counties that would delimit the existing traditional cultural characteristics of single areas. The most popular and widely known was the Spiš county the centre of which was the Spiš Castle and later the town of Levoča. In the period that followed the Abov County (or the County of Turnany and Abov) with its seat in the town of Košice, and the Šariš County with its seat in the town of Prešov gained significance. From the ethnical point of view the Zemplín county also was a county of considerable importance (Valentovič et al., 2006, p. 6).



Figure 1: The region of Eastern Slovakia and its position within the territory of the Slovak Republic

Source: Valentovič et al., 2006, p. 6

What is the competitive advantage of Eastern Slovakia is its favourable strategic position. It is the only region of the Slovak Republic to border three other countries, being at the same a border region of the European Union. Taking into consideration the cultural, transport, linguistic and other links already established, this very region could become an important trade bridge between the former Soviet Countries and the countries of the European Union (VALENTOVIČ et al., 2006, p. 7).

The Košice Region has total area about 6 753 km<sup>2</sup> with 11 districts, 440 municipalities and about 766 000 inhabitants. The Prešov Region has total area about 8 998 km<sup>2</sup> with 13 districts, 666 municipalities and about 790 000 inhabitants.

### ***Economic Performance of Slovak Regions***

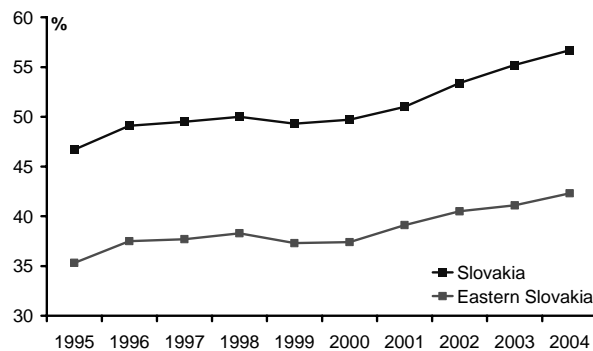
One way of judging the performance of a certain area economy can be done for instance using the indicators such as gross domestic product (GDP). The next table shows GDP at current market prices at NUTS level 2 measured as purchasing power parities per inhabitant in percentage of the EU average.

*Table 1: Economic Performance of Regions of Slovakia*

| <b>Region</b>            | <b>1995</b> | <b>1996</b> | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>2004</b> |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <i>EÚ (27)</i>           | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       | 100,0       |
| <i>EÚ (25)</i>           | 104,4       | 104,4       | 104,5       | 104,9       | 105,0       | 105,0       | 104,8       | 104,6       | 104,4       | 104,2       |
| <i>EÚ (15)</i>           | 115,7       | 115,3       | 115,2       | 115,5       | 115,5       | 115,2       | 114,8       | 114,3       | 113,8       | 113,2       |
| <i>Slovakia</i>          | 46,7        | 49,1        | 49,5        | 50,0        | 49,3        | 49,7        | 51,0        | 53,4        | 55,2        | 56,7        |
| <i>Bratislava Region</i> | 100,0       | 102,9       | 106,2       | 107,6       | 104,9       | 107,9       | 112,4       | 120,7       | 124,1       | 129,3       |
| <i>Western Slovakia</i>  | 44,5        | 47,0        | 46,7        | 46,8        | 47,0        | 47,1        | 47,4        | 48,8        | 51,6        | 52,7        |
| <i>Central Slovakia</i>  | 38,3        | 40,5        | 41,0        | 41,6        | 40,6        | 41,0        | 42,6        | 44,8        | 45,7        | 46,7        |
| <i>Eastern Slovakia</i>  | 35,3        | 37,5        | 37,7        | 38,3        | 37,3        | 37,4        | 39,1        | 40,5        | 41,1        | 42,3        |

Source: Eurostat

According to the presented data, Eastern Slovakia shows the lowest level of economic performance (only 42,3% of EU average and approximately 75% of Slovak average in 2004). If we take a look at the next chart showing the percentage of GDP EU average of Slovakia and Eastern Slovakia, we can see that the average annual growth of Slovakia is higher (about 2,2%) than growth of Eastern Slovakia (about 2,06%) (calculations are based on Eurostat data).



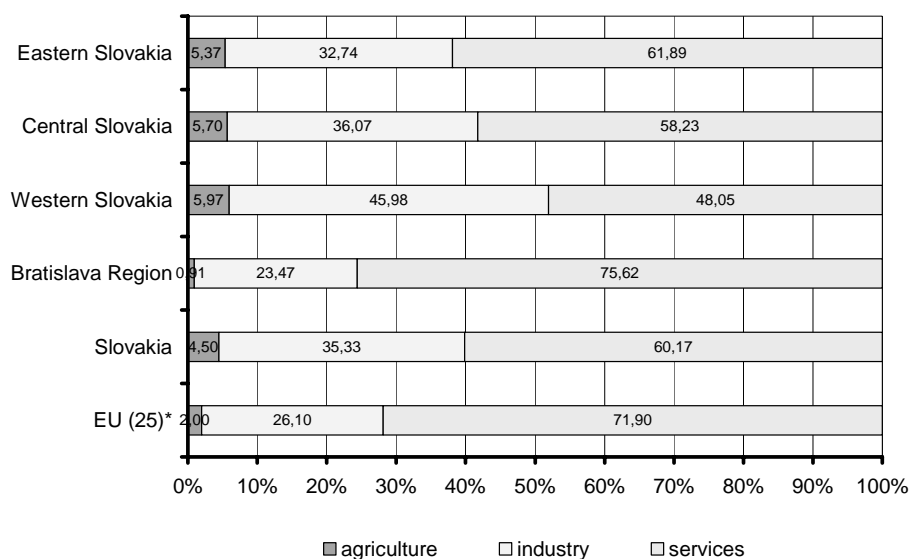
*Figure 2: Percentage of GDP EU average*

Source: Eurostat

If the Slovak economy grew faster than the economy of Eastern Slovakia, regional economic performance of Eastern Slovakia would never reach national average. In other words, regional disparities in Slovakia would never disappear. The situation of Eastern Slovakia can change only after eliminating existing structural and peripheral disadvantages, which by itself is not security for convergence.

### ***Regional Economic Structure***

Structure of economy can be analyzed for instance by using the share of each sector's value added in GDP or share of employment in sectors.



\* EU(25) data available for 2003 only, EU(27) not available

Figure 3: Regional Economic Structure in 2004

Source: Eurostat, calculations done by the authors

Comparing the structure of economy of Eastern Slovakia to other regions of the country, we can say that its structure is the best after Bratislava Region and is comparable to the EU average. The share of agriculture (including forestry and industry) is about 5,4%; industry and construction about 32,7% and services about 61,9%. It is remarkable that the share of services in GDP, which is above the national average still doesn't reach the EU-25 average.

Let's take a look at a more detailed view of economic structure of Eastern Slovakia. The next figure shows share of each sector's gross value added in GDP:

In Fig. 4 we can see, that the share of manufacturing in GDP is declining, while the share of wholesale, real estate and almost all kinds of services is increasing.

The other way of analyzing economic structure can be done by using share of each sector's employment in GDP. The numbers obtained by one method will probably differ from the numbers obtained by the other method. Comparing the both numbers we get a picture of correspondence of employment with added value in GDP in each of the sectors.

According to the chart in Fig. 5 *agriculture* (including hunting and forestry) creates about 6% value added in GDP. The share of agriculture in GDP during the whole period has been stable, while the proportion of employees in agriculture on total employment has decreased. Before 2002 the ratio of employment in agriculture was higher than share of agriculture in GDP. The cause of such development could be explained by improving labor productivity in the field of agriculture.

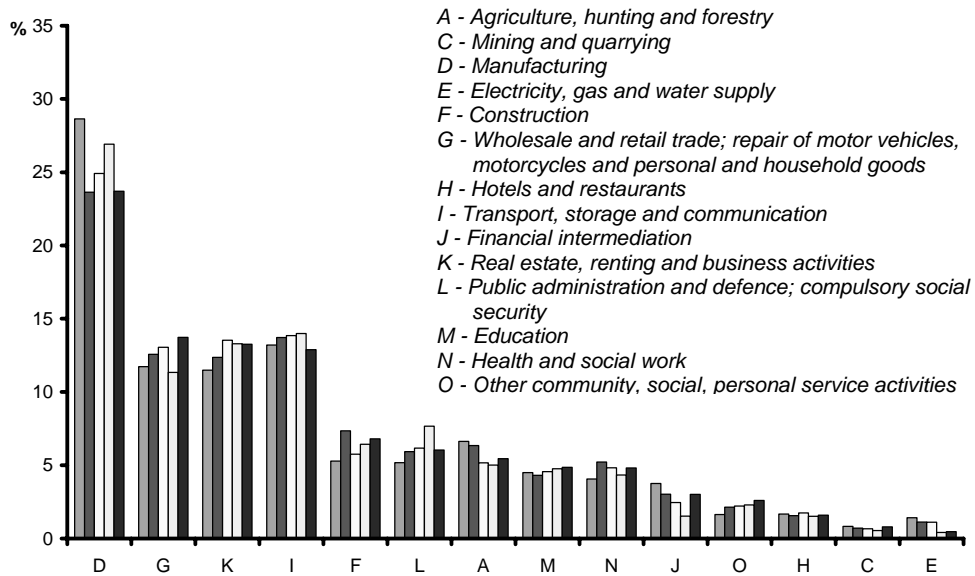


Figure 4: Regional economic structure of Eastern Slovakia (gross value added in GDP)

Source: Eurostat, calculations done by the authors

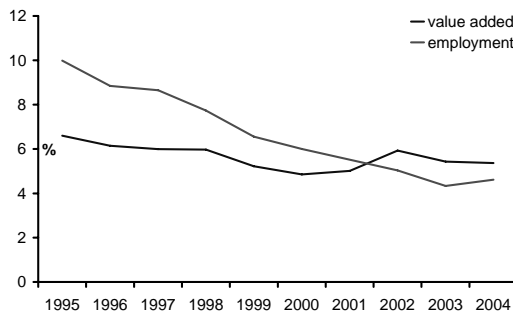


Figure 5: Agriculture, hunting and forestry  
Source: Eurostat, calculations done by the authors



Figure 6: Manufacturing  
Source: Eurostat, calculations done by the authors

One of the most important sectors for Eastern Slovakia is *manufacturing* (see Fig. 6). The trend of manufacturing's share in GDP shows some cyclical pattern and is declining over the period. Also its share of employment in total employment is declining.

*Wholesale and retail trade* (including repair of motor vehicles, motorcycles and personal and household goods) is probably sector with the fastest growth rate of employment in the sector – as shown in Fig. 7. Share of employment in wholesale in total employment was about 10% in 1995 and about 15% in 2004. The share of value added in GDP of this sector was stable – about 12 – 14% during the period.

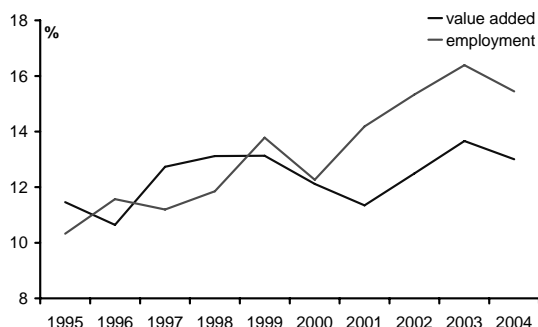


Figure 7: Wholesale and retail trade  
Source: Eurostat, calculations done by the authors

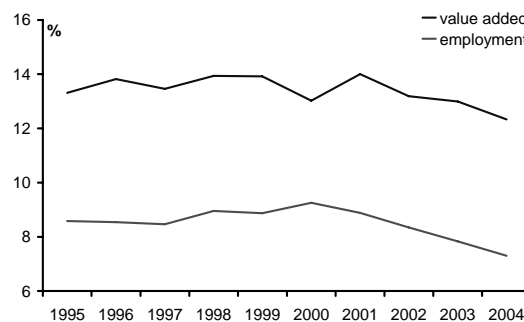


Figure 8: Transport, storage and communication  
Source: Eurostat, calculations done by the authors

*Transport, storage and communication* – as shown in Fig. 8 and *real estate* (including renting and business activities) – as shown in Fig. 10 are sectors with much greater share of value added in GDP than sectors' share in employment. Both sectors show stable shares in GDP as well as in employment during the whole period.

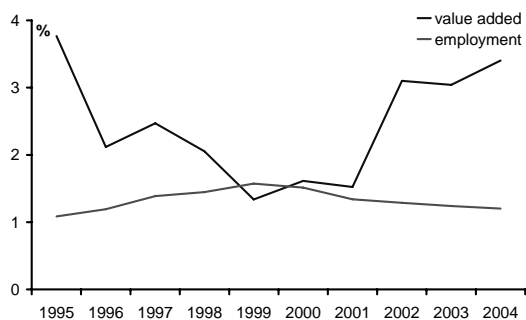


Figure 9: Financial intermediation  
Source: Eurostat, calculations done by the authors

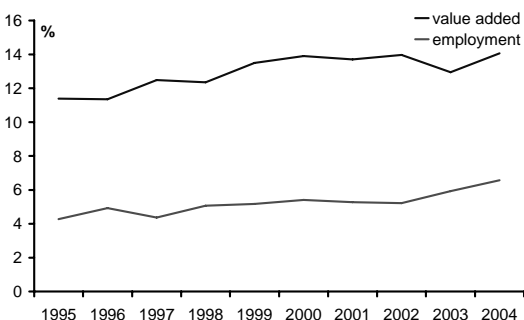


Figure 10: Real estate  
Source: Eurostat, calculations done by the authors

The last sector to be discussed in this paper is *financial intermediation*. Share of employment of this sector in total employment was stable – about 1%. Its share of value added in GDP declined more or less slightly from about 4% in 1995 to about 1,5% in 2001. We can then notice sharp increase in 2002 – from 1,5% in 2001 to over 3% in 2002. Such development can be reasoned by the process of bank sector restructuralization.

#### **Foreign Direct Investments in Eastern Slovakia**

We could say that inflow of foreign direct investments (FDI) to a certain region might be one of the indicators of an improved environment of the region. The next figure shows volume and inflow of FDI to Eastern Slovakia.

The inflow of FDI to Eastern Slovakia increased slightly from 1996 to 1999. In November 2000 the ownership of the complete metallurgical operation of the East Slovakian Steelworks was successfully transferred to the U. S. Steel Group, then a unit of the USX Corporation (now the United States Steel Corporation). That's the reason why the growth of FDI volume was so sharp in 2000.

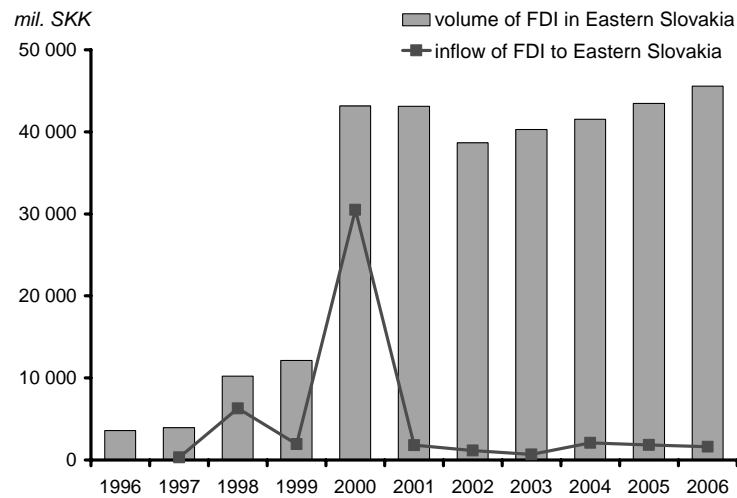


Figure 11: Volume and inflow of FDI to Eastern Slovakia  
Source: National Bank of Slovakia, calculations done by the authors

Now we can take a look at the sector distribution of FDI in Eastern Slovakia:

Table 2: Sector distribution of FDI in Eastern Slovakia in 2002 – 2005

| Industry           | Branches ranked according to three criteria |      |                    |      |                        |      |
|--------------------|---|------|--------------------|------|------------------------|------|
|                    | Number of investments                       | Rank | Newly created jobs | Rank | Investment in mil. EUR | Rank |
| Aubomobile         | 6   | 1    | 2811               | 1    | 367,35                 | 1    |
| Machinery          | 5   | 2    | 353                | 5    | 26,3                   | 6    |
| Wood and furniture | 3   | 4    | 262                | 6    | 110,4                  | 2    |
| Chemical           | 4   | 3    | 417                | 4    | 16,5                   | 7    |
| Textile            | 1   | 5    | 25                 | 13   | 0,1                    | 12   |
| Electrotechnical   | 1   | 5    | 200                | 8    | 4,5                    | 10   |
| Shoemaking         | 1   | 5    | 500                | 3    | 13                     | 8    |
| Construction       | 1   | 5    | 40                 | 11   | 1                      | 11   |
| Plastics           | 3   | 4    | 1343               | 2    | 47,76                  | 3    |
| Metal              | 1   | 5    | 100                | 9    | 38                     | 4    |
| Paper              | 1   | 5    | 125                | 10   | 37                     | 5    |
| IT                 | 1   | 5    | 220                | 7    | 6,6                    | 9    |
| Metallurgical      | 1   | 5    | 30                 | 12   | 4,5                    | 10   |
| Development Centre | 1   | 5    | 20                 | 14   | N/A                    | N/A  |

Source: HUDEC et al., 2006a, p. 21

From the figures in Tab. 2. we can see that the most of the investments between 2002 and 2005 were directed to automobile industry. Investments in the industry created over 2800 new jobs and the total amount invested was about 367 mil. EUR.

Over 1340 new jobs were created in plastics industry with the total investment about 50 mil. EUR and about 110 mil. EUR were invested in wood and furniture industry, while about 260 new jobs were created.

## 2. The Innovation Environment in Europe and Eastern Slovakia

Innovation plays central importance in the development of knowledge-based economy. There exists significant research that demonstrates how high levels of innovation activities influence rate of economic growth, business activity, national and regional competitiveness and others economic values.

However, the measurements of innovation performance are limited to available data and indicators.<sup>1</sup> The main sources of the data useful for the description of innovation performance are OECD, Eurostat and national and regional surveys. At the European level, a big effort has been done by the European Commission to observe the innovation capacities of Member states/regions/sectors through the annual innovation trendchart and European Community Innovation Surveys (CIS), which gives the picture of the relative strengths and weaknesses of the innovation indicators in Member States/regions/sectors<sup>2</sup> in order to fulfill the targets of the Lisbon strategy.

There are several approaches to describe the regional innovation potential according to the selected innovation indicators. The selection of such benchmarking indicators is determined by the available statistics at regional level and by the specific dimension of innovations.

The last European Regional Innovation Scoreboard (2006 RIS)<sup>3</sup> revised in January 2007 provides data of 208 regions including the regions of the new member states. The number of compared indicators was reduced from 13 (2003 RIS) to 7, which are good available on the regional level:

1. Human resources in science and technology – core (% of population)
2. Participation in life-long learning per 100 population aged (25-64)
3. Public R&D expenditures (% of GDP)
4. Business R&D expenditures (% of GDP)
5. Employment in medium-high and high-tech manufacturing (% of total workforce)
6. Employment in high-tech services (% of total workforce)
7. EPO patents per million population

Mentioned indicators, compiled with Eurostat data, enable a comparative overview of each region's performance against the EU average.

The RIS 2006 used a composite indicator to identify the best and worst performing region for each country. From this point of view the best performing Slovak region is "Bratislava – region (Bratislavský kraj)" (on rank 29) and the worst performing is "Eastern Slovakia (Východné Slovensko)" (on rank 189).

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<sup>1</sup>Methodology problems of innovation indicators contains Trend Chart Methodology Report 2006 [http://trendchart.cordis.lu/scoreboards/scoreboard2006/pdf/eis\\_2006\\_methodology\\_report\\_missing\\_indicators.pdf](http://trendchart.cordis.lu/scoreboards/scoreboard2006/pdf/eis_2006_methodology_report_missing_indicators.pdf)

<sup>2</sup> European Innovation Scoreboard, European Sector Innovation Scoreboard, European Regional Innovation Scoreboard etc.

<sup>3</sup> [http://trendchart.cordis.lu/scoreboards/scoreboard2006/pdf/eis\\_2006\\_regional\\_innovation\\_scoreboard.pdf](http://trendchart.cordis.lu/scoreboards/scoreboard2006/pdf/eis_2006_regional_innovation_scoreboard.pdf)

There are several problems in analyze of the innovative capabilities of regions. We can summarize them in follow way:

- According to NUTS classification there are large differences in the size (population, economic indicators) of compared regions<sup>4</sup>.
- Countries are divided in different size of regions.
- Different availability of data in regions.
- The regional data delayed behind national data.

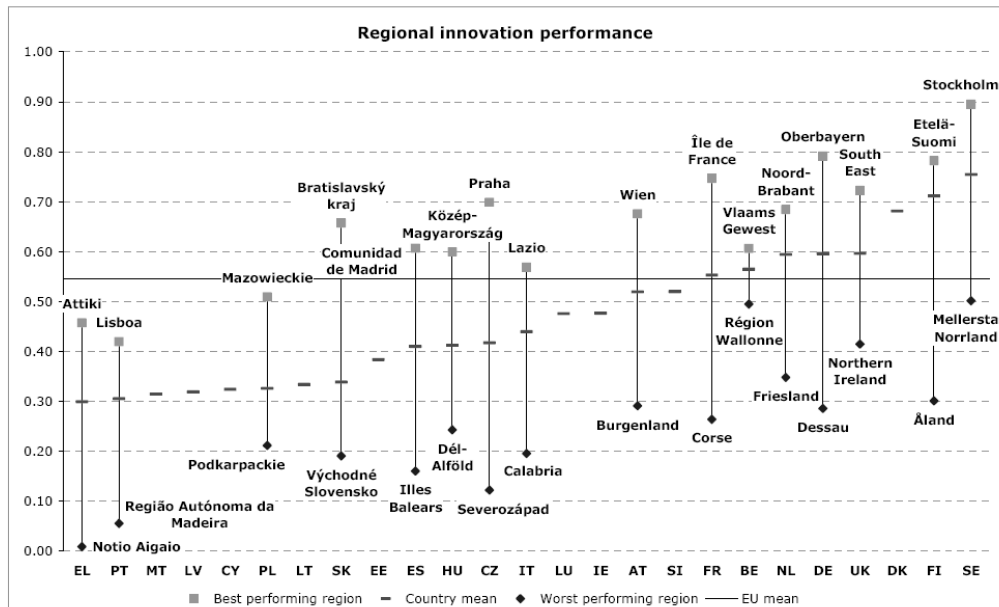


Figure 12: Regional innovation performance in EU

Source: European Regional Innovation Scoreboards 2006, European Commission

### ***Innovation performance of Eastern Slovakia***

Regional innovation capability of Eastern Slovakia seems to be weak according to input indicators such the employment in high-tech sectors and R&D expenditures. Rate of researchers in Eastern Slovakia is about 17,12 % of the total researcher in Slovakia, there are only 2,5 researcher per 1000 inhabitants and their monthly salaries are lower than Slovak average. Although in the region are several educational institutions located (e.g. Technical University) serious problem is lack of tertiary educated human resources who move into regions with higher economic performance and higher salaries. The number of tertiary educated people is about 2,6 per 1000 inhabitants (Slovak average 5,4/1000 inhabitants).

The region miss the direct regional Technology foresight and innovation in region. Wide scale of stakeholders and foreign partners will be included into this RIS project. The RIS will be finished by the end of 2009.

Identification of RIS objectives and its implementation can be the basis for enhancement of innovation activities in the region. Important could be the document obligatory force for involved partners and regular evaluation of the implementation process.

<sup>4</sup> This can create anomalies, such as a small region doing comparatively well on a indicator because a single innovative firm or public research institute is based there (RIS 2006)

RIS, although there have been prepared several documents, which included the innovation policy objectives (Regional operation program, Regional development plan for Eastern Slovakia, Social and economic development plan for Košice-region etc.).

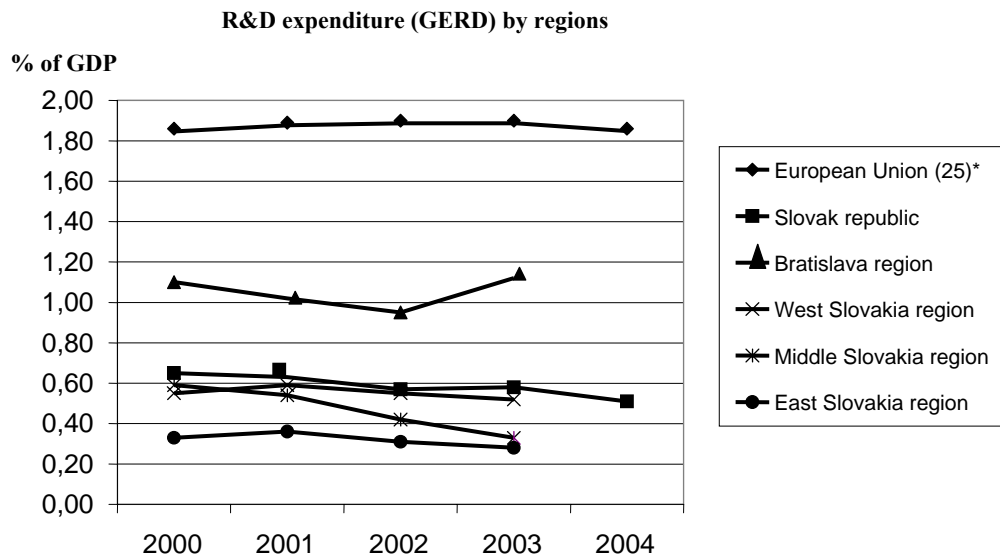


Figure 13: R&D expenditures in Eastern Slovakia

Source: Eurostat, graphic made by author

Since 2005 there was established cooperation between regional government and regional education institution (Technical University of Košice) targeted to develop RIS for Košice-Region. There is preparing common RIS for Košice- region and Northern Hungary and not for the whole Eastern Slovakia. The Prešov –region is preparing its own RIS. The common bilateral RIS is preparing with the support of the Sixth Framework Program NORRIS. Nowadays there is realizing qualitative and quantitative survey about present state

We can define as the main problems of low regional innovation capacity in Eastern Slovakia following issues:

1. Insufficient financial resources for innovation. (dependence on EU funds, lack of risk capital)
2. Missing innovation tradition (in public, private sector)
3. Brain drain of potential innovation holders
4. Missing innovation strategy (Technology foresight, RIS)

There are broad possibilities for regional governments to influence regional innovation capability. The main opportunities for innovation policy in Eastern Slovakia could be e.g. using of EU funds: - RIS preparation based on regional partnership and coordination with RIS of Prešov region, development of Partnership public – private sector (example IT Valley in Košice region), improvement of regional innovation governance system, attracting of FDI – investors in high-tech sector (Industry park Kechnec, international R&D park Prešov-Košice-Miskolc), human resources development (e.g. Support of study programs related to IT) and improvement of innovation support infrastructure (including financing support mechanism, hard infrastructure etc.)

### 3. Conclusions

There exists positive relation between innovative and economic performance, in particular in regions with low per capita income, the support of innovation could become driver of regional development. Eastern Slovakia shows the lowest level of economic performance in Slovakia. The regional policy can influence innovation activities using several policy instruments. The strategic documents (RIS, Regional Technology Foresight) play a crucial role the effectiveness of governance structures related to innovation policy.

Eastern Slovakia is lagging behind in innovation performance, but there exist several important opportunities, that could have significant impact on its innovation potential in the future.

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**Richárd Kása**

## **New Production Factor in Economics – Innovation and the New Economy**

### **1. New Economy**

#### *Changing in Terminology*

Famous economists have started to mention recently a new economical stream, the so called New Economy which puts production into brand new frames after the industrial capitalism. Even more of them argue that the last 20 years have made critical and significant structural changes in terms of economical production and the hegemony of the old trinity of land-capital-labor seems to be falling down. (LANDFELD, 2000). Many favourable conditions has contributed to change the industrial capitalism into something different. In the economic centers the real GDP is skyrocketing, such as the production efficiency, productivity, the profitability and the investment inclination is increasing while the rates of inflation and the unemployment seems to get lower as the income distribution is smoothening and there is a long-term boom in stock markets. All these changes have basicly changed the economic space with all the effect of globalisation, stimultion of international competition and the many new advanced management methods which cause cost reduction and efficiency in the long run (LANDFELD, 2000).

The new economy and the accompanying favorable economic conditions it have been the subject of considerable attention in the media, on Wall Street, among economists, at central banks and in government agencies. Although some seem to take it on faith that there is a permanent change in the economy powering the current expansion and stock-market climb, many are scouring economic statistics for evidence on the importance of this new economy to economic performance and whether there really has been a fundamental and lasting change in the structure of the economy. (LANDFELD, 2000).

The term “new economy” was developed by the economy press to nominate two trends in world economy which can be observated pretty nice for a certain time (SHEPARD, 1997).

The first one is the business globalisation. That means that after the collapse of socialism capitalism rule the world. Simply explained, this means that, after the collapse of socialism, capitalism is spreading around the world. Markets are being introduced, and trade and capital flows are being deregulated. International trade and investment now play a greater role in each country’s economic policy than 15-20 years ago. (POHJOLA, 2002).

The second trend is the revolution in information and communication technology. Its driving forces are rapid improvement in the quality and sharp decline in the prices of ICT equipment and software, the convergence in communication and computing technologies and the swift growth in network computing. The ICT revolution has been going on since the invention of the transistor in the late 1940s. But given that computer prices have been declining at rapid rates for the past 50 years, what makes the late 1990s so different from the earlier periods that the use of the phrase ‘New Economy’ is justified. Three explanations can be given. First, a technological breakthrough seems to have occurred in the mid-1990s in semiconductor manufacturing as this industry shifted from a three-year product cycle to a two-year one (JORGENSEN, 2001).

#### *Is That Real?*

Among the central questions being asked about the new economy are: Is it real, or is it an illusion of measurement? Does it represent a fundamental and lasting change in the structure of the economy, or is it the result of a number of temporary phenomena? Can we accurately measure the new economy?

The answers to these questions are important because if it is real, structural, and likely to last, then there are major implications for: tax and spending projections; the funding and allocation programs; technology policy; regulations, laws, and tax rules affecting saving; investment in physical and human capital, R&D, financial markets, and the Internet; understanding of the sources of growth and productivity. (LANDFELD, 2000).

However we can still ask what can be that factors in economics characterising new decade in economy. The real price depression ? ICT prices have been falling since the 1960, so that cannot be adequate answer. So what else? Three answers seem to be:

First, a technological breakthrough seems to have occurred in the mid-1990s in semiconductor manufacturing as this industry shifted from a three-year product cycle to a two-year one. (JORGENSEN, 2001).

The second explanation is the increase in network computing due to the rapid diffusion of a widespread information infrastructure - the internet. It is in fact the first truly global marketplace and hence the factor that links together the two broad trends defining the New Economy, namely the globalization of business and the revolution in information and communication technology. The Internet is integrating markets and linking together people across all kinds of traditional boundaries. (POHJOLA, 2002).

The third explanation for the interest in the NE is the fact that labour productivity appears to have picked up in the United States in the mid-1990s. The growth of output per hour worked in the non-farm business sector accelerated from around 1.4 per cent per annum before 1995 to 2.5 in the period 1995-2000. It is interesting that service industries seem to have accounted for much of this acceleration. For example, wholesale and retail trade as well as telecommunication services have all had increases in labour productivity which are greater than for the economy as a whole. In their survey of the debate, Baily and Lawrence (2001) conclude that IT innovation has been driven by the demand for improved technologies in the using industries and that in the United States competition in the service industries, often on a global scale, has encouraged them to seek out new technologies to improve their own productivity. (POHJOLA, 2002).

#### *Innovation – Knowledge – ICT*

In the pursuance of my research I deduce the new production factor – innovation out of corporative knowledge and obtained to answer how affect this knowledge at organisations on innovation inclination and ability, how affect the employment-knowledge on innovation potential. I examine the cause of innovation distribution: researching the main cause of innovation inclination and potential.

## **2. Empirical Research**

### *Path-model*

Making the research I have used among the usual firm-questionnaires a special one for all experts of a company to examine the expert competences.

I have used two kinds of questionnaires in the following chapters and gained more than 150 statistical variables:

1. General data
2. Human resources
3. Creditors & debtors
4. Innovation
5. Financials
6. Management
7. Expertcompetences

The so-gained statistical substance after some forthcalculations consists of 179 variables as a total. During the research my base assumption was the path modell, built out of five regression models with 23 variables. After the adequate calculations the significant modell is created with the significant paths, and the level of "R" is also indicated with a 95% of significancy level representing the strong and avarage connections.

ICT has a two way assumption on innovation potential. This is the two additive part of the Pearson-linear-rank-zero correlation coefficient.

So let's see what are the consequences drawn from the path modell. Indicated in figure 3.

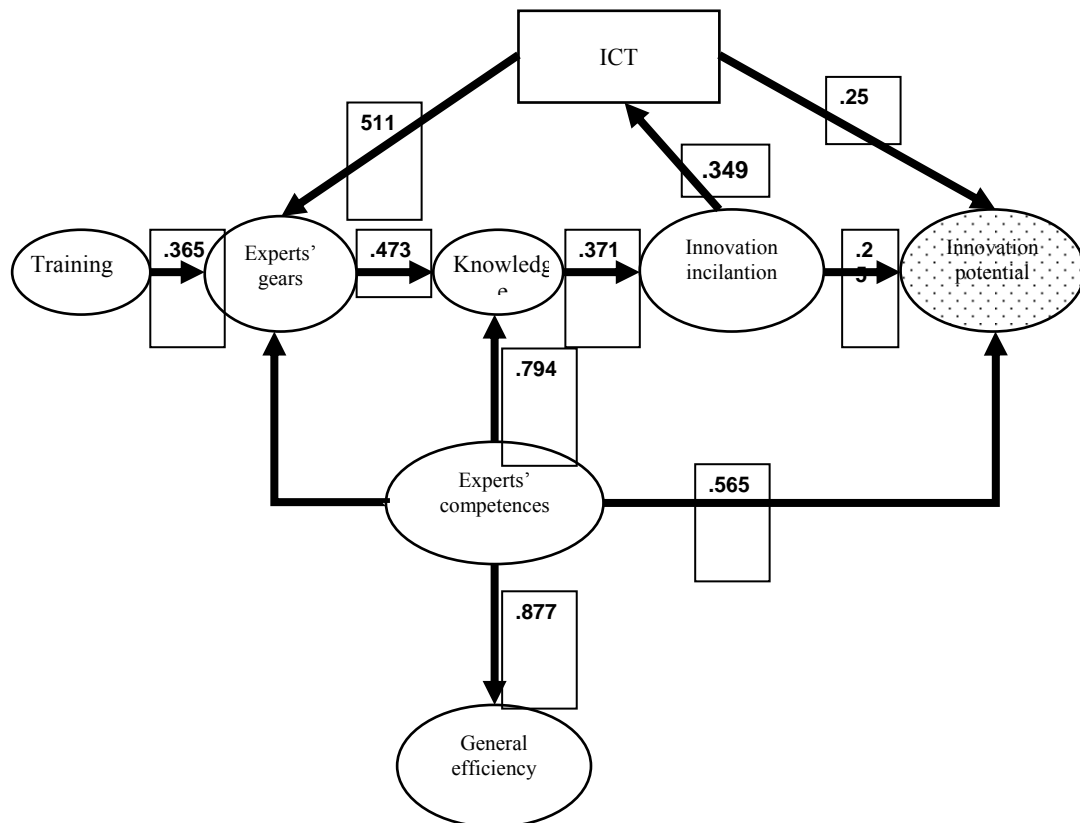


Figure 3: Significant connections in my path modell indicated the intensity

As all of the correlation coefficients are greater than zero, arrows represent cause and effect situation. That means that ICT engagement has a direct link to the innovation potential through the expert gear of a company leveraged the knowledge as well. If I cut out the concerning part of the modell, the following figure is arisen which gives a better adaptation of the above mentioned cause-effect connections.

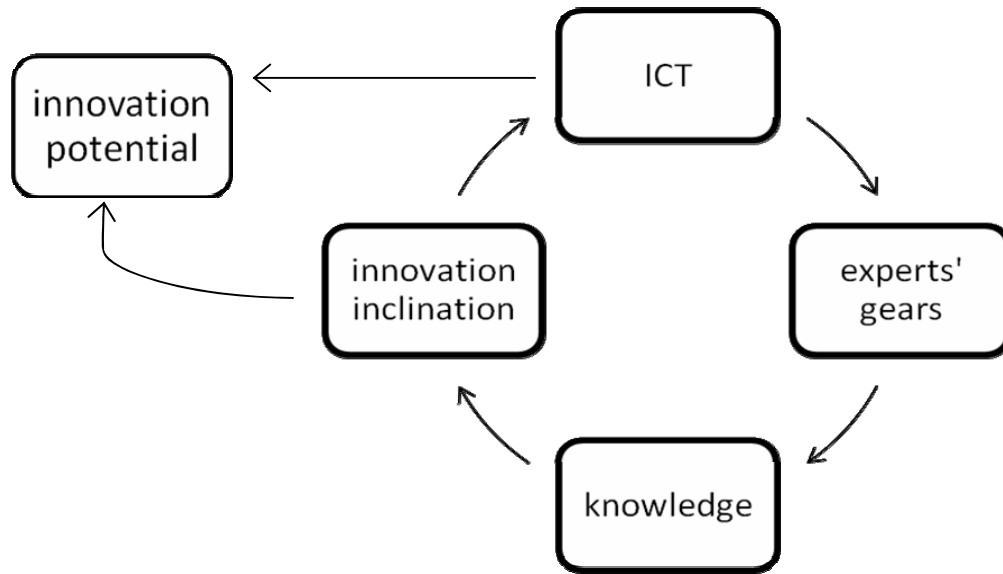


Figure 4: Casualty extract from the path model

#### *Innovation Obstructives*

The second great part of my research is the innovation obstructives. I would like to prove my hypothesis that says: not all kind of innovation needs financial cover. For this problem I had to make differency between sorts of innovation, and I used factor analyse as a method for this and the following datas were extracted with the factor component weight indicated:

|                    |                        |       |
|--------------------|------------------------|-------|
| Soft<br>innovation | •New production method | 0,810 |
|                    | •New market acces      | 0,704 |
|                    | •New acquiring markets | 0,778 |
| Hard<br>innovation | •New product/service   | 0,549 |
|                    | •New organisation      | 0,883 |

Figure 5: Factors of created innovations (KMO=0,610;  $\chi^2=37,141$ ; sig.=0,000)

### Hard Innovation

Detecting the innovation barriers I did a K-mean-cluster analysis. In the first session hard innovation and financial barriers are involved as statistical variables. The clusters came out of four centers, and the separated cluster number is also four which is shown below.

The most interesting group for us is the 4<sup>th</sup> with its 33 firms this is the congestion point of the graph. It means, that those firms who has financial obstructives are not able to manage and adopt innovations.

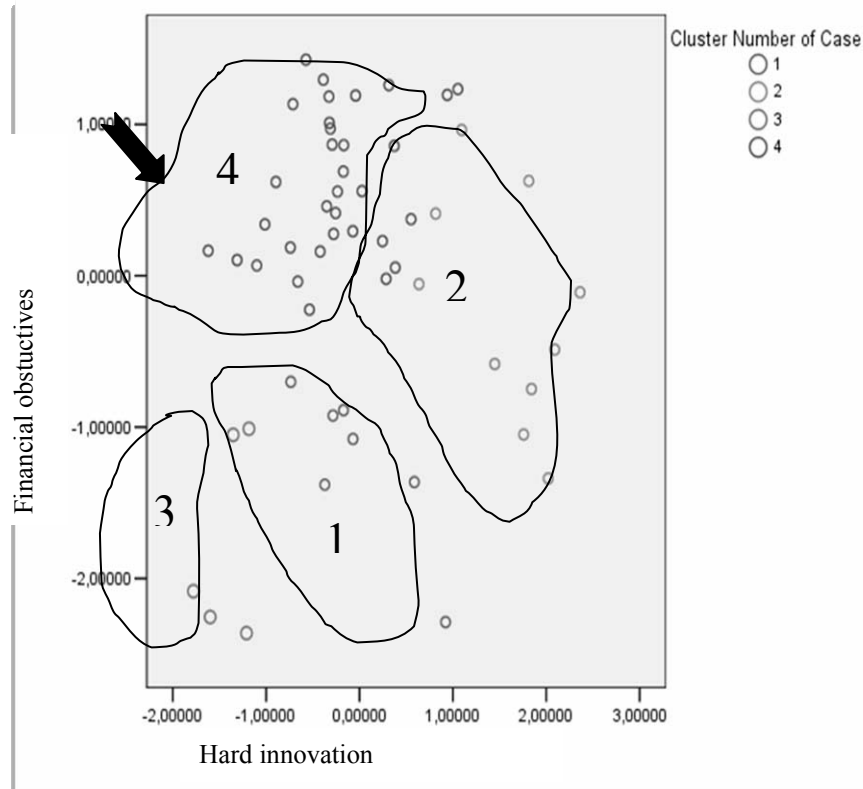


Figure 6: Hard innovation and financial obstructives

### Soft Innovation

Doing the same methodology with the same parameters on soft innovation the picture has changed. The following clusters are drawn:

Members of the first cluster are keen on doing innovation as they have no financial obstructives. The second cluster members cannot manage innovations, however no financial barriers exist in their lives. The third group can manage and adopt innovations nevertheless hard obstructives they have. But these are “only” soft innovations.

Comparing the congestion points at the two above graph we can make an important conclusion: hard innovations are money indicated, but soft ones need not as more financials as hard ones.

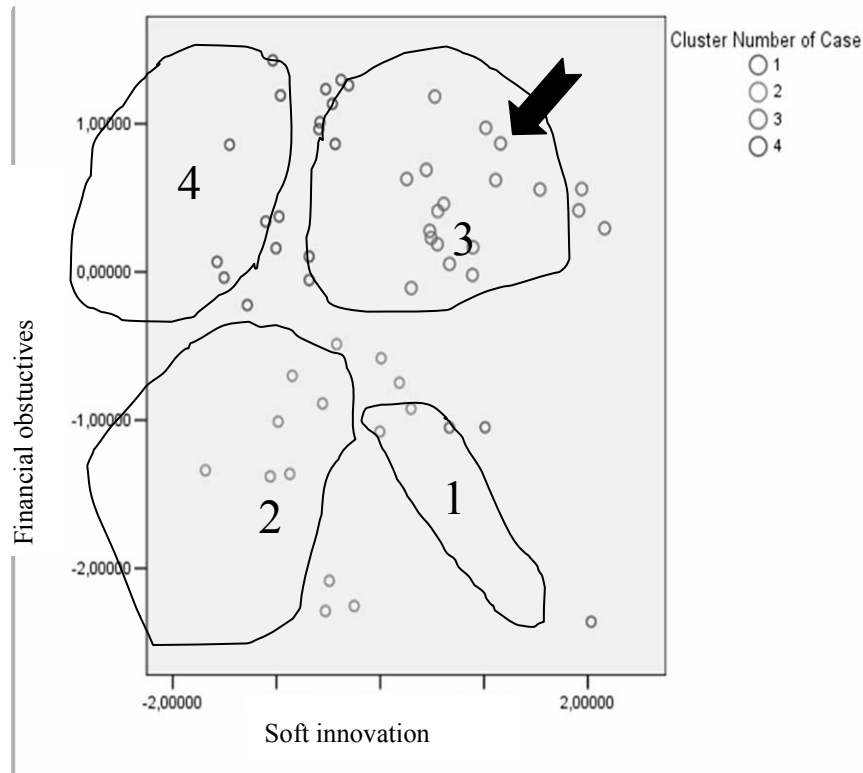


Figure 7: Soft innovation and financial obstructives

### 3. Leadership styles and Innovation

#### *Lewin's Leadership styles*

Kurt Lewin and colleagues did leadership decision experiments in 1939 and identified three different styles of leadership, in particular around decision-making.

#### *Authoritarian Leadership (Autocratic)*

Authoritarian leaders provide clear expectations for what needs to be done, when it should be done, and how it should be done. There is also a clear division between the leader and the followers. Authoritarian leaders make decisions independently with little or no input from the rest of the group.

Researchers found that decision-making was less creative under authoritarian leadership. Lewin also found that it is more difficult to move from an authoritarian style to a democratic style than vice versa. Abuse of this style is usually viewed as controlling, bossy, and dictatorial. Authoritarian leadership is best applied to situations where there is little time for group decision-making or where the leader is the most knowledgeable member of the group.

#### *Participative Leadership (Democratic)*

Lewin's study found that participative (democratic) leadership is generally the most effective leadership style. Democratic leaders offer guidance to group members, but they also participate in the group and allow input from other group members. In Lewin's study, children in this group were less productive than the members of the authoritarian group, but their contributions were of a much higher quality. Participative leaders encourage group members to

participate, but retain the final say over the decision-making process. Group members feel engaged in the process and are more motivated and creative.

*Delegative (Laissez-Fair)*

Researchers found that children under delegative (laissez-fair) leadership were the least productive of all three groups. The children in this group also made more demands on the leader, showed little cooperation, and were unable to work independently. (SZINTAY, 2004).

In this aspect the distribution of firms is as follows. The democratic style has almost a 2/3 hegemony and half of it is autocratic. Delegative style has only 11%.

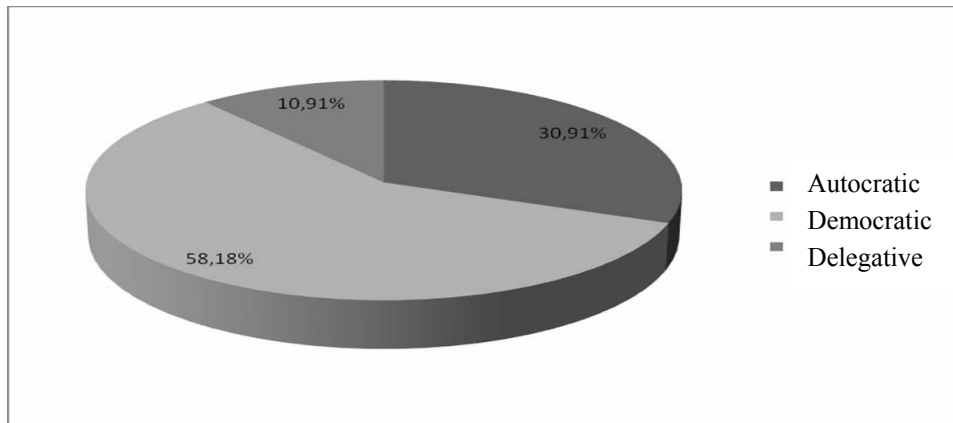


Figure 8: Lewin's styles distribution

Looking at the leadership styles and the total created innovations the following graph can be drawn.

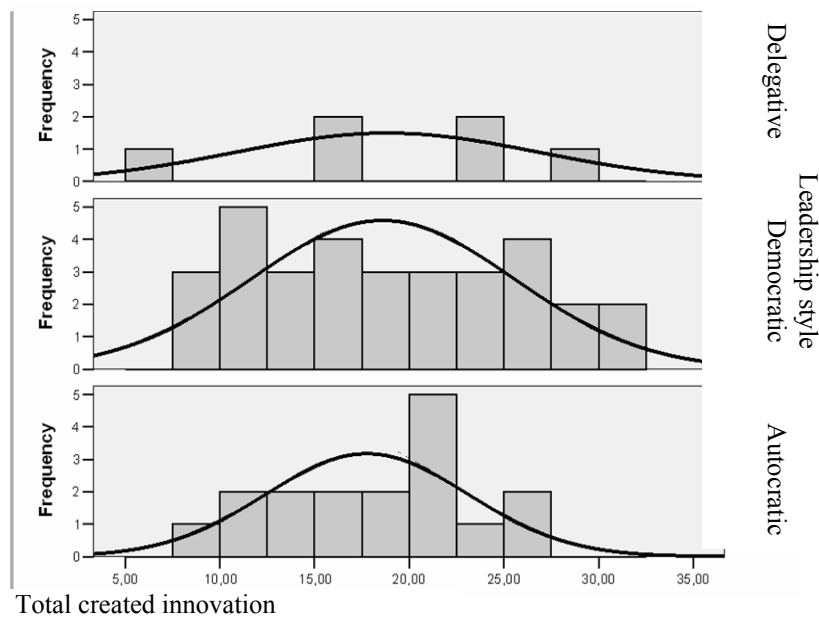


Figure 9: Lewin's styles and innovation

It nicely seems, that democratic firms can produce the greatest amount of innovation while autocratic style firms are on the third place.

### ***Hersey and Blanchard leadership styles***

This form of leadership changes to reflect the situation. This is because situational leadership theories believe that a leadership style will be more effective if it can be tailored to the situation. In the Hersey and Blanchard model the leader changes their style to suit the follower/direct report.

Hersey and Blanchard divided leadership styles into four types. In each of the leadership styles, the amount of direction and support (provided to the follower) is different;

- S1 Telling/Directing; the follower is monitored closely by the leader, their tasks are defined by the leader and the leader will make decisions. Communication is one way. Support is low as the follower's commitment is high.
- S2 Selling/Coaching; the leader defines tasks and will make decisions but they invite suggestions from the follower. Communication is two way. Support and direction is high to overcome the follower's lack of competence and commitment.
- S3 Participating/Supporting; the follower will make daily task decisions although the leader will still facilitate decision making. As competence is high, the leader provides little direction. However as the follower needs encouragement, support from the leader is high
- S4 Delegating/Observing; the follower will make decisions and decides how and when to involve the leader. As the follower is highly competent and committed they need little support and direction from the leader.

|                     |      |                           |                     |
|---------------------|------|---------------------------|---------------------|
| supportive behavior | high | style #3<br>Participating | style #2<br>Selling |
|                     | low  | style #4<br>Delegating    | style #1<br>Telling |
|                     |      | low                       | high                |
|                     |      | guidance/task behavior    |                     |

Figure 10: Hersey & Blanchard leadership model

Source: Dr. Szintay István: Vezetélmélet

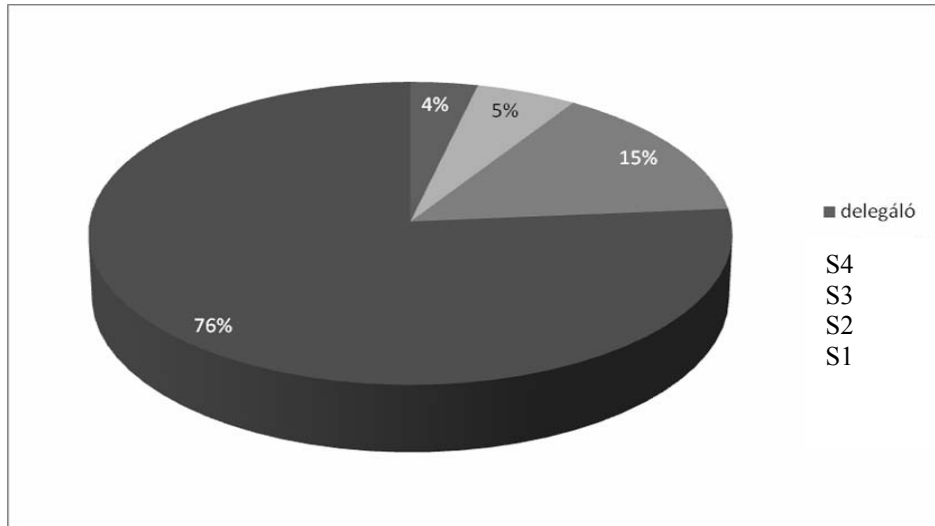


Figure 11: Distribution of firms regarding to innovation potential

Nominating the leader style of the asked firms we can draw the below arrangement of management styles within those companies.

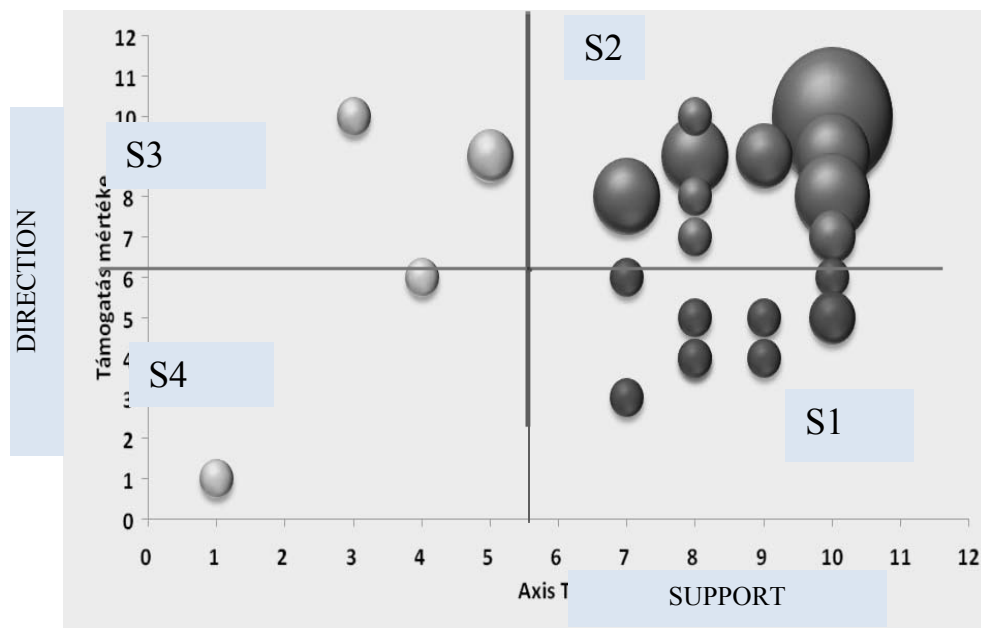


Figure 12: Hersey & Blanchard count of asked firms

It finely seems that S2 has a massive majority (size of the balles in each cell represent the number of firms regarding to that grid). The places of extra axes have been calculated by some statical methods of median of the variable.

Table. 1: Hersey &amp; Blanchard Leadership Styles and Innovation Potential

|                                      |                    |                    | Innovation potential |        |       | Total |
|--------------------------------------|--------------------|--------------------|----------------------|--------|-------|-------|
|                                      |                    |                    | low                  | medium | high  |       |
| Hersey & Blanchard leadership styles | delegating         | count              | 1                    | 1      | 0     | 2     |
|                                      |                    | % within style     | 50                   | 50     | 0     | 100   |
|                                      |                    | % within Inno.pot. | 3,45                 | 6,25   | 0     | 3,64  |
|                                      |                    | % within total     | 1,82                 | 1,82   | 0     | 3,64  |
|                                      | participating      | count              | 2                    | 0      | 1     | 3     |
|                                      |                    | % within style     | 66,67                | 0      | 33,33 | 100   |
|                                      |                    | % within Inno.pot. | 6,90                 | 0      | 10    | 5,45  |
|                                      |                    | % within total     | 3,64                 | 0      | 1,82  | 5,45  |
|                                      | telling            | count              | 8                    | 0      | 0     | 8     |
|                                      |                    | % within style     | 100                  | 0      | 0     | 100   |
|                                      |                    | % within Inno.pot. | 27,59                | 0      | 0     | 14,55 |
|                                      |                    | % within total     | 14,55                | 0      | 0     | 14,55 |
|                                      | selling            | count              | 18                   | 15     | 9     | 42    |
|                                      |                    | % within style     | 42,86                | 35,71  | 21,43 | 100   |
|                                      |                    | % within Inno.pot. | 62,07                | 93,75  | 90    | 76,36 |
|                                      |                    | % within total     | 32,73                | 27,27  | 16,36 | 76,36 |
| Total                                | count              | 29                 | 16                   | 10     | 55    |       |
|                                      | % within style     | 52,73              | 29,09                | 18,18  | 100   |       |
|                                      | % within Inno.pot. | 100                | 100                  | 100    | 100   |       |
|                                      | % within total     | 52,73              | 29,09                | 18,18  | 100   |       |

#### 4. Blake-Mouton Managerial Grid

Concern for People – This is the degree to which a leader considers the needs of team members, their interests, and areas of personal development when deciding how best to accomplish a task.  
 Concern for Production – This is the degree to which a leader emphasizes concrete objectives, organizational efficiency and high productivity when deciding how best to accomplish a task.

Using the axis to plot leadership ‘concerns for production’ versus ‘concerns for people’, Blake and Mouton defined the following five leadership styles.

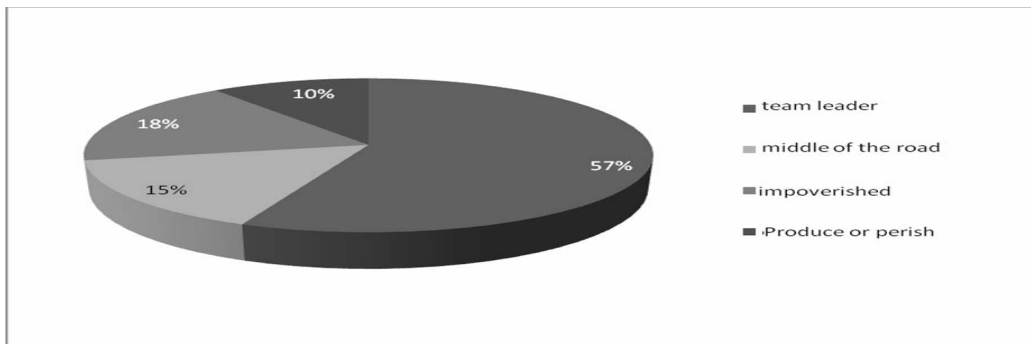


Figure 13: Blake-Mouton managerial grid

Source: Dr. Szintay István: Vezetéstudomány

More than half of the asked companies (57%) has a team leader, other styles have uniform distribution among the rest of the firms.

|                        |        |  |   |   |
|------------------------|--------|--|---|---|
| concern for people     | high   | Country club management<br>Most concerned about the needs and feelings of members of his/her team. Work environment that is very relaxed and fun but where production suffers due to lack of direction and control.                              |   | Team leader<br>Pinnacle of managerial style. Creates a team environment based on trust and respect, which leads to high satisfaction and motivation and, as a result, high production.  |
|                        | medium |  | Middle of the road<br>Balance of the two competing concerns. Neither production nor people needs are fully met. Settle for average performance. |   |
|                        | low    | Impoverished<br>Leader has neither a high regard for creating systems for getting the job done, nor for creating a work environment that is satisfying and motivating. The result is a place of disorganization, dissatisfaction and disharmony. |   | Produce or perish<br>Employee needs are always second-dary to the need for efficient and productive workplaces. This type of leader is very autocratic, has strict work rules, policies, and procedu-res, and views punishment as the most effective means to motivate employees. |
|                        |        | low  | medium  | high  |
| concern for production |        |  |   |   |

Figure 14: Blake-Mouton distribution of asked firms

Table 2: Blake-Mouton styles and innovation at SMEs

|                                |                    |                    | Innovation potential |              |            | Total<br>medium |
|--------------------------------|--------------------|--------------------|----------------------|--------------|------------|-----------------|
|                                |                    |                    | low                  | medium       | low        |                 |
| Blake-Mouton leadership styles | team leader        | % within style     | 50                   | 31,82        | 18,18      | 100             |
|                                |                    | % within Inno.pot. | 52,38                | 63,64        | 57,14      | 56,41           |
|                                |                    | % within total     | 28,21                | 17,95        | 10,26      | 56,41           |
|                                | middle of the road | % within style     | 33,33                | 33,33        | 33,33      | 100             |
|                                |                    | % within Inno.pot. | 9,52                 | 18,18        | 28,57      | 15,38           |
|                                |                    | % within total     | 5,13                 | 5,13         | 5,13       | 15,38           |
|                                | impoverished       | % within style     | 71,43                | 14,29        | 14,29      | 100             |
|                                |                    | % within Inno.pot. | 23,81                | 9,09         | 14,29      | 17,95           |
|                                |                    | % within total     | 12,82                | 2,56         | 2,56       | 17,95           |
|                                | produce or perish  | % within style     | 75                   | 25           | 0          | 100             |
|                                |                    | % within Inno.pot. | 14,29                | 9,09         | 0          | 10,256          |
|                                |                    | % within total     | 7,69                 | 2,56         | 0          | 10,256          |
| Total                          | % within style     | 53,85              | 28,21                | 17,95        | 100        |                 |
|                                | % within Inno.pot. | 100                | 100                  | 100          | 100        |                 |
|                                | % within total     | <b>53,85</b>       | <b>28,21</b>         | <b>17,95</b> | <b>100</b> |                 |

## 5. Summary

Question can be raised: have we really entered into a new decade of economy? Can we call this change ICT or hi-tech revolution, where the old product factors has only a supplementary role and new one take the hegemony? The answer is a massive YES and the mentioned new factor is innovation. I have showed in my research – hereby only a short draft is indicated – what is critical in adapting innovation: susceptibility and commitment.

According to Larry Summers rector of Harward University the NE is based on old values: such as thrift and investment, but principally – just let the market operateing.

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**Gabriela Kol'vecková - Radoslav Tušan**

### **Supply and Demand on Innovation in Eastern Slovakia**

#### **1. Introduction**

The very first thoughts about innovations were published by J. A. Schumpeter (1964) in the work „Theory of economic development“. Schumpeter presents his sight that the cause of economy depression is expansion, which “rolls over” the economy and calls for special way of adaptation to new conditions. Schumpeter illustrates the base of the economic cycles by endogenous causes, but he accepts also the influence of so-called exogenous natural and social factors that can prolong the state of depression. Innovation process is in his opinion dependent upon technical progress and activities of entrepreneurs and innovations are the core of the effective competition. Economic development is base on the changes that arise spontaneous, within the system. This endogenous factor brings up innovations, fundamental changes in the field of technique and technology of production, in the organisation of production and its management. According to Schumpeter the main personality that gives dynamics to the economic system is the entrepreneur, who by his creative activity realizes economic development. The task of the entrepreneur is new combination of production factors – innovation. Schumpeter understands the notion innovation as follows:

1. launching the new product to the market, respectively of the product of new quality,
2. launching the new method of production, which has not been applied till now, although it does not rest on the new scientific findings,
3. discovery of new markets for the products produced irrespective of previous existence of that market,
4. exploitation of the new raw resources,
5. organizational change in production including creation of monopoly, respectively to its repression as an impact of competition.

#### **2. Objective**

Herewith the readers are being informed with results of the survey carried out within the NORTH HUNGARY AND KOŠICE BILATERAL REGIONAL INNOVATION STRATEGY PROJECT - NORRIS project. One of the goals in the project was to describe the situation in the Hungary and Slovak Republic in terms of innovation policy, although the NORRIS project refers to BAZ (BAZ - Borsod-Abaúj-Zemplén, Heves and Nógrád counties) region and Košice region only. This was the reason why the national actors of regional development were presented here as well. Several key regional players, existing Small and Medium Sized Enterprises - SME - support environment and technology providers have already proven their ability to contribute to the regional initiatives related to the Regional Innovation strategy - RIS process, but only with help of the financing of Research and Development - R&D sector by the state.

*The objective included following research questions, which had been examined in time span of December 2006 – March 2007.* In both regions were applied similar methods i.e. 600 questionnaires had been sent out for each region.

*The research question number one was:* “What are the innovation needs and obstacles in Eastern Slovakia?” This question dealt with demand side of the research, while the next one dealt with the supply.

*The research question number two was:* “What are the innovation characteristics for the supply in Eastern Slovakia?” Both questions were answered and assessed by means of qualitative and quantitative methods. There were two types of questionnaires specialized: one for supply and one for demand side.

### 3. Method

As for the demand, in the survey carried out within NORRIS project we examined innovations within sectors (see Table 1: Questionnaire distribution for the demand side) in compliance with the historical given potential, presumption of the Eastern Slovakia area. The number of required questionnaires for the research were set 20 per each sector, apart from mining where we accepted 5 complete questionnaires.

*Table 1: Questionnaire distribution for the demand side*

| Sectors                          | Number of questionnaires | International Standard Industry Classification (ISIC) |
|----------------------------------|--------------------------|---|
| Machine industry                 | 24                       | D28, 29,34  |
| Electrical and optical equipment | 20                       | D30, 31, 32, 33                                       |
| Food industry                    | 25                       | D15   |
| Material production              | 22                       | D23, 24, 25, 26, 27                                   |
| Environment Industry             | 21                       | D37, E40, O90   |
| Wood industry                    | 8                        | D20,21,36   |
| Computer and related activities  | 12                       | K72   |
| Tourism services                 | 11                       | H55   |
| Construction industry            | 11                       | F45   |
| Mining and quarrying             | 8                        | C11,13,14   |

As for the supply, we examined innovations within providers (see Table 2: Questionnaire distribution for the supply side) in compliance with the potential that has been developed in the Eastern Slovakia area since 1989.

*Table 2: Questionnaire distribution for the supply side*

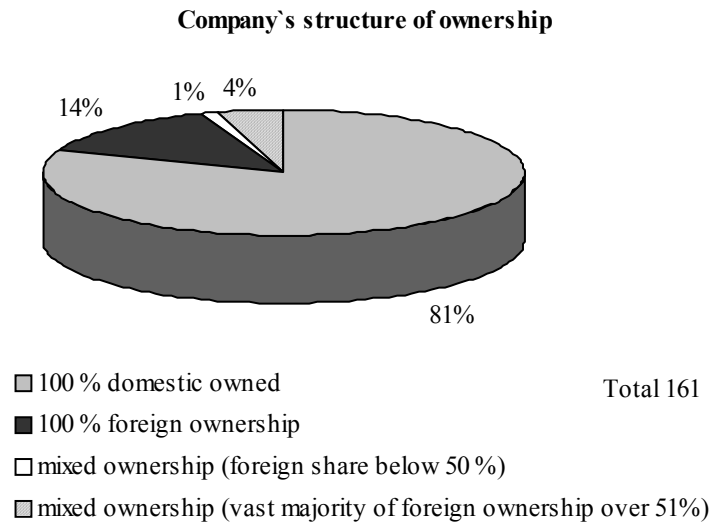
| Organization type              | Number of sample |
|--------------------------------|------------------|
| Technology Providers           | 17               |
| Business Supporting Structures | 10               |
| Public Organization            | 4                |

### 4. Outcomes

#### *What are the innovation characteristics for the demand in Eastern Slovakia - in Košice upper-tier territorial Unit?*

The question in title was partly answered thanks to the questionnaire, which was one task within the NORRIS project. Demand analysis was conducted with the companies, which were anticipated to have innovation potential and at the same time had a historical background for their own development and growth in the Košice region. Also some newly established companies were included into the survey. The survey had used several questions for describing

the respondents. One of the distinctive features was ownership that is shown in Figure 1. Obviously, prevailing share of the companies are domestic.



*Figure 1: Sample description by ownership*

After the respondents were introduced by one of their features, their answers were compiled and presented here.

The crucial part of the questionnaire was query about innovations. The stress was given on innovation needs in all companies from sectors in line with the quota sample provided above. The electrical and optical industry had the greatest desire to innovate, which was also in line with the results from the supply side analysis, where the supporting institutions had shown dominant role in the innovation processes in the Košice region. There was “a match” of demand and supply proven. But still electrical industry is vivid and snappy one, therefore the innovation need was expressed on scale almost 5. The Technicom and IT Valley (mentioned below) is again evidence that this “vehicle” of innovation process was initiated very well. Apart from environment industry that demonstrated its needs as neither important nor unimportant, which was the lowest level among companies from all sectors. An essential outcome of these answers was that none of the respondents declared the innovation needs to be unnecessary or less important (see Figure 2: Innovation needs of the companies in Košice region). Overall judgment on innovation needs was expressed on scale rather as a high importance for most of the sectors.

Even when the company has strong desire to innovate, it cannot be done without invention, i.e. ideas, sources for innovation. Therefore next result of the survey is devoted to answer the question: *On what do you base your need for product innovation?*

It was proved that own ideas and own customers are important for development of innovations in respect to results of the survey. Respondents are less likely to use journals or media for the innovation of their product range. Other sources of information for the innovation needs were presented in Figure 3: The sources of the innovation needs.

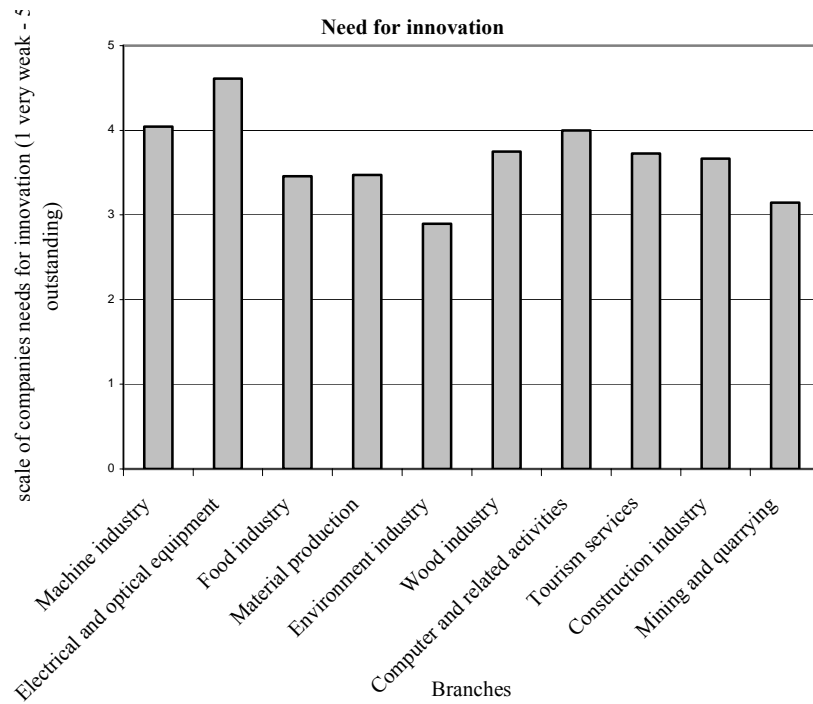


Figure 2: Innovation needs of the companies in Košice region

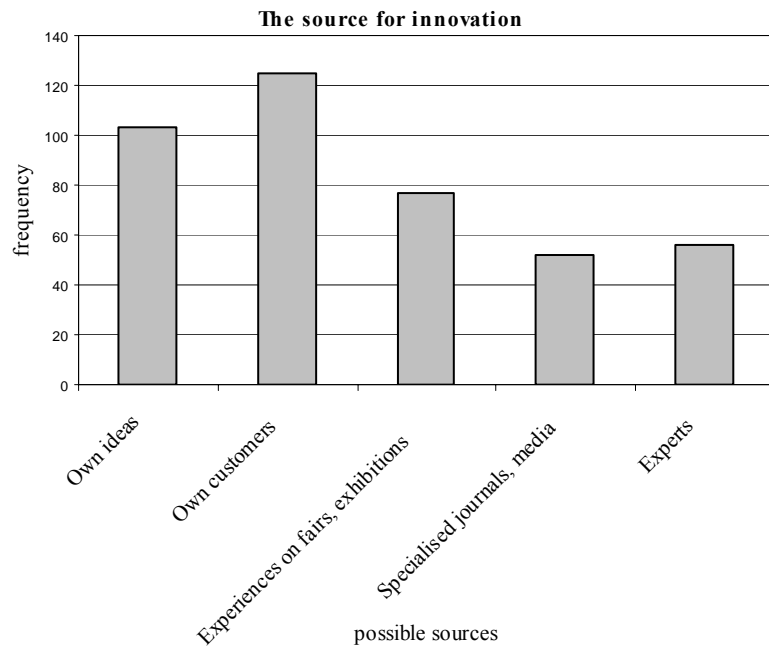


Figure 3: The sources of the innovation needs

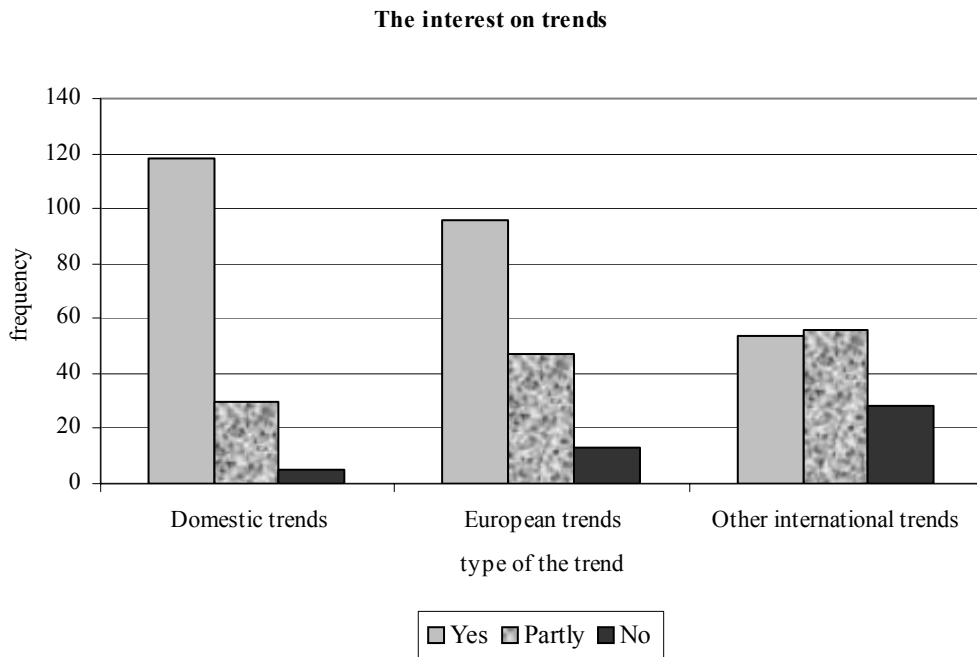


Figure 4: The knowledge of the trends

Watching the competitors or simply observing new trends in the sector can stimulate the source of innovation, such as „own idea“. The next paragraph explains these stimulations for the Košice region.<sup>1</sup>

The knowledge of the trends shown by Figure 4 presents results of another self-evaluating question. The companies revealed their preferences of trend observation. More than 61% of firms indicated to observe European trends in their area of business. On one hand it is surprising that only 37% declared to observe the other international trends. On the other hand this fact is in line with the fact that companies rely mostly on their own capacities and own ideas when developing new products or just bringing to life any kind innovative effort for the sake of their own companies' market success.

<sup>1</sup> „To Schumpeter the fundamental question of business cycles was causation. In causation, he explicitly recognized the importance of external factors. Innovation plays the central role in Schumpeter's theory. He defined it “as the setting up of a new production function. This covers the case of a new commodity, as well as those a new form of organization such as a merger, of the opening up of new markets, and so on.” Innovation is different from invention, which provides the raw material, so to speak, for innovation. The individuals who introduce new production functions as distinct from reproducing old ones and altering the proportions and quantities of factors within old ones are called entrepreneurs. Innovation is more difficult than the ordinary running of a business for it involves a choice not between the tried and the tried but between the tried and the untried. But once the way has been shown it becomes easier for others to do the same thing, to improve upon it, and “to do similar things in similar lines”; the latter two categories represent what Schumpeter called “induced innovation”, though the first presumably is not innovation at all. This provides the explanation for the observed facts that innovations are not evenly distributed over time but come in clusters that they “are not at any time distributed over the whole economic system at random, but tend to concentrate in certain sectors and their surroundings.” (SCHUMPETER, 1964 In: SCHUMPETER, J. A. (1987) Teória hospodárskeho vývoja, Pravda)

To conclude the following can be stated:

- There is a gap in the trend observation, thus there is a need to turn the SMEs' attention towards the international – opened EU market, esp. behind the frontier because the innovation needs might be solved also by the help of foreign companies
- The companies already see customers as another source of the innovation ideas that might be used and broaden
- Any kind of information system created as a companies activity that would enable the personal contacts and quick reaction on the new trends
- The creation of (by business supporting organizations) a platform (e.g. club) for the communication towards the marketable innovations
- A support in the innovation process for the SME's is to follow EU relevant standards (EU standards is a must – the company ought to innovate the machinery in accordance with the norms)
- Accountancy should have more favorable conditions for the purchases of machinery. At present the system is not „SME friendly” (SME's cannot account depreciation and amortization e.g. of machine, however for the SME's this is the key for the development)
- In their own interests the SME's should recognize the need of cooperation with the technology providers using business supporting structures
- Required is permanent and closer cooperation and information changing. More project consideration is needed according to SME's. Introducing of regional universities, and research institutes, FP6 and FP7 for the SME's would be useful.

***What are the innovation characteristics for the supply in Eastern Slovakia - in Košice upper-tier territorial Unit?***

There were identified three groups on the supply side of the innovation process. The groups were: Technology Resource Centres, Business Supporting Structures, Public Organisations.

Technology providers are aware about technology innovations, as: energy safety innovations, alternative energy sources innovations. They are aware about European Framework Program (6.FP, 7.FP).

European programmes were implemented in the region. Slovak Research and Development Agency (APVV) is oriented on basic research, not for innovations.

Few institutions were successful in any national innovation supporting funding in the last years. Political and lobbyist aims are significant marked in area of innovation schemes. Institutes of Slovak Academy of Sciences are aware of importance of basic research grants.

Business supporting organisations - Regional Development Agencies have mostly negative opinion about the availability, accessibility and allocation mechanism of the regional innovation related funds. They declared a lack of suitable mechanism for innovation support. Accessibility of innovation funds is low, more units have no sufficient information about this existence of supporting tools. Agencies declared no legislative support for innovations. Grant financing scheme was realised through national level in some cases.

Bank organisations declared low accessibility of funds for innovations, because of conservative banks' policy. This policy decelerates the inflow of funds into a region.

Within these groups the dominant role was assorted to the following organizations: Slovak Academy of Sciences – SAV and its Institutions and Technical University of Košice and its Faculties and departments: Department of Electrical Drives and Mechatronics, Faculty of Electrical Engineering and Informatics.

Technology providers use to finance their innovation related activities own or domestic resources – funds (Scientific Grant Agency, Slovak Research and Development Agency), and projects of bilateral co-operations. Multilateral grants are involved, as: INTAS, COST,

EUREKA. Less funds inflow is from operation activities and from the sponsorship. Their exploitation of 6.FP funds is very low. They mostly participated in international R+D projects, especially in the last three years.

Business supporting organisations had mostly innovation related assignment in the last three years. Financial resources used to finance innovation activities were their own and EU funds, assigned to entrepreneurs' projects (PHARE, NORRIS).

The figure 1 below describes the relations among the subjects of the innovation suppliers and their objects in the innovation processes. But question that was not clear from this figure was: how do the suppliers know the needs? Obviously, when the Business Support Organizations provides consultancy, it is based on the SME's query. Or is it only single-ended approach - an offer of their services to SME's? As for the analysis of demand side, we found out that 58%<sup>2</sup> of SME's in examined sectors do not contact and do not need their services at all.

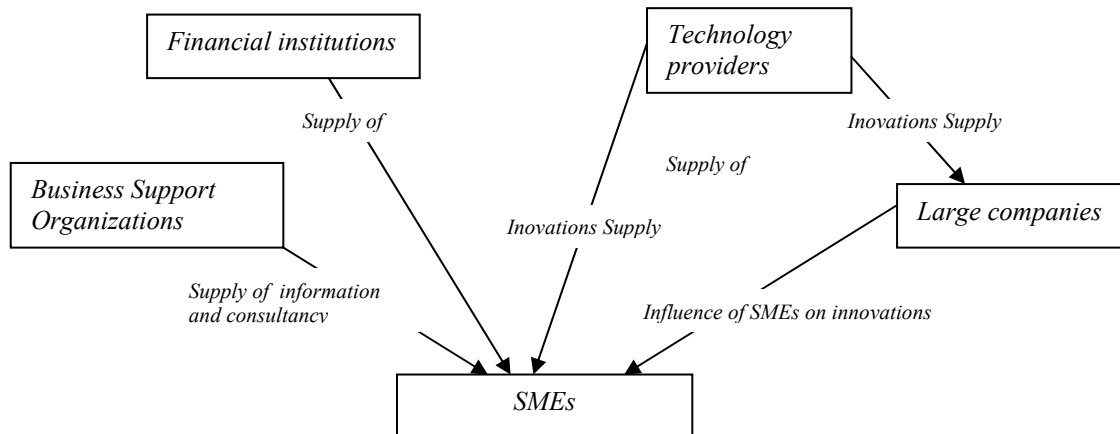


Figure 5: Support activities for innovations in the region

Support of innovations stems from brain, therefore the attitude towards innovations was also examined for the supply side analysis. It was disclosed that the attitude could be assessed from two perspectives. Because the answers of respondents were split and had stated that first group of respondents are strongly goal-oriented towards the collaboration. Their visions are oriented for the cooperation with companies. Second group of respondents does not declare their attitude openly, but express their research programs (e.g. SEGA, KATI, Aeronautics Institute of Kořice, Centre of progressive materials) that are often in collaboration with various institutions. Some respondents have mission and vision "clear", where they express a "freedom of scientific research", creative thinking, which are all factors of systematic implementation into networking within international cooperation. A special group of respondents are technology providers, who carry out the basic research. Their cooperation simply must exist, because their research field is small as well as the amount of companies that use the technology. But the cooperation is rather hidden behind the formal relations nowadays.

The collaboration in general is seen as positive feature that can help building of new capacities such as places to work, laboratories etc.

<sup>2</sup> Question C5.

In the survey was found that each organization claim to have a vision, or mission statement containing reference to innovation. The offer is denoted by new facilities, increased number of projects, etc.

To conclude the analysis of supply side in Eastern Slovakia: An important activity in regards to the RIS was an establishment of the Initiative of the Scientific and Technical Park Východ (TECHNICOM) in 2002, which was created in order to enhance business development and technology transfer at KSK. Technicom is an association created by of the Technical University of Košice - TU Košice, Košice Self-governing Region, Prešov University in Prešov and the city of Košice. In general the association has apart from other also these goals: to build the building in the scientific park and to secure a building permit on the TU campus. A feasibility study was carried out. Moreover, the project on obtaining funds from the EU structural funds was developed. It was based on 13 integrated projects of the research and scientific centres with most prominent companies in Slovakia. Business rules for spin off companies were developed within the TU Incubator. The main task of TU Incubator was to create opportunities to foster business activities at the TU primarily for students, postgraduate students and staff. IT Valley was established in 2007 by ten bodies: Technical University of Košice, University of P. J. Šafárik in Košice, Košice self-governing region, T-Systems Slovakia, Siemens PSE, NESS Slovakia, VSE IT services, Cisco Systems Slovakia, Microsoft Slovakia and Slovak Telekom.

#### ***Some more general remarks towards the supply side***

In order to describe the supply side the individual key players were specified, one by one, in the surveyed area.

In Slovakia, the competence of the field of research, education and information technologies falls under the Ministry of Education though a portion of scientific and research sector policies remains within the terms of reference of individual departmental ministries while the innovation policy falls under the Ministry of Economy. The coordination in scope of this area has been carried out by the Slovak Government Council for Science and Technology as an advisory body of the Government, composed of the representatives of the administration central bodies, and representatives of organizations and workplaces of the research and development, as well as of the representatives of private sector. Although the Ministries work relatively well within their terms of reference, in view of achieving the Lisbon strategy targets, the system showed as little effective. Therefore, the Slovak Government proceeded to set up and then to complete the MINERVA Programme, which is a practical development of Lisbon strategy at the conditions of Slovak Republic.

SARIO - The Slovak Agency for the Development of Investments and Trade (Slovak Ministry of Economy) – provides a wide range of information and consultancy services with the aim to support entities which are interested to invest in Slovakia, and it also provides a service to the Slovak exporters with the aim to give them assistance in their expansion to the world markets. SARIO plays an important role in representing Slovakia as an investment locality of the Central Europe.

NADSME -The National Agency for the Development of Small and Medium-Sized Enterprises (Slovak Ministry of Economy) – The Agency is an association of legal entities, the founders consisting of: the Slovak Ministry of Economy, The Slovak Association of Entrepreneurs, and the Slovak Union of Sole Traders. The Agency provides coordination of all the activities to support small and medium-sized business in Slovakia, including financial ones, on the international, national and local levels. It provides management of the integrated networks RPIC and BIC.

The Slovak Energy Agency (Slovak Ministry of Economy) – fulfils the tasks in the field of intermediating the transfer of new manufacturing programmes and technologies into the

projects, the support, organization and coordination of resolving and completion capacities, their interconnection to the international network for the needs of the preparation, solution and completion of the innovative projects. This agency is going to be responsible for the innovation process.

The Slovak Guarantee and Development Bank - a specialized financial institution oriented to the support of small and medium-sized business, which is currently completed through nine guarantee programmes, seven subsidy programmes and three credit facilities.

Agency for the Regional Development Support (Slovak Ministry of Construction and Regional Development) – established to provide administration of the projects financed from Pre-Accession and Structural Funds of the European Union. It provides management of the integrated network of Regional Development Agencies and Euroregions.

Agency for Science Support as a purposeful organization of the Slovak Ministry of Education with returnable and non-returnable funds from the state budget, from the subsidies of the National Property Fund and other funds;

Agency for Research and Development Support is the most significant institution in Slovakia to support all areas of science and technology. It has been established based on the Act 172/2005 on the organization of the state support to the research and development. It is the assignee organization after the Agency for the science and development support, established by the Act 203/2001 dated 1st July 2001. The Agency supports research and development by providing purposeful proceeds from the state budget to support the Applicant's own research objectives. It supports individual projects as well as the projects in scope of Agency's programmes. The action plan of the Agency for Research Support focuses on:

- Support to national centers of excellence
- Support to human resources
- Support to the international scientific and technical cooperation

SARC – Centre for Development, Research and Technology (Slovak Ministry of Education) – The initial objective was to support creation of a link between science, research, development and the industrial production. Though recently, it is mostly orientated to the coordination of the European Union research projects.

The remaining participants are various associations representing the undertakings (the Association of Employer Unions and Associations, the Association of Industrial Unions, the Slovak Chamber of Commerce and Industry), and/or the industrial scientific and research organizations (the Association of Industrial Research and Development Organizations).

The Innovation Fund under the Slovak Ministry of Economy - a non-investment fund that is an independent non-profit, non-state-run legal entity established by the Slovak Ministry of Economy. Its objective is to support financially the scientific, research and development projects, the processing of conceptual studies, the development of supporting tools of technical policy, and the protection of intellectual property. The maximum support by the Innovation Fund goes up to 5 million SKK, while 50 % of the total costs have to be guaranteed by the resolving subject from its own sources.

## 5. Discussion

*The comparison of the outcomes in Košice upper-tier territorial Unit with North Hungary in terms of supply and demand was carried out. But the objective of this very paper<sup>3</sup> was to comment on the Eastern part of Slovakia only.*

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<sup>3</sup> This part is provided as a complement in the article of colleagues Attila Nyiry and György Kocziszky that is to be found in this very issue of the booklet.

## 6. Conclusion

All what was surveyed in the region could be described by theory. Therefore the “innovation is defined more rigorously by means of the production function. This function describes the way in which quantity of product varies if quantities of factors vary. If, instead of quantities of factors, we vary the form of the function, we have an innovation. But this not only limits us, at first blush at least, to the case in which the innovation consists in producing the same kind of product that had been produced before by the same kind of means of production that had been used before, but also raises more delicate questions. Therefore, we will simply define innovation as the setting up of a new production function. This covers the case of a new commodity, as well as those of a new form of organization as a merger, of the opening up of new markets, and so on.”

“In the prosperity phase, investment from innovating activity increases consumers spending almost quickly as producers spending. A new factory in a village, for example, means better business for the local grocers, who will accordingly place bigger orders with wholesalers, who in turn will do the same with manufacturers, and these will expand production or try to do so, and so on. But in doing this many people will act on the assumption that the rates of change they observe will continue indefinitely, and enter into transactions which will result in losses as soon as facts fail to verify that assumption. New borrowing will then no longer be confined to entrepreneurs, and ‘deposits’ will be created to finance general expansion, each loan tending to induce another loan, each rise in price another rise.” (AGHION, 2002)

According to Patrick FRANCOIS and Huw LLOYD-ELLIS (2005) the Schumpeter’s ideas have had a lasting impact on macroeconomic thoughts. For example, the process of “growth through creative destruction” has become central to theories of endogenous long-run growth. What the theory above revealed is desired in praxis and the common Regional Innovation Strategy may be the first step to substantiate the theory into the practice of the less-developed regions far away from Brussels.

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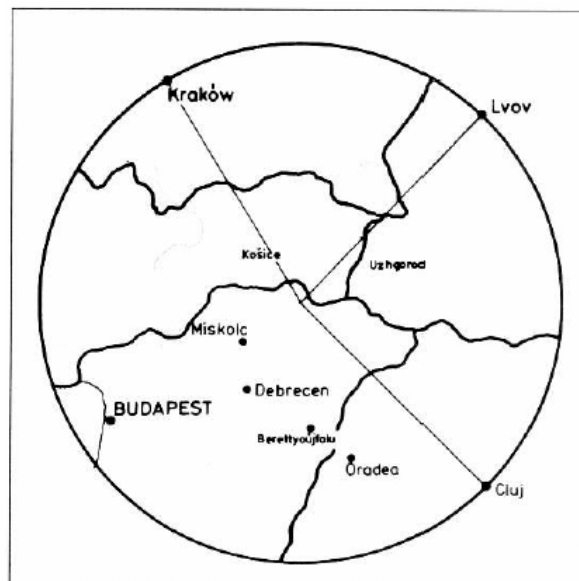
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László Dankó

### Development of Cross-Border Cooperation in the Tri-Border Region

#### 1. Historical Background

The common, tri-border regions of the Central European countries (Ukraine, Slovakia and Hungary) have similar geographical and economical features. The distance from the capital cities resulted in the local population seeking relations more intensely in all possible areas of life (economic, cultural, education, artistic, sports, etc.). This process was caused by the fact that the population grew more ethnically diverse after new borders were introduced following World War I. National minorities were shut out of their mother countries, striving to maintain or rebuild connections with their national states, since the secular traditions of economical and commercial collaboration were broken off.



*Figure 1: A Central European Regional with long-term Political and Economic Continuity (Dankó 1993)*

Initial arrangements directed towards the activation of the tri-border regions' economy have been, for the most part, conceived at the governing level during the past decade, but failed to be efficiently realized due to the lack of prerequisite political and ethnic subtlety deriving from the region's individual particularities.

In the absence of proper information and active communication the government organs could not have the benefit of any support coming from local business entrepreneurs. Entrepreneurial initiatives in the area were typically self-supportive, missing all types of central monetary backing or management which could have led to developments of a higher nature. It was not, therefore, accidental that in the early 1990's there were organizations coming to life with the aim of stimulating and enlivening business enterprises, that took the interests of the local communities into consideration as well, working as foundations on non-profit basis. (Zemplén Local Enterprise Development Foundation, Sátoraljaújhely, 1991, Nagykapos Regional Enterprise Agency, Nagykapos ( Vel'ke Kapusany ) 1992, Carpathian Society of Hungarian Intellectual Workers, Ungvár ( Uzhgorod, 1993. )

The Carpathian Border Region Economic Development Association was established in 1994 by economic and business promoting branches that were already functioning in Hungary, Slovakia and Ukraine, with the purpose of fostering the recovery of the region's economy<sup>1</sup>. Beyond providing direct assistance for the enterprises run in the bordering area of the founding countries, the CBED have been working on to draw western investments, upholding the admission of the "free market" principles among the countries and peoples involved.

We are strongly convinced that the Europe-conform strategic concept for economical and regional development, having been elaborated by CBED, will ensure an unprecedented opportunity for those participating in the realization of the project. It will keep unitary economic development principles in view and assist the gradual improvement in living standards for the population in the Carpathian border area. The entrepreneurs polled agree on the point that the economical subsistence in the near future entirely depends on the responsive cooperation in the Carpathian region. The strong intention for this vital collaboration is present on the part of the countries and leaders of the county and local governments. The local economic development centers began actually to carry out the realization of the project in 1995.

The Tri-Border Region Economic Cooperation Strategic Program is directed towards an area geographically designated and includes the Zemplén region in North-East Hungary (Bodrogköz, Hegyköz.), provinces bordered by Eastern Slovakia and Hungary (Terebes and Nagymihály/ Trebisov - Mihalovce) as well as the Ungvár and Beregszász (Uzhgorod - Beregovo) districts in Kárpátalja.

## 2. A Brief Analysis of the Situation

Due to the absence and instability of programs for area and regional development projects the properties and the economic condition of certain territories reveal considerable similarities.

The tri-border regions of the Carpathian area in Eastern Slovakia, Kárpátalja and North-East Hungary are lagging behind and deficient in economic progress although they are geographically diverse, with manifold advantages in regard to the geopolitical features.

The regions lagging behind the economic evolution of the preceding decades, are a great distance from their capitals which resulted in the total lack of central administration or of financial support.

There were no significant companies being established here; the dominant branch of the region's economy was agriculture. This branch, which functioned in collective structural forms earlier, had to cope with adverse climatic and soil conditions, which left little or no prospect for people employed in farming to take initiatives in the new economic structure based on private properties.

The smaller portion of employment was provided by processing and light industrial sectors that had settled in cities ( food industry, wine-production, wood products, furniture, mechanical

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<sup>1</sup> [http://www.zemplen.hu/rva/khgsz\\_eng.html](http://www.zemplen.hu/rva/khgsz_eng.html)

and ancillary engineering, etc.) These worked as affiliated companies of larger state companies, thus it was chiefly these productive branches that had to undergo liquidation and bankruptcy proceedings owing to the course of privatization. The size of the workforce with no employment has grown at a startling rate in the last years. The qualification of the unemployed has deteriorated even further, due to the steady flow of migration of the trained manpower unable to find jobs in the region.

A large number of people having been excluded from employment are now in exigency having neither adequate qualifications nor enough experience to start running an enterprise of their own. They are, however, compelled to establish a small business. The insufficient amount of conditions (typically low income rates, absence of purchasing capacity, lack of experience and in tradition, lack of information, the clumsiness of administration, the slowness and complexity of acquiring loans, the unfavorable attitude of banks towards small-business owners, etc.) leads to the outcome that around 30% of the new small business enterprises are bound to go bankrupt before the end of their first year.

It has to be stated though, as a positive factor, that since the industrial production has not caused any serious damage to the environment, it could be considered as a potential breakthrough to develop these regions for purposes of tourism.

The development of tourism that is based on natural sources (hills and mountains covered by forests, mineral springs, etc.) and on “pure” environment has close ties to other regional developments aspects.

Modernization, for instance, is indispensable in certain districts: to construct the road, water, gas and telephone networks in the area, to attract tourists showing interest from other sectors.

It is the enterprise development organizations that have taken over the initiation of discussions with the regions concerning the borders, thus coordinating the tasks for economic and regional development, as well as elaborating the complex development ideas. When forming the strategic programs both the definite advantageous and the disadvantageous sides are taken into consideration.

| Good points  | Bad points  |
|--|---|
| <ul style="list-style-type: none"> <li>• advantageous geopolitical situation - shortage of assets in business start-up at the join of North-Southern deficiency in international funds and East-Western directions</li> <li>• convenient transit and transport facilities peripheral location (standard and broad-gauge loading districts: Záhony, Tiszacsérnyő)</li> <li>• two international airports (Kosice, Uzhgorod) - possibility of transporting by water rivers,</li> <li>• international energy cables infrastructure (gas, oil, electric energy),</li> <li>• beneficial infrastructure conditions infrastructure relations and services regarding telecommunication</li> <li>• untouched natural sources, tourist potential</li> </ul> | <ul style="list-style-type: none"> <li>• Shortage of assets in business start-up deficiency in international funds,</li> <li>• long distance from capital cities, - peripheral location,</li> <li>• declining rate of industrial and agricultural activity,</li> <li>• attractive provinces are difficult to access, defects in transportation,</li> <li>• undeveloped business-financial, infrastructure relations and services,</li> <li>• restricted transport capacity of routes,</li> <li>• differences in legal regulation</li> <li>• a general lack of knowledge on market economy and of business experience,</li> <li>• missing AutoRoute facilities (Helsinki – Dukla pass – (Odessa) - Istanbul- Middle-East),</li> <li>• the region's being scarcely known at low wages international level,</li> </ul> |

| Good points   | Bad points   |
|---|--|
| <ul style="list-style-type: none"> <li>• ethnically mixed, economy and of business experience multi-language population,</li> <li>• workforce available at relatively low wages,</li> <li>• traditions in cooperation among local enterprise development organizations</li> <li>• available international resources' being enterprise development organizations hardly known in the area,</li> <li>• civil organizations' and local governments' growing experience and sense of responsibility in regional development.</li> </ul> | <ul style="list-style-type: none"> <li>• available international resources' being hardly known in the area.</li> </ul> |

### 3. Rationale of the Projects

Springing from the features mentioned above, the CBED's entrepreneurs and regional development programs aim to promote the international collaboration among undertakings working within the countries involved by way of realization of distinctly outlined objectives.

The most important aim, which makes up part of the Tri-border Economic Development Strategic Program, is to provide local enterprises with up-to-date information as well as to constantly convey alterations of laws controlling business activity to firms and individuals. A database, which is being continually updated, is set up to assist the administration of the potential clientele.

To achieve this goal, we operate an office network, with a computerized database being at the disposal of enterprises searching for business partners. This is where we gather and disseminate all the current economic information that is considered crucial for making and maintaining external trading relations.

To ensure more efficient services, we are planning to set up new office(s) in the region so as to spread and facilitate our information services. (A new office was opened on February 1, 1997 in Királyhelmec- Kralovsky Chlemec - Slovakia) Regularly organized international exhibitions and markets guarantee a wide range of opportunities to shape definite business relations and to locate further markets. In meetings held simultaneously with the exhibitions, current information about economic regulations, legal and customs conditions is publicized for businessmen who come to attend these events.

Partner-searching is further encouraged by catalogues showcasing the entrepreneurs who participate. These are distributed among those interested at the end of the meeting.

The Carpathian Business Review a quarterly published newsletter through which we intend to broaden intermediary services for information and business contacts and to provide the possibility for business advertisements. To supplement our information services, we broadcast the television program called "Referencia", a monthly business production, which enables mostly local enterprises to publicize the introduction of their activity in the region.

It also contributes to more acute, more thorough partner-searching attempts. Experts are invited to take part in the programs so all current changes in laws are immediately conveyed to each of the three parties involved in this project.

By the statements conveyed in the study "Tri-border Region Economic Cooperation and Development – Creating an Entrepreneurial Sector", which was elaborated by the CBED, the

economic cooperation among these border regions is restricted not only by differences in jurisdiction processes and rules but by several physical obstacles as well.

The organizations joining CBED and the Council pursue explicit lobbying to coordinate and settle problems regarding border transportation. Besides these physical difficulties the problem area includes the question of initiating the simplification and facilitation of custom processes. We wish to make feasibility studies in these fields and introduce them to the appropriate governing bodies, since the completion of the project cannot be effectively fulfilled without central support.

The development of the tri-border regions can only be accomplished by organizing and integrating these closely related bordering business sectors as soon as possible, as they are to ensure the necessary sphere for achieving the economic union of enterprises and companies in the area. The countries joining in the project take up actualizing these enterprise zones according to their own regulation processes.

Simultaneously with the creation of enterprise sectors, we intend to compile a comprehensive and multi-language promotion publication on the economic potency of the region. It will provide explicit facts and figures for foreign investors. We expect this booklet to arouse the attention of companies that have already shown interest in investing in the area. This region has such an exemplary geographical position, since business establishments settling down in this territory would have continuous access to the potential markets of several countries within only a remarkably short distance.

Our continued objective is to get acquire sponsorships / applications for the Strategic Program of the Tri-border Region and to recruit members currently participating within CBED. To subsidize programs included in the project we wish to gain supplementary resources by means of fund applications. Partners cooperating in the enterprise are to broaden the scope of their supporting members (local governments, civil organizations, companies, private individuals, banks, etc.) through their respective recruiting strategies, based on local circumstances.

Besides other resources, the funds that are obtained from these organizations are used for assisting the operation of the regional offices. To foster recruitment, we want to increase the publicity and the number of visual presentations of CBED as an effectively functioning organization by means of its active participation in exhibitions, its dynamic relations with the media, etc. We also would be happy to share our experiences obtained through the course of project realization with organizations working on similar developmental objectives in other regions. We intend to take part in both domestic and international trade programs and to organize similar events in our region. The description and availability of the Tri-border Region Strategic Program for Economic Cooperation may greatly encourage the elaboration of other border region development concepts not only in Hungary but in further regions of similar characteristics in Central-Eastern Europe.

#### **4. Description of the Program**

The project is going to be executed in geographically defined areas (Eastern-Slovakia, North-East Hungary, border regions in Kárpátalja), aiming at, for the most part, the improvement of economic relations of the small- and medium-sized enterprises in the neighboring countries, the physical infrastructure and other microeconomic conditions. Having been elaborated by CBED, its main objectives focus on concrete strategic sub-areas, which are meant to serve the development of the tri-border economic cooperation system.

1. Operating information offices in each of the three countries, providing interested entrepreneurs with up-to-date information in the Carpathian tri-border regions: Hungary,

Slovakia and Ukraine. Business proposals, supply and demand intercession. Enlargement of an information network involving Poland (Krosno) and Romania (Satu Mare, Baia Mare).

2. Organizing entrepreneur exhibitions, markets, international business meetings in cities situated in the neighboring areas to foster the shaping and development of partnerships as well as to set up potential markets and export-possibilities.

3. Quarterly publishing of a multi-language newsletter containing economic and business information to make partner-searching more effective; entrepreneurial advertisements. Monthly broadcast television program with current economic information in each of the three regions.

4. Creating homogeneous, consistent, entrepreneurial sector/s in the tri-border areas, harmonizing with the judicial forms, which are elaborated at varying levels for the time being. Having minor studies developed for exploring possible ways of project realization. Launching infrastructure and other regional development programs.

5. Initiating the inauguration of further crossing stations, as well as informing local, county, governing and ministerial bodies of the absolute necessity of making those already existing crossings suitable for international transportation. Coordinating lobbying for the sake of improving physical and human factors and facilitating the integration of customs regulation processes.

6. Compiling a unitary promotion publication in order to introduce the entire economic potential of the border regions, offering them for potential investors. Coordinated PR activity, organizing investment meetings.

7. Convening international regional development forums with the participation of all local governments, civil organizations and enterprise development / professional associations interested in integrated regional development. Summarizing the experiences and results acquired throughout project realization for other organizations being interested or involved in similar development programs.

8. Growing the number of active memberships within CBED, turning it into a self-supporting organization.

## **5. Result of the CBED Program**

In order to accomplish its objectives, the Association has developed a coordinated schedule for the years 1995 and 1996. The realization of the goals sorted out in that schedule has been completed with the following results:

## **6. Outlining A Regional Entrepreneurial Database:**

With the help of the three organizations participating in the Association's work and by employing full-time chief administrators we have established an office network. The central office in Sátoraljaújhely has been functioning since January, 1995; the ones in Nagykapos and Ungvár were founded in May, 1995. The basic technical equipment was provided for each of the three offices, including a proper telephone line, a facsimile and a photo copier machine. The administrators were charged with gathering facts and details about all the actively working enterprises in the tri-border areas, with the aid of the "Regional Data Sheet", which was developed jointly and distributed in Hungarian, Slovakian, Ukrainian and English languages. These data sheets were placed at the disposal of interested clients in our offices and at international markets and business meetings.

Since December, 1995, it has also been available as part of the quarterly published Carpathian Business Review editions. Registration in the database is free of charge for our clients. To accelerate the course of gathering information we have installed computers of the same configuration in our offices, thus we have succeeded in simplifying data processing.

## **7. Partner-Searching Services**

From the database of the regional enterprises we provide our clientele with gratuitous services for interceding business proposals and information about potential partners. This service is available both directly in our offices and by phone, facsimile or E-mail as well. The number of business partners sought in the offices was initially around 2-3 on weekly basis (equaling 240-360 altogether in the three countries).

Partner-searching activities seem to be prominent in the following fields:

- commerce (farming products, provisions, wood and wooden products, articles of clothing and other light-industrial products, machinery, equipment, supply and demand on technology),
- production cooperation, conveyance, supply and demand on basic material,
- transportation activity,
- tourism, accommodation facilities.

We do not have the explicit number of successful ventures interceded through services provided by CBED. Since the participation on the part of the clients is voluntary, there is no obligation for their giving us feedback.

According to our estimations, the CBED has provided able guidance and support to 40-50 bilateral ventures since it began operating.

## **8. International Exhibitions And Markets – Business Meetings**

The CBED, partaking in the organization of exhibitions regularly held in the last few years in the tri-border region, now joins in arranging Hegyalja Farmers' Days (in Szerencs), the Uzhgorod EXPO (in Ungvár), and in COPUS EXPO (in Nagykapos). CBED participates, in particular, by compiling the professional programs and through the invitation of local companies and other business establishments. Within the framework of these events, which last several days, the professional programs include lectures held on topics such as current international economy, commerce, customs and taxation, with the participation of experts in charge of the given areas.

During the last years we have had the opportunity to welcome, among others, the vice-chairman of the EBRD, the President of the Hungarian Parliament, leaders of factories accredited to certain countries, international desk officers of county and district bureaus, the Minister of Agriculture (Hungary), the managing director of the ÁPV Rt., the president of the Hungarian Tourist Service, the deputy-chairman of the Ukrainian Ministry of Foreign Affairs, the secretary-general of the Carpathian Euroregion, leaders of local governments, mayors, chamber leaders and a number of economic experts from all three parties. The program also covers entrepreneurial meetings, which are visited by business representatives coming from a broadening circle and by businessmen on behalf of Hungary, Slovakia, Ukraine, Rumania, Poland and Bohemia. As a further service, colleagues of the CBED were distributing "market circulars" and catalogues on business meetings in the region.

## **9. Carpathian Business Review - A Tri -Lingual Newsletter**

The idea of publishing a quarterly economic/entrepreneurial newsletter was established in the 1995 schedule of the Association. The 16-page long publication is meant to fill a gap in the Carpathian border region area and is issued in Hungarian, Slovakian and Ukrainian languages (in 4000 copies supplied with a summary in English). Its columns cover four major fields:

- A.) Articles analyzing actual changes made in laws of the three countries. Within this scope we have presented –among many others- the CEFTA regulation, the customs policy of Hungary, legal procedures pertaining to customs free districts, alterations in taxing laws, etc.
- B.) News, up-to-date information about foreign trade, customs proceedings, taxation and other regulations, in brief form, making references to the explicit places of articles so that those who are interested know where to find the complete text of certain acts.
- C.) The free publication of business proposals and partner-search requests through completion of the Registration Form. We ensure publishing paid advertisements as well.
- D.) Regional, entrepreneurial information, introduction of CBED offices, news about its programs, current events.

The issues of the Carpathian Business Review are forwarded to local governments, county and district economic and regional development organizations and to establishments who join in helping execute our projects: local agencies of commerce, to entrepreneurial associations, chambers and to the National Entrepreneur Association. To our international partners organizations in the USA and in Europe, we direct the summaries published in English.

The important role of this publication is indicated by the growing number of clients coming to our offices subsequent to its distribution. We also receive positive feedback regularly from various organizations.

Within the framework of the Carpathian Euroregion, the Polish party intends to join in compiling the circular introduced in The Regional Development Committee, by providing economic and entrepreneurial information.

#### **10. Expert Study On Tri-Border Region Economic Development**

The “Kárpátia” enterprise was established in October, 1995 by winning a competition and employs the academic analysis of the Marketing Department of the Miskolc University. It has developed the study “Tri-Border Region Development – Creating Entrepreneurial Sectors”, which consists of over 600 pages. Its first volume (which was edited in December, 1995) outlines and summarizes the current situation of the region to be developed on the basis of research, documents and both macro- and micro-economic analysis previously prepared by CBED offices (DANKÓ, 1995-1996).

The study served as a basis for a 50-page long summary, which contains the Strategic Program of Tri-Border Economic Cooperation. We have put the complete study and the summary at anyone’s disposal in our offices, and the summary has been translated into the official languages of the cooperating countries. (The summary in English has been forwarded to a number of American and European organizations.)

With the help of the CBED Committee Members, the leaders of the regional enterprise development organizations and representatives we began lobbying to activate central support for the regions.

Since routes to central governments vary in different countries, the achieved results are also different.

As an outcome of the Act of Region Development acceded in November, 1995, more and more attention has been paid to the promotion of these desolated areas.

The “Europe-Conform” interregional programs outlined by this regulation indicate the projects that may be expected to gain noticeable support from governmental funds, aiming at achieving the complex development of certain territories, like the one nurtured by CBED<sup>2</sup>.

The study has not reached the ministerial level in Slovakia, but the summary was sent to the Eastern-Slovakian district leaders. The administration map of the region underwent a course of

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alterations by the new executive decree, which was accepted in 1996. The size of the cooperative areas remained more or less the same with the Nagymihály center. The new leader of the Regional Development Department of Administration is an expert who sees the opportunity for future developments in close economic cooperative links with the neighboring Hungarian regions. He was presented with the CBED programs, many of which he regarded as potentially feasible. At present, they are working on building relations with the Terebes district leadership to obtain their support for the realization of the strategic program. Slovakian internal affairs are, however, rather disadvantageous for placing much hope in winning central government support for the able development of territories bordering Hungary.

As for Kárpátalja, both district and county administrations have warmly welcomed the proposals put down in the study, having integrated several of its elements into their own development programs. The representative of the region has turned in the study to the Foreign Trade Ministry.

Definitive measures, however, apart from opening or expanding several border stations were not completed till December 1998. Kárpátalja was designated as a special economic zone in December 1998.

### **11. "Referencia" - An Information Television Program**

The CBED started the regular transmission of the live television program "Referencia" in March, 1996. The broadcasts are produced in cooperation between the Association and the Zemplén Television Station in Sátoraljaújhely and they are presented in Hungarian, Slovakian as well as in Ukrainian languages.

The program consists of four blocks:

A.) Live talks with experts on current matters of foreign trade, enterprising and regulations. Topics that have been discussed so far are: a detailed overview of the joining to the EU, INTERREG, Shengen, CEFTA ruling, Hungarian and EU customs policy, regulations concerning foreign trade relations, the question of entrepreneurial sectors, customs free districts designed for the region.

B.) We film and introduce successfully functioning border-crossing enterprises and business relations, analyzing the results; the leaders of these establishments show the steps of building international entrepreneurial cooperation through their own concrete examples.

C.) We provide the possibility for Hungarian, Slovakian and Ukrainian enterprises to introduce their companies and activity within the section "Supply and Demand", which amounts to almost half of the program time. Making the most of the broadcasts, there is a chance to briefly present the range of products, and the company directors are encouraged to make direct business proposals in public.

D.) At the end of the programs, we call the attention of businessmen and entrepreneurs to other broadcasts dealing with questions of current regional economy.

The influence of "Referencia" is clearly shown by inquires and opinions phoned in by our viewers during the broadcasts. In the days following the transmission, there are, on the average, 3-4 clients who come to our offices to request information about the products or business proposals presented.

### **12. Building An Association Body**

At the time of its establishment, the Association set up the objective of making all efforts to create a broad unity of cooperation for the sake of successfully realizing the projected economic development programs. The active participation in these mutual programs have been judged fundamentally important by the collaborating parties. To achieve the same goal of building a

body of members, however, different methods are required, owing to the discrepancies among countries and attitudes of entrepreneurs, companies and local governments.

### **13. Planning, Realizing, Sources of the Project**

The Carpathian Border Region Economic Development Association has been performing its job, since its establishment in 1994, based on constant coordination between leaders of the founding organizations and Committee members. The schedules elaborated by the leaders of economic development foundations and centers for 1-year periods are introduced to the Committee for consent. Besides the leaders of the founding economic development organizations, there are dedicated mayors and entrepreneurs from the region who take part in the Committee's job of designing and executing the outlined projects. Members also make attempts to gain support for the Association in their own countries, which means, first of all, providing information about the Association and its programs, taking advantage of their respective relations.

To carry out the projects, there are regional offices collaborating in the three countries, where managing clerks and contributors are working on certain tasks. The mutual objectives (providing information, partner-searching, organizing exhibitions and markets, business meetings, holding forums on regional development, publishing the international newsletter, etc.) are done jointly. In addition, each center works on carrying out its own projects, making efforts to find sponsors for the integrated developmental activities.

Managing administrators are supposed to compile a report on the course of goal-achievement and on financial completion every three months. The CBED analyzes the results and makes decisions on Association projects and financial backings. The program manager of the CBED is the person responsible for executing the settlements included in the minutes prepared on these sessions. The Association is represented by the President of the CBED, who takes initiatives towards third parties in accordance with the consent of the members.

The Association endeavors to enlarge its base and to enter into agreements on cooperation with local organizations, local governments and regional development partnerships operating in the area. It invites representatives of partner associations to its programs and partakes in regional meetings held by its collaborators to exchange experiences acquired in regional development.

We obtain information and exchange views about interregional cooperation with our partners on international conferences.

To financially support sub-projects, within the elaborated economic- and regional development program, which are to be realized in the countries involved. The founding organizations submit applications to different organizations ( County Development Councils, national funds, foreign aid programs, etc. ) to obtain both domestic and foreign grants.

To ensure proper incomes needed as contributions to operate our offices, each founding member is to organize local sponsorships, to win new active supporters and partners (local governments and their partner associations, civil organizations, companies, enterprises, banks, etc. ) in its own country. In order to ensure further successful operations for the Association's programs we are planning to charge for certain services in the future (for instance, advertising, participating in businessmen's meetings, etc.) (DANKÓ, 2003)

### **14. Organizations Participating in the CBED**

#### *1. Zemplén Local Enterprise Foundation*

18 Rákóczi Street, Sátoraljaújhely H-3980  
Tel: 36-47 / 523 -080 , Fax: 36-47 / 322-919  
E - mail : zrva@axelero.hu

The Zemplén Local Enterprise Foundation (ZRVA) was founded in June, 1991 for supporting the growth of small and medium enterprises in the Zemplén region.

The ZRVA is a non-profit foundation, which encourages and supports the formation of enterprises that are about to be established as well as ventures already functioning. The ZRVA, through the course of accomplishing its programs, takes emerging demands and the particulars of the area into consideration.

- professional preparatory and executive participation in regional and area development programs
- elaboration of individual expert studies for the coordinated development of the region
- professional accordance with organizations, local governments and associations involved in regional development

With the agreement of the cooperating partner associations the center of CBED is in Sátoraljaújhely, at the Zemplén Local Enterprise Foundation. Coordinating the program is done by György Sáfrányos, a programmanager working for the Association. The managing director of the Zemplén Local Enterprise Foundation is István Juhász, who is the President of the Association since January 31, 1995.

#### *2. Enterprise Development Association - Vel'ke Kapusany*

4. Hlavná Street, Vel'Ke Kapusany SL 079 01

Tel / Fax: 00-421-949 / 38-2995

E-mail: rvsz@nextra.sk

The organization was registered to Nad/1/92 by the Nagykapos District Office on 18 September, 1992.

The organization gives support to starting small enterprises in the Nagykapos region and launches entrepreneurial training programs in marketing, financing and communication.

It encourages relations between both domestic and foreign entrepreneurs and enterprises, and takes part in regional development programs. The managing director of the Enterprise Center is Sándor Fuksz, who is also member of the CBED Council, a Slovakian coordinator.

#### *3. Regional Development Agency of Královsky Chlmec*

SK-077 01 Královsky Chlmec ul. L.Kossutha 102.

Tel: +421-56/ 628-1210

Fax: +421-56/628-1211

E-mail: rra@rrakch.sk

Office Manager: Károly Horváth

#### *4. Enterprise Development Center ( KVK ) - Uzhgorod*

5/ a Tolsztoj Street Uzhgorod UA 079 01

Tel / Fax : 00-380-3122 / 1-70 -27

E -mail : kvk@email.uz.ua

The organization was registered at No. 017 by the judicial department of the state office of the Kárpátalja region on 10 September, 1993.

The Carpathian Society of Hungarian Intellectual Workers is a professional collaboration of economic experts and of entrepreneurs working in the private sector, or in financing, administration, commerce, industrial production, company economy or agriculture. The Association is designed to execute economic and regional development programs elaborated for the Kárpátalja region.



Figure 2: Map of the tri-border region

The Chairman of the Association is György Dupka, who is a member of the Council of the Association, the coordinator of the CBED program in Kárpátalja and is in charge of managing the CBED office.

### 15. The Zemplen Euroregion

In the course of XII. Zemplen interregional Enterprise Days opened the Zemplen European House in Sátoraljaújhely in 2004. 23th of April. Péter Kiss chancellery minister inaugurated the renovated and widen Enterprise House, which have been active for 13 years, by Zemplen Local Enterprise Foundation<sup>3</sup>.

The Prime minister office's directing minister said, this European House is good example for the one city's ambition meet with international regions ambition. This house serve the helping of enterprises and the people's prosperity. One week before to Hungary and Slovakia join to European Union, the Zemplén Euroregion has been established. 9 Slovakian micro regions, 5 Hungarian small area, the two country's regional organizations, and 17 cooperated partners sign the Euroregion's deed of foundation in ceremonial frame in the Zemplen County House of Sátoraljaújhely.

The Zemplen Euroregion contain the historical Zemplen county's areas. This union's aim is a common elaboration and implementation of development programmes for Zemplen region,

<sup>3</sup> [http://www.zrva.hu/euroregio\\_eng.html](http://www.zrva.hu/euroregio_eng.html)

according to formulated of strategic programme plans. The two borderregional area's closing up with the basis of partnership, concentration of local and regional resources, and with efficient application of European Union, Hungarian, and Slovakian resources of budget project.

The slovakian Regional Development Agency of Királyhelmece and the Zemplen European House will be the centres of this interregional union. The members of union whose are interested in for European Unions resources exploitation, in common development, and in local enterprises helping, choose Sátoraljaújhely to centre which became Zemplen county again.

The common aims are: to hold together, and operate for the region's interest the economic and social situation's better enterprises service, develop the human infrastructure, cooperation of local government, and civilian initiatives in interest of joining neighbouring regions.

*Showing of the aims:*

The strategic development of the borderregional - economic cooperation aims are the followings (Dankó 2005):

- improvement of cooperation's economic basis, and increase of competitive goods base's quantity,
- improvement of economic cooperation's physical condition system,
- improvement of cooperated borderregional area's capital attraction,
- marketing and informatical development of borderregional cooperation.

We would like to make a stronger of economic-social conditions, improvement of life quality, and people would become citizens. We need to tell, in the course of borderregional economic cooperation enjoy priority by just such projects, whiches suitable for European Union requirement (environmental protection, quality insurance). The produced goods need to be a competitive in European Union's markets.

*Suggest measures:*

In the interest of achieve the aims we formulated the following measures:

- Development of the borderregional economic connections.
- Improvement of the cooperation's constitutional centres.
- The aim of measure is to develop the constitutional frame of the cooperation, revise the cooperation's aim.
- Develop the borderregional enterprisedevelopment cooperation.  
The aim is to realize the zemplen interregional economicdevelopment and educational centres industrial parks, and incubatorhouses development. (Sátoraljaújhely, ZRVA, Királyhelmece RRA), and widen the secondary and higher educational cooperation programmes (university, secondary, adult, enterprise and basic training).
- Start of the borderregional marketing activity.  
In the framework of this measure realize the borderregional improvement regionmarketing (tourism, investment urging).
- Realize of common infrastuktural and environmental protecting development.  
Improvement the bordercrossing:  
The aim is to improve the crossing points, make a better of border crossing until the European Unions crossing points close down.



Figure 3: The Zemplén Euroregion

- Development of crossborder environment- and nature protection:  
The environmental activities are efficient just in the scope of this cooperation (Hegyköz, Bodrogköz). This measure's aims are to develop the nature protecting areas, to step up against the problem of environmental protecting, floods, inland waters protection (Tisza river and Bodrog river).
- Development of borderregional settlements's cultural and change connection.  
The aim is to develop and harminizing the localgovernments, settlement's cultural, cooperation, and improvement the common development programmes.

The cooperated small area's economic statistical datas show intensiver cooperation than macroeconomics cooperations, so there is the base of development of cooperation.

The center organizations of Zemplén Euroregion:

- Királyhelmecei Regionális Fejlesztési Ügynökség (Regional Development Agency of Kráľovský Chlmec),
- Zempléni Regionális Vállalkozásfejlesztési Alapítvány (Zemplén Local Enterprise Foundation - Satoraljaújhely).

### *IX. Carpathian Supplier Cluster Initiative*

Establishment of the Carpathian Supplier Cluster:

On November 19, 2004 in Sátoraljaújhely the cooperation agreement “Carpathian Supplier Cluster” has been signed by the Hungarian, Slovak, and Ukrainian founders.

Non-profit organizations specializing in business development, industry settlement, contributed to the cooperation, symbolizing that the three-border region concerned is open to all its competitive businesses.

The goal of the Carpathian Supplier Cluster is to facilitate:

- The settlement of companies in the region that are already suppliers or that are in position to be suppliers to big multinational companies,
- The integration of the three-border region and the Zemplén Euroregion into the economic processes of the centers,
- The creation of a cooperation network between new and existing industries, trading and logistic companies of the region and the improvement of the efficiency of cooperation,
- The establishment of new supplier connections,
- Attaining supplier status within the cluster,
- The improvement of supplier skills,
- The settlement of foreign businesses in the Zemplén Euroregion/in the three-border region (Dankó 2006).

Founding organizations of the Cluster:

- Kárpátaljai Vállalkozásfejlesztési Központ (Enterprise Development Center - Uzhgorod)
- Királyhelmecei Regionális Fejlesztési Ügynökség (Regional Development Agency of Királyhelmece)
- Magyar Tudományos- Technológiai és Ipari Parkok Szövetsége (Association of Hungarian Scientific, Technological and Industry Parks)
- Miskolci Egyetem Marketing Intézet Nemzetközi Marketing Tanszék (University of Miskolc, Institute of Marketing Department of International Marketing)
- Szerencsi Ipari Park Kft. (Industrial Park of Szerencs Ltd.)
- Sátoraljaújhelyi Ipari Park Kft. (Industrial Park of Sátoraljaújhely Ltd.)
- Zempléni Regionális Vállalkozásfejlesztési Alapítvány (Zemplén Local Enterprise Foundation)

The Carpathian Supplier Cluster wishes to finance its activities from applications. The necessary business infrastructure will be provided by Zempléni Regionális Vállalkozásfejlesztési Alapítvány (Zemplén Local Enterprise Foundation).

The development of the cluster initiative within the framework of the Phare CBC program has already started with the writing of the feasibility study based on the research of market relations and potentials actors, with the workshops and with the trainings helping to become a supplier.

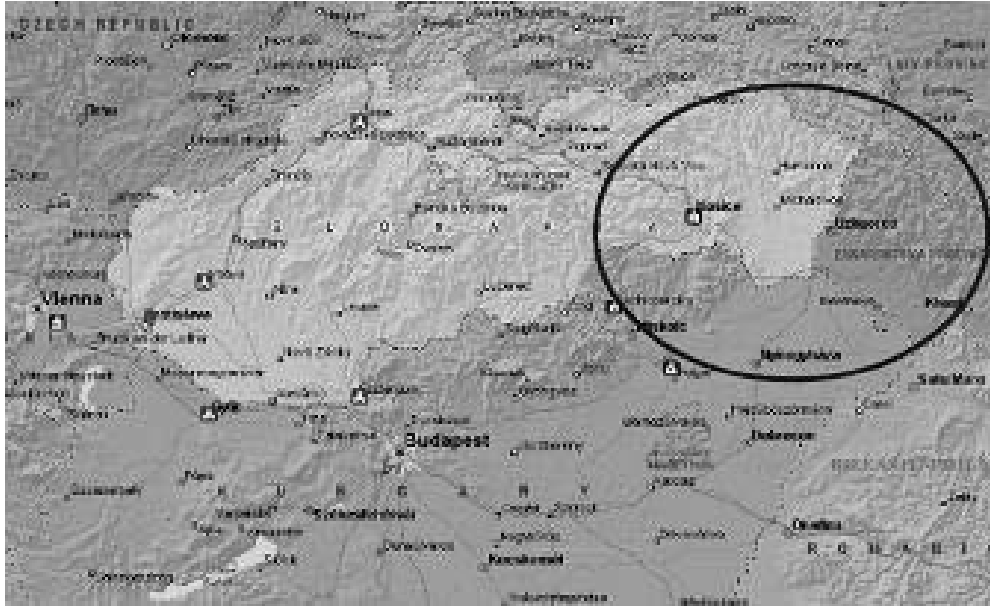


Figure 4: Area of the Carpathian Supplier Cluster

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**Peter Džupka**

**Increasing absorption capacity of the EU structural funds, on regional level in Slovakia,  
by improving decision tools, with focus on innovation**

**1. Introduction**

Problem of the absorption capacity of the structural funds is on high importance between public administrations on all levels (regional, national and also EU level). Research organizations within whole EU are also very active in this field. Most of the studies and analyses are focused on issues like managerial capacities, problems with co-financing, macroeconomic situation or problems with quality of projects developed by the applicants. These issues are analysed in details with aim to find the best ways for increasing the absorption capacity of the EU structural funds throughout the EU member states.

This article is not focused on such issues and even through this; the main aim of the article is absorption capacity of the EU Structural funds, focusing on innovation. First part of the article is focused on analysis of the absorption capacity definition and its relationship to issues or problem that should be analysed regarding to increasing the absorption capacity.

Second part of the article is dealing with R&D and innovation impacts on economy – with aim to analyse possibilities to measure these impacts.

Third part of the article offers some solutions (tools) how to increase the effectiveness of EU structural funds in the field of innovation and therefore to increase the absorption capacity of structural funds.

Last part of the article presents the results of the analysis dealing with possibilities of implementation of selected tool for innovation impact measuring on regional level in Slovakia.

**2. Analysis of the absorption capacity definition**

There are many of absorption capacity definitions. The most important, regarding to the aim of this article, is definition of the Europe Commission (EC) which define absorption capacity of the EU structural funds as: “the degree to which a country is able to effectively and efficiently spend the financial resources received from the European Funds.”<sup>1</sup>

Going deeper in analyzing the absorption capacity two faced (demand and supply side) of absorption capacity were defined by the NEI Regional and Urban Development institution<sup>2</sup> which has delivered the study “Key Indicators for Candidate Countries to Effectively Manage the Structural Funds” for the EC.

The Demand side measures the ability of potential beneficiaries - private and public - to generate appropriate and acceptable projects.

The Supply side of absorption capacity is determined by three main factors, which divide absorption capacity on:

- macroeconomic,
- financial,
- administrative.

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<sup>1</sup> Absorption capacity definition: available on [http://en.wikipedia.org/wiki/Absorption\\_capacity](http://en.wikipedia.org/wiki/Absorption_capacity)

<sup>2</sup> NEI Regional and Urban Development: “Key Indicators for Candidate Countries to Effectively Manage the Structural Funds” Rotterdam.2003

- Macroeconomic absorption capacity indicates the rate of EU funding in terms of the GDP of the country-beneficiary. The capacity to absorb macroeconomic effects generated by the inflow of the supplementary investments is also related to the macroeconomic absorption capacity.
- Financial absorption capacity means the ability to co-finance EU-supported programmes and projects, to plan and guarantee these national contributions in multi-annual budgets, and to collect these contributions from several partners (state, regional and local authorities, private bodies), interested in a program or project.
- Administrative absorption capacity can be defined as the ability and skills of central, regional and local authorities to prepare acceptable plans, programmes, and projects in due time, to decide on programmes and projects, to arrange co-ordination among the principal partners, to cope with the vast amount of administrative and reporting work required by the Commission, and to finance and supervise implementation properly, avoiding fraud as far as possible.

The core of this definition is focused on efficiency of the structural funds absorption. When taking into account the general meaning of term of efficiency and effectiveness than ...."Being effective means producing powerful effects. Being efficient means producing results with little wasted effort".(HEARN, W.)

Translating this word to structural funds absorption "being effective" means to reach the largest possible positive impacts of structural funds on economy. On another side "being efficient" means to reach these impacts in best possible way.

Following these definitions the demand side and also supply side of the absorption capacity (except macroeconomic absorption capacity) is directly focused on ability of the country (or region) to efficiently spend the financial resources received from the European Funds.

But the effectiveness of structural funds is also very important (when not more important than efficiency). Effective exploitation of the available resources for improving the regions competitiveness is one of the bases of the endogen regional development theory. (ŠEBOVÁ, ŠEBO 2007) How therefore to ensure the effectiveness of Structural funds and to increase the absorption capacity? The only answer lies in the programming period of the structural funds. It is up to each member state which sectors, sub sectors and activities will be supported by the structural funds. To find out the sectors and activities which will initiate the largest possible effects, decision tools that can help state administrations to make "effective" decisions are needed.

### **3. R&D, innovation and their effects within the economy**

When talking about the decision tool that will enable state administrations to increase the absorption capacity through the effectiveness of structural funds focused on innovation and R&D, there is high need to find out what effects are caused by the innovation within the economy.

Primary, innovation and R&D are increasing technology equipment of the companies and causing positive spillovers within the economy. In general innovation enables firms to produce better products (or services) at lower costs, which means for customer higher quality and lower prices. Innovation positive spillovers can be in general described as follows: (ADAM, B.)

*Knowledge spillovers* - knowledge created by one agent can be used by another without compensation, or with compensation less than the value of the knowledge. Knowledge spillovers are particularly likely to result from basic research, but they are also produced by applied research and technology development

*Market spillovers* - result when the operation of the market for a new product or process causes some of the benefits thereby created to flow to market participants other than the

innovating firm. It is this "leakage" of benefits through the operation of market forces, rather than the flow of knowledge itself, that distinguishes market spillovers from knowledge spillovers. Any time a firm creates a new product, or reduces the cost of producing an existing product, the natural operation of market forces will tend to cause some of the benefits thereby created to be passed on to buyers.

*Network spillovers* - result when the commercial or economic value of a new technology is strongly dependent on the development of a set of related technologies. An example of network spillovers exists among all of the different developers of application software for use with a new operating system platform. If one firm develops a particular application, people will buy it only if many other firms develop other sufficient applications so that the platform itself is attractive and widely used

There are many more effects of innovation to be describing, but this article is not focused on that issue. The aim of this article is to describe decision tools that have strong potential to increase the effectiveness of the structural funds in the field of innovation and R&D.

Innovation effects within the economy are complicated and have impact on supply side as well as demand side of the economy. Therefore simple analytical tools, usually used in Slovakia for allocation of the structural funds, are not able to offer outputs suitable for effective decisions in the field of structural fund allocation.

#### **4. Decision tools for improving the absorption capacities of structural funds on regional level**

Increased absorption capacity through the effectiveness of structural funds can be ensured only by the decision tool that will enable state administrations to effectively decide which innovative sectors and which innovative activities to support by the structural funds. This decision tool, must therefore in addition, be able to cover complexity of problems regarding to innovation effects within the economy.

This part of the article is analysing methods that can be used as effective decision tool for increasing absorption capacity of structural funds in the field of innovation.

When analyzing the approaches, methods and tools used for structural funds evaluation in the EU, there must be clearly defined the level of evaluation. There exist several approaches and tool which are mostly divided by the level of evaluation.

In the literature are these levels describes in most of the cases as follows:

- "micro level" – impact evaluation of concrete projects and their contribution for the region
- "mezzo level" – impact evaluation of the group of the projects on one goal from operational program. (for example evaluation of decrease in unemployment as a consequence of some employment program)
- "macro level" – using these types of methods all impacts and factors of policy are taken into account. These types of methods are suitable for evaluation of the structural funds.

From methodological point of view, methods used on "micro level" are mostly methods like case studies, CBA – Cost benefit analyses, Input – output models, CGE models etc. These methods are usually used for project ranking according to their efficiency, without any further impact on wider environment (region).

As it was already mentioned group of methods on "mezzo level" are usually used for impact evaluation of several projects on one objective. These methods also does not take in to account all factors (using former example – by evaluation impact on unemployment they ignore problem of salaries) Use of these methods are useful by evaluation smaller supporting programs or programs with shorter duration.

“Macro level” methods are characteristic by the fact, that they are trying to cover all possible influences and factors. They are, for example, able to describe and analyse technological progress within the economy (direct connection to innovation). There exists wide range of methods – macroeconomics models – used for different policy impact evaluation. On another hand there also exist different opinions on their applicability. Concrete method selection depends on several factors.

The most discussed “macro level” methods in EU at the present are macroeconomics models focused on structural funds impact evaluation. The biggest advantage of these methods is that they give opportunity to estimate impacts of the structural funds in advance. That enables policy maker to find the best possible way for sources allocation. These methods also enable to evaluate already implemented programs in very flexible way and to measure direct impact of the policy on basic macro-economic indicators as GDP, unemployment etc. This direct impact is purified from another influences (additional state support) so policy makers can for example clearly investigate what share of annual GDP growth was directly caused by the support from the structural funds. In the EU environment are frequently used for structural funds evaluation models like HERMIN or QUEST.

Another example of the method used on “macro level” is adjusted Input-Output method which was several times used for Community Support Framework impact analyses. This method was used on regional level in former East Germany, in Mezzogiorno region in Italy and on national level in Greece, Ireland, Portugal and Spain.

Some macro level approaches are based on common statistical treatments. De la Fuente a Vives 1995 has measured the impacts of the European regional development and public infrastructure and education investment fund on level of incomes in several Spanish regions. (FUENTE, VIVES 1995)

Frequently used tool is also a panel data analysis which is based on time series relationships investigation. Ederveen, De Groot and Nahuis have used this method for structural funds impact evaluation in 13 countries from 1960 till 1995. (EDERVEEN, GROOT, NAHUIS 2002)

From all mentioned methods are at the present the most frequently used already mentioned macro econometrics models, which usage is also supported by the Europe Commission.

The main advantages of the macro-econometric models (as decision tool) regarding to increasing absorption capacity can be summarized as follows:

1. econometrics models are able to evaluate impact of the structural funds ex-post as well as ex-ante and therefore enable decision makers to allocate sources in the most effective way,
2. econometrics models are complex enough to cover effects of innovation within the economy.

In the EU environment there exists several methods which were practically used for structural funds evaluation in different EU countries and regions. The development of new model is very difficult and expensive, so actual experiences from different EU countries suggest adapting existing models for usage in particular country or region.

This part of the paper, therefore briefly describes the main outcomes of the analyses and selection of the existing econometric model suitable for evaluation of the structural fund on regional level in Slovak environment.

Six existing econometric model were selected for analysis. Each model was in details analyzed from following points of view (criteria):

- (C1) Practical usage for structural funds impact evaluation
- (C2) Possibility and practical usage for evaluation on regional level
- (C3) Suitability for evaluation during whole programming period (ex-ante, mid-term and ex-post evaluation)

- (C4) Data- intensive point of view.

Wide spectrum of information and data were collected and analyzed for each criterion. According to this analyses selection of the most suitable model for Slovak regional environment was made. This selection was made with the usage of the multicriterial analysis according to following conditions:

- Criteria were consistent with analyzing point of views (criteria).
- Alternatives were defined as six selected models:
  - Model HERMIN
  - Model QUEST
  - Model REMI
  - Model E3ME
  - Beutel model
  - CGE Model
- For improving the objectivity of the multicriterial analysis the criteria weights were determined with usage of the Saaty matrix.

Results of the weight determination from Saaty matrix and results of the multicriterial analyses can be seen in table 1 and 2.

*Table1:* Criteria weights according to the Saaty matrix

| Criterion (C) | Weight (W) |
|---------------|------------|
| C1            | 0,123      |
| C2            | 0,275      |
| C3            | 0,062      |
| C4            | 0,540      |
| Total         | 1          |

*Source:* DŽUPKA P.

*Table2:* Evaluation and results of the multicriterial analysis

| Criteria/<br>Alternatives | C1 | W1        | C2 | W2        | C3 | W3    | C4 | W4    | Result |
|---------------------------|----|-----------|----|-----------|----|-------|----|-------|--------|
| HERMIN                    | 6  | 0,12<br>3 | 9  | 0,27<br>5 | 8  | 0,062 | 10 | 0,540 | 9,12   |
| QUEST                     | 4  | 0,12<br>3 | 4  | 0,27<br>5 | 4  | 0,062 | 8  | 0,540 | 6,16   |
| REMI                      | 4  | 0,12<br>3 | 10 | 0,27<br>5 | 8  | 0,062 | 7  | 0,540 | 7,52   |
| E3ME                      | 3  | 0,12<br>3 | 8  | 0,27<br>5 | 8  | 0,062 | 3  | 0,540 | 4,69   |
| BEUTEL                    | 4  | 0,12<br>3 | 10 | 0,27<br>5 | 8  | 0,062 | 5  | 0,540 | 6,44   |
| CGE                       | 4  | 0,12<br>3 | 2  | 0,27<br>5 | 2  | 0,062 | 2  | 0,540 | 2,25   |

*Source:* DŽUPKA P.

According to these results the most suitable decision model which should be adaptable for Slovak environment on nation as well as on regional level is the model HERMIN.

### 5. Possibilities of implementation of the HERMIN model as decision tool in Slovakia

The aim of this article is to offer concrete decision tool for increasing the absorption capacity through the increasing the effectiveness of structural funds supporting innovation within the Slovak regions. Going beyond this aim, this article presents also the results of the implementation possibility analysis of the HERMIN model on regional level in Slovakia.

Possibility of HERMIN model implementation has been made according to the regional data accessibility in Slovakia. First of all, detail input data analysis of the model HERMIN has been made. According to the list of HERMIN input data, the accessibility of data on regional level in Slovakia has been investigated. For analysis of data accessibility Kosice self-governing region has been selected.

For regionalization of HERMIN model 28 input regional data are needed. Only 9 of these data are available in requested form, quality and for period long enough for econometric modelling. One data category (household consumption) was not available in requested form, but according to Eurostat methodology there is possibility to adjust these data to form requested by the HERMIN model. The rest of the data (18 input data) are absolutely not adjustable to requested form. Availability of regional data is presented in table 3.

Table 3. Availability of the regional data

| Data  | Available for period | Availability   | Source   |
|---|----------------------|--|--|
| <b>Production side of the HERMIN model:</b>             |                      |  |  |
| Regional GDP  | 1995-2003            | Data not available in requested form                                   | Statistical office of the Slovak Republic -REGSTAT |
| Employment  | 1997-2005            | Available  | Statistical office of the Slovak Republic          |
| Gross fix capital creation                              | 1995-2003            | Data not available in requested form                                   | Statistical office of the Slovak Republic -REGSTAT |
| Employees income  | 1994-2006            | Available after adjusting  | Statistical office of the Slovak Republic          |
| Population according to age                             | 1997-2006            | Available  | Statistical office of the Slovak Republic          |
| Migration   | 1997-2006            | Available  | Statistical office of the Slovak Republic          |
| <b>Expenditure side of the HEMRIN model:</b>            |                      |  |  |
| Household consumption                                   | 1998-2005            | Available after adjusting  | Statistical office of the Slovak Republic          |
| Public consumption                                      |                      | Not available on regional level  |  |
| Stocks chase  | 1995-2003            | Not available  | Statistical office of the Slovak Republic -REGSTAT |
| Export/Import   |                      | Not available. Estimation possible : $NTSV = GDPV - (CONSV + GV + IV)$ |  |
| <b>Income side of the HERMIN model:</b>                 |                      |  |  |
| Incomes and expenditures of the state administration    |                      | Not available  |  |
| Income and expenditures of the regional administrations |                      | Not available  |  |

Source: own table

According to this analysis, implementation of the HERMIN model on regional level in the Slovakia is impossible because of the regional data unavailability. According to the HEMRIN model analysis and its comparison with other existing econometric models this model is undemanding to data – to be usable also in new EU countries with “pure” statistic availability. Impossibility of usage of the HERMIN model on regional level in Slovakia explicitly means that with very high probability no existing econometric model is usable on regional level in Slovakia.

## 6. Conclusion

Increasing absorption capacity of EU structural funds through the increasing effectiveness of its usage on regional level depends on quality of decision tools. Innovation and its complex and very hardly measurable impact on regional economy, require also very complex decision tools (methods). Only econometric models are suitable for regional authorities to be able to prepare effective decision regarding to increasing effectiveness of the structural funds usage. Very low availability of regional statistic data in Slovakia unable usage and adoption of existing econometric models, therefore regional public administrations are missing effective tool for decision making in the field of structural funds and innovation.

Increasing availability of the regional statistic data in Slovakia should therefore be very first step in the long way of increasing absorption capacity of the structural funds through its effectiveness increase.

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**Ildikó Kneisz - Kornél Kalocsai - Viktória Józsa-Búzás**

## **Supply and Demand in Innovation and R&D in the Region of Northern Hungary**

### **1. Introduction**

The most recent survey of supply and demand in 'innovation and research and development' in the region of Northern Hungary took place in the framework of the NORRIS project<sup>1</sup> between December 2006 and March 2007. The project made it possible to make a detailed analysis of the demand of small and medium-sized enterprises for innovation and research and development (demand side), as well as the services offered by various organisations in these fields (supply side). Before the survey was begun, the framework conditions were developed for conducting the questionnaire surveys and interviews parallel with each other in the district of Kosice (Slovakia) and in the three counties in the region of Northern Hungary.

### **2. Methodological foundations**

Innovation and research and development can be analysed by several methods which can also be used in economic-social analysis (BABBIE, 1995). For conducting primary investigations, questionnaire surveys are the best available methods [PAKUCS-PAPANEK, 2006].

The European Union has conducted several surveys concerning the member states of the Union, called Community Innovation Surveys (CIS), the methodology of which is given in the Oslo Manual (KSH, 2003).

The projects aimed at creating the Regional Innovation Strategy (RIS) funded by the EU were begun in 1994 (GROSZ-RECHNITZER, 2005), through them currently approximately 150 regions have their Regional Innovation Strategies, with some being developed at present. The European Commission has established an organisation consisting of expert bodies: Innovative Regions in Europe (IRE), with the primary task of providing professional support to ongoing RIS projects (LIPPÉNYI, 2004). This has resulted in a methodology for the preparation of Regional Innovation Strategies (KOCZISZKY, 2004), which is periodically updated by IRE and supplemented by the experience of the regions [IRE Secretariat, 2007].

In the development of Regional Innovation Strategies six areas have to be focused on with the strategic priorities based on demand factors:

- Consensus on the innovation situation in the region.
- An analysis of the innovation demands of the enterprises in the region (bottom-up approach).
- Understanding the most important trends in technology and industry, forecasting their impacts on the region.
- A survey of the demands for support and services.
- Formulating the strategy.
- Developing the framework system for implementing the strategy. (GROSZ-RECHNITZER, 2005)
- On the basis of the six areas it can be seen clearly that the questionnaire survey is of key importance for developing the appropriate strategy.

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<sup>1</sup> [www.norrisproject.eu](http://www.norrisproject.eu)

In developing the methodology for the analyses used in the NORRIS project the consortium took into consideration the above methodologies, then the demand analysis was conducted under coordination by the University of Kosice (NORRIS WP8), while the University of Miskolc coordinated the survey of the supply side (NORRIS, WP7).

## **SURVEY OF THE SUPPLY SIDE**

### **3. Research objective, presenting the research method**

The objective of the research is to map the organisations supporting the innovation activities of enterprises in the region of Northern Hungary, with special regard to the following questions serving as topic areas for the analysis summarising the findings of the survey (NORRIS D7.4).

- What is the organisation's mission in terms of research and development and innovation activities?
- What are the innovation programmes implemented in the region?
- What funds are used by the organisation for R+D and innovation activities?
- What capacities does the organisation have for performing R+D and innovation activities?
- What services does the organisation offer for SMEs in R+D and innovation?
- What size is the gap between those providing innovation and those demanding it?
- What efficiency and coherence do partner connections work with in R+D and innovation?
- What extent does networking have among organisations working on the supply side?

The population serving as the basis of the research consisted of three parts:

- Knowledge centres involved in research and development and innovation and organisations producing technology.
- Business support organisations.
- Public institutions.

The list of the organisations in the population included 45 entities<sup>2</sup>. All the questionnaires sent out and all the requests for interviews produced in all 31 responses that could be evaluated. The spatial distribution of the responses showed the dominance of Borsod-Abaúj-Zemplén county, where 70 % of the responses originated with 22 % from Heves and 8 % from Nógrád counties.

The methodology in the research used a questionnaire survey and deep interviews.

Two methodology materials were used to evaluate the potentials, opportunities and opinions of institutions on the supply side of the innovation and research and development market:

- Questionnaire for technology providers and public institutions<sup>3</sup>. (NORRIS D4.1),
- Deep interview guidelines for business support organisations<sup>4</sup>. (NORRIS D4.3).

The findings of the survey were recorded in reports (NORRIS D7.1, D7.2, D7.3).

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<sup>2/</sup> The list of addresses for the questionnaires sent out was obtained from the county Chambers of Commerce and Industry of the region and from the Innovation and Technology Transfer Centre of the University of Miskolc.

<sup>3/</sup> The questionnaire was based on the questionnaire used by the Department of Regional Economics of the University of Miskolc in surveying innovation potential [Kocziszky, 2004].

<sup>4/</sup> It was prepared with contributions by Tamás Madarász Ph.D, Department of Hydrogeology - Engineering Geology of the University of Miskolc.

#### 4. Presenting the respondents

The following is a summary of the findings of the 22 questionnaires returned and the 9 deep interviews.

*Table 1: Composition of the respondents (pcs)*

| Organisation type                        | Number of samples |
|--|-------------------|
| 1. <i>Technology providers</i>           | 20                |
| 2. <i>Business support organisations</i> | 9                 |
| 3. <i>Public institutions</i>            | 2                 |

*Source: authors' work based on the data of the survey*

The organisations providing innovation in the region include mainly research institutes and higher education institutions, or organisations established by them. There exist also recently established for- and non-profit organisations that usually have the classic forms (limited companies, etc.), but co-operations of a new type are also present (cooperating research institutes and incubators). These types of cooperation can be successful in the fields of innovation and innovation transfer, not only in the region, but all over the country.

#### 5. Decisive organisations in the region

One of the outstanding research and development and innovation organisations of the region of Northern Hungary is the University of Miskolc, thanks to its numerous departments (more than 100), close to 74% of which are in some way involved in innovation or research and development activities, as well as to its significant R+D+I human resource capacity. It is mainly the engineering faculties and that of economics that are involved in research activities of several years' standing with the SMEs of the region, but these faculties also work together with such large companies as Bosch or MOL. The infrastructure required for basic and applied research is largely available at the University. Investments of infrastructure type and developments are continuous in the institution, but infrastructure as old as 20 years can also be found at some departments.

#### 6. Main research fields of the research organisations examined:

- Combustion technology and heat engineering.
- Electro-technique - electronics.
- Energy utilisation.
- Geophysics.
- Production processes.
- Environmental technologies.
- Logistics.
- Mechatronics.
- Management and economics.
- Agriculture
- Production methodology.

Technology providing organisations provide various types of services related to their main research fields primarily to the SMEs in the region (Table 2).

Table 2: Services provided by the organisations examined

| Services   | Technology providers | Business support organisations | Public institutions |
|--|----------------------|--------------------------------|---------------------|
| Development of R+D projects  | 6                    | 0                              | 0                   |
| Support for purchasing R+D or innovation equipment                     | 0                    | 1                              | 0                   |
| Trainings  | 15                   | 0                              | 0                   |
| Quality and certification.   | 0                    | 0                              | 0                   |
| Experiments and analysis   | 2                    | 0                              | 0                   |
| Developing new products  | 4                    | 0                              | 0                   |
| Technology presentation  | 10                   | 0                              | 0                   |
| Technical consulting   | 2                    | 0                              | 0                   |
| Support for process development (system automation)                    | 1                    | 0                              | 0                   |
| Searching for technology information (patents, equipment)              | 3                    | 4                              | 0                   |
| Searching for partners   | 2                    | 5                              | 1                   |
| Support for innovation management                                      | 2                    | 2                              | 1                   |
| Support for starting up business/additional benefits                   | 1                    | 4                              | 1                   |
| Support for industrial property protection                             | 0                    | 0                              | 0                   |
| Technology offers  | 11                   | 0                              | 0                   |
| Technology requirements  | 0                    | 0                              | 0                   |
| Searching for capital.   | 1                    | 4                              | 1                   |
| Support for preparing proposals for national/regional projects         | 1                    | 6                              | 2                   |
| Support for preparing proposals for European/international projects    | 1                    | 6                              | 2                   |
| Information on national/regional guidelines and public subsidies.      | 0                    | 1                              | 1                   |
| Information on European/international guidelines and public subsidies. | 0                    | 1                              | 1                   |
| Support for preparing a business/product plan                          | 0                    | 0                              | 0                   |
| Support for business management (human resources, accountability)      | 0                    | 0                              | 0                   |
| Activities for encouraging entrepreneurial dynamism                    | 2                    | 5                              | 2                   |
| Venture capital  | 0                    | 2                              | 0                   |
| Support for making business international                              | 1                    | 4                              | 0                   |
| Analysing the national market  | 2                    | 0                              | 0                   |
| Analysing the international market                                     | 1                    | 0                              | 0                   |
| Financial support.   | 0                    | 2                              | 0                   |

Source: authors' work based on the survey

## 7. Number of employees related to innovation supporting activities

On the basis of the responses to questionnaires and interviews, the number of direct employees in the activities supporting innovation and of research and development is in general 10-49 persons in the individual institutions<sup>5/</sup>. About 70 % of the employees of technology providers work in R+D fields (mostly university departments and research institutes), while business support organisations work only with a small number of employees (2-5 persons).

Opinions of the respondents show several similarities on the innovation climate of the region (Table 3). A felmérésben megkérdezettek véleménye a régió innovációs környezetéről sok hasonlóságot mutat (3. táblázat). The respondents stressed the following as clear strengths:

- the free accessibility of research and human resources,
- expertise in certain research fields,
- the well-operating consultation service background,
- flexible reaction to changing market requirements,
- efficient national and international cooperation networks,
- continuously developed infrastructure.

Table 3: Opinion and evaluation of the respondents on the situation of research and development and innovation in the region of Northern Hungary<sup>6/</sup>.

|   | <b>Technology providers</b>   | <b>Business support organisations</b>  | <b>Public institutions</b>   |
|---|---|--|--|
| <b>Availability, accessibility and patterns of use of capital connected to regional innovation:</b> | <ul style="list-style-type: none"> <li>– Complicated processes and administration procedure.</li> <li>– Slow decision making.</li> <li>– Difficulty of obtaining funds.</li> <li>– Long procedural processes.</li> <li>– Bureaucratic procedures.</li> <li>– Limited availability.</li> <li>– The mostly recurrent opinions on the distribution of regional innovation capital are rather pessimistic.</li> </ul> | <ul style="list-style-type: none"> <li>– Project/proposal possibilities are taking the right direction.</li> <li>– Program-type supports were more efficient.</li> <li>– Sustainability of programs/projects is improving, enabling continuation of the projects.</li> </ul> | <ul style="list-style-type: none"> <li>– Closed system.</li> <li>– Continuous accessibility is required.</li> <li>– Beneficiaries should come from a wider range of organisations.</li> <li>– Rational utilisation process is required.</li> <li>– Decision making time should be shortened.</li> <li>– Faster payments to beneficiaries, with much less bureaucracy.</li> </ul> |

<sup>5</sup> In higher education institutions the respondent departments are considered to be units, thus the category number of employees refers to them.

<sup>6</sup> Responses are summarised based on analysing the questionnaires of the survey and the contents of the interview reports

|  | <b>Technology providers</b>   | <b>Business support organisations</b>   | <b>Public institutions</b>   |
|--|---|---|--|
| <b>Cooperation with the partners:</b>                          | <p>All technology providers asked stressed national and international research cooperation. Different forms of cooperation were chosen but some common topics can be mentioned:</p> <ul style="list-style-type: none"> <li>– Publishing joint manuals and textbooks.</li> <li>– Writing project FP5-7.</li> <li>– Joint research projects.</li> <li>– Mainly training activities (training courses).</li> <li>– Participation in and organising conferences.</li> </ul> <p>In some cases language difficulties represented problems</p> |   | <ul style="list-style-type: none"> <li>– Looking for cooperation with potential partner organisations.</li> <li>– Acquiring as much as possible national and EU funding is typical.</li> <li>– Attempts at generating project-partners (founding consortiums) in order to achieve higher efficiency in cooperation.</li> </ul> |
| <b>Man driving force of the innovation-related activities:</b> | <ul style="list-style-type: none"> <li>– Free accessibility of research and human resources.</li> <li>– Existing cooperation with experts.</li> <li>– Good relations with other research institutes.</li> <li>– Personnel.</li> <li>– Innovation potential.</li> <li>– Knowledge base.</li> <li>– Excellent personnel and laboratory (equipment).</li> <li>– Control tools are decisive.</li> </ul>   | <ul style="list-style-type: none"> <li>– Improving experience and expertise in the organisations.</li> <li>– Only few companies in the region make demands (negative).</li> <li>– Encouraging SMEs to provide innovation service support is a separate task.</li> <li>– Training, open days, dissemination of information.</li> </ul> | <ul style="list-style-type: none"> <li>– Continuously arising demand (from the business sphere)</li> </ul>   |

*Source:* authors' work based on the survey

### 8. Major findings of the survey

- In higher education institutions the slowness of decision making was the most often stressed obstacle to innovation and research and development, which process is further complicated by the various levels involved (faculty, finance board, university senate). It appears as a positive feature that cooperation with companies is much more efficient in the current legal environment.
- It is essential for increasing efficiency that cooperation be strengthened between researchers and innovation experts (economists, lawyers, sociologists, etc.).

- All those asked follow the local, national and European markets, but consider opportunities outside Europe to be less important. This point of view naturally differs from one professional field to the other. At the national level R+D and innovation services, products and technologies are the most important, but in the international market technology transfer appears beside the products. Services mean mainly search for partners, market exploration and search for financial support (foreign funds).
- Traditional ways of contact (official presentations, events, bilateral talks) as the most efficient methods of communication are kept by the institutions; however, new solutions (e.g. focus groups, ‘innovation café’) are also accepted.
- Establishing R+D+I cooperation forms seemed difficult in some cases due to the financial situation of the SMEs. For solving this problem it appears as a solution if the companies enter into R+D contracts instead of paying money into the innovation fund.
- For R+D+I cooperation to be established, both companies and research units have to make initiatives.
- According to opinions on the equilibrium of the supply and demand sides of innovation, the difference is significant in many cases. The main problem that only a small proportion of the companies consider innovation by themselves arises mainly due to financial causes and to the conservative way of thinking (currently companies mostly show a “next user” mentality and are not aware of new issues or are not willing to consider them). Both sides are to be improved: the supply side has to shape applied research according to market requirements, has to improve its infrastructure background and increase its human resource capacity. And on the demand side, the sensitivity to the innovative way of thinking has to be improved.
- In general fast results can be achieved by improving the operation of the information channels, because sometimes the supply and demand sides are not even aware of each other (each other’s requirements).
- Efficient cooperation makes incubation and the high quality of the innovation chain including the whole projects essential, including the presence of venture capital.

## **SURVEY OF THE DEMAND SIDE**

### **9. Research objective, presenting the research methods**

The fundamental objective of the research was to survey the demands for innovation and research and development at the level of small and medium-sized enterprises in the region, with special regard to the following three groups of questions which served as topic areas for the analysis summing up the findings of the survey.

- General presentation of the organisation.
- Necessity for innovation, product and service development, excluding technology development.
- Necessity for technology innovation.

The consortium of the NORRIS project had previously adopted the methodology of using a questionnaire<sup>7</sup>, which was recorded in a separate project document (NORRIS D4.6). Accordingly, the methodology, following the economics and industry classification of International Standard Industry Classification (ISIC) (TEÁOR being its Hungarian equivalent),

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<sup>7</sup> The first version of the questionnaire was written by the Department of Regional Economics of the University of Miskolc under the leadership of Dr. György Kocziszky.

determined the sectors to be included in the analysis, based on employment in the regional sectors, location quotient (NORRIS D4.6), and also took regional priorities into account.

The population serving as the basis of the research consists of two parts in the region of Northern Hungary:

- Small and medium-sized enterprises.
- Large companies.

The methodology of the research comprised a questionnaire survey and deep interviews focused on large companies.

The survey of the demand side of the innovation and research and development market was supported by two methodology materials:

- A questionnaire for technology providers and public institutions,
- Deep interview guidelines for large companies.

The findings of the survey were recorded in reports.

## 10. Evaluation of the questionnaires

Out of the 750 questionnaires<sup>8/</sup> sent out in the region of Northern Hungary the number of questionnaires filled in and returned was 103, with a spatial delimitation of close to even<sup>9/</sup> that is 46% of the questionnaires came from Borsod-Abaúj-Zemplén county, with 34% and 20% from Heves and Nógrád counties, respectively (Table 4).

The following table sums up the distribution of the questionnaires returned according to the industries previously agreed on.

*Table 4: Sectorial distribution of the demand side questionnaires (pcs)*

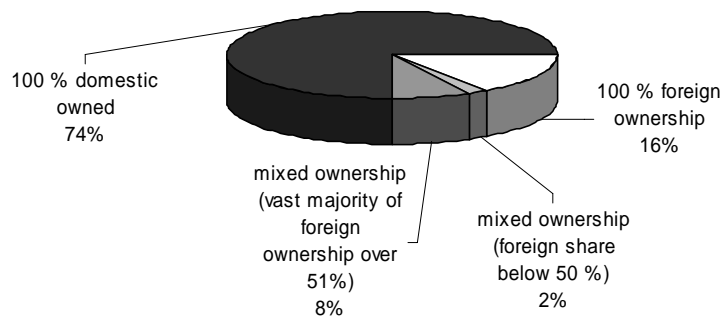
| Sectors                          | Number of questionnaires returned |
|----------------------------------|-----------------------------------|
| Machine industry                 | 27                                |
| Electronics and optical industry | 19                                |
| Food industry                    | 18                                |
| Raw material production          | 21                                |
| Environmental industry           | 18                                |
| <b>Total</b>                     | <b>103</b>                        |

*Source: authors' work based on the survey data*

Looking at the ownership structure of the respondents, close to 75% were fully in Hungarian ownership, while 15.5% were fully in foreign ownership, which was primarily typical of large companies (Figure 1).

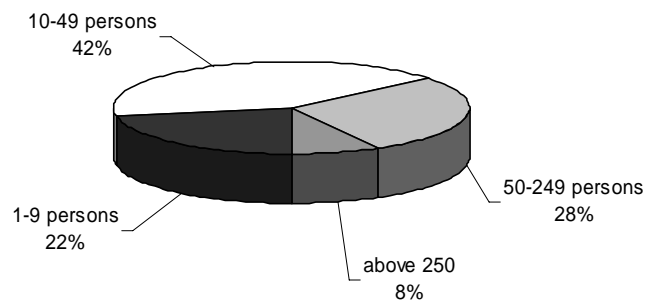
<sup>8</sup> The list of addresses for the questionnaires sent out was obtained from the county Chambers of Commerce and Industry in the region and the Innovation and Technology Transfer Centre of the University of Miskolc.

<sup>9</sup> In developing the methodology, in accordance with the RIS methodology, priority attention was paid to spatial equilibrium. The number of questionnaires sent out was determined so that it should correspond both to industrial classification and to the population rates of the counties, thus attempting to maintain the representativeness of the sample examined. Regarding the questionnaires returned, in order to maintain representativeness, additional questionnaires had to be sent out repeatedly.



*Figure 1. Ownership structure of respondents*  
*Source: authors' work based on the survey data*

On the basis of the number of employees of the enterprises investigated, 22% were micro enterprises, 42% qualified as small enterprises, 28% as medium-sized ones and 8% as large companies (Figure 2).



*Figure 2. Categories of employees of the respondent enterprises*  
*Source: authors' work based on the survey data*

50% of the respondent enterprises indicated that the national market was important for them, while only 35.6% regarded international markets as important. The local-regional market of neighbouring countries was indicated as important by outstandingly few respondents (4%) (Figure 3).

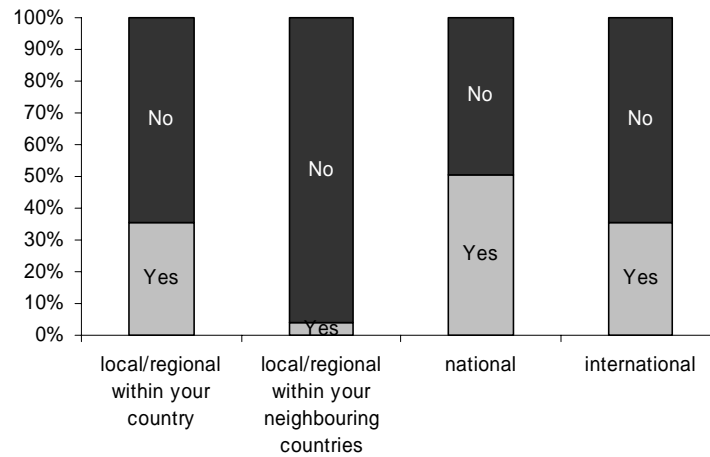


Figure 3. Markets regarded as important by the respondents

Source: authors' work based on the survey data

Examining the lifetime of the products of the companies analysed is decisive in evaluating the innovative character of the enterprise. The products of 44.6% of the respondent enterprises have a lifetime of more than 9 years, which is a rather high value and may represent rather slow and troublesome innovation (Figure 4).

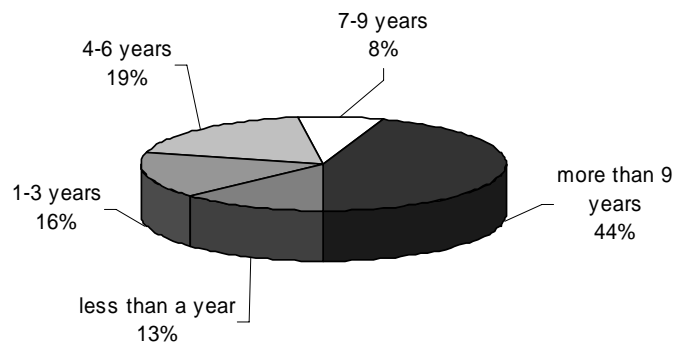


Figure 4. Product lifetime of the companies

Source: authors' work based on the survey data

Examining the innovation needs related to the products of the enterprises, 64% of the respondents marked the answers 'important' and 'very important'. This, by all means, shows a high susceptibility to product innovation, or the fact that the enterprises are aware of the meaning and importance of innovation (Figure 5).

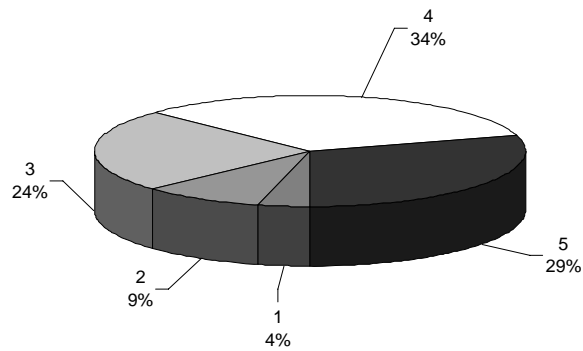


Figure 5. Product innovation needs of the enterprises  
(5 – very important; 1 – not important)

Source: authors' work based on the survey data

In surveying the needs of the enterprises it is an important question to what extent they themselves are aware of the tendencies and trends of the topic areas they consider to be important. On the basis of the questionnaires returned, the enterprises follow domestic processes (68%), partially follow European trends (49%), and are not or are only partially aware of other international tendencies (40%) (Figure 6).

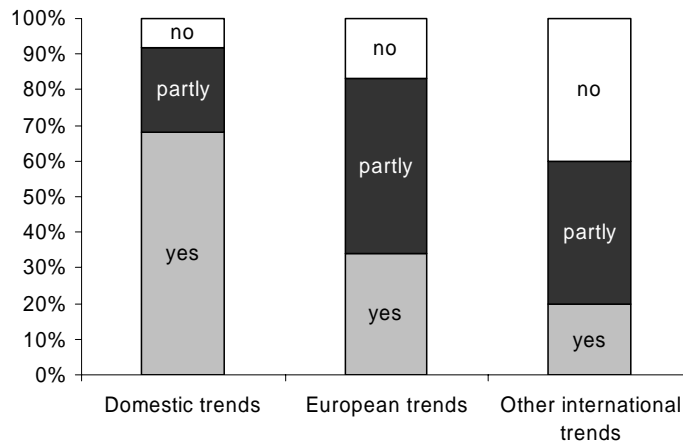


Figure 6. Trends having an impact on enterprises

Source: authors' work based on the survey data

The answers to the question on what enterprises based their product innovation needs the largest percentage of the responses was own ideas and feedback from customers, while the involvement of experts had the lowest value. This may mean that the majority of enterprises do not trust the recommendations of external experts (Figure 7).

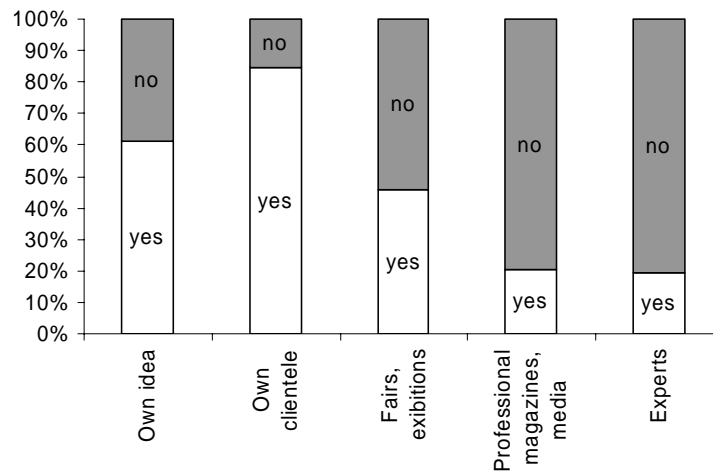


Figure 7. The basis of the product innovation needs of enterprises  
 Source: authors' work based on the survey data

In relation to the previous question, we examined what forms of cooperation the enterprises trusted if there was product innovation. As before, enterprises showed more confidence in personal relations and the integration of suppliers/customers as in cooperation obtained either at exhibitions or events (Figure 8).

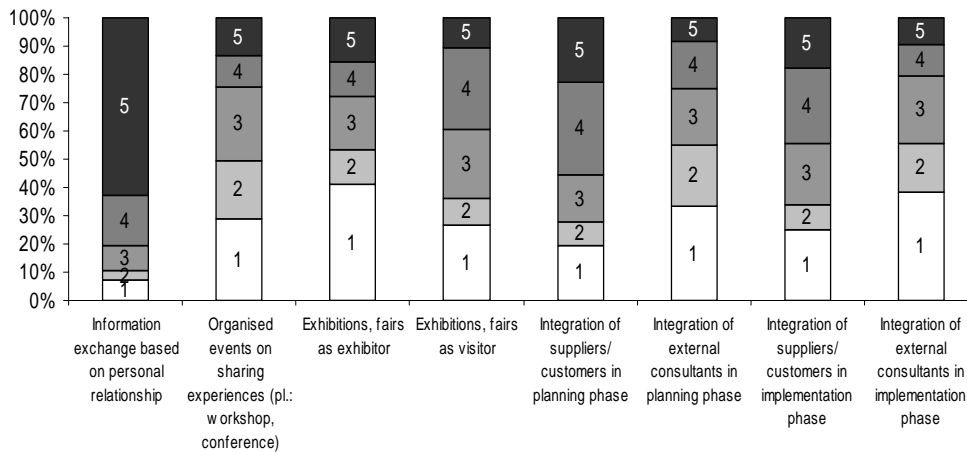


Figure 8. Cooperation forms regarded as important in the product innovation of enterprises  
 (5 – very important; 1 – not important)  
 Source: authors' work based on the survey data

Only 30 % of the respondents regarded the needs for product-related technology innovation as 'important' and 'very important'. This is surprising because in case of an innovation, technology innovation would be the most obvious possibility, but for the respondents this was either capital-intensive or the product itself was such that it was not possible to develop the technology (Figure 9).

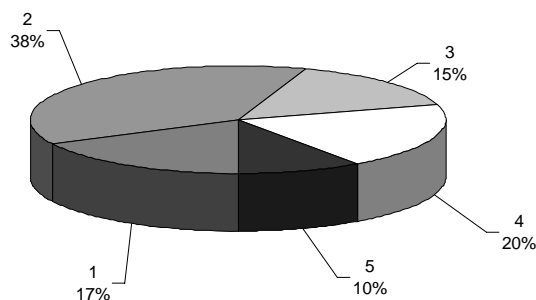


Figure 9. Importance of technology innovation in the enterprises asked  
(5 – very important; 1 – not important)

Source: authors' work based on the survey data

For the detailed analysis the reader is referred to the webpage of the NORRIS project<sup>10/</sup>.

## 11. Summary

The number of newly established enterprises in Hungary is relatively small, which is also contributed to by the increasingly weakening entrepreneurial spirit, due to the relatively high financial (taxation and additional costs) and administrative burdens. These trends represent problems also because in the neighbouring Slovakia, as a result of the entrepreneur-friendly regulations and more favourable economic environment there are more and more enterprises starting up (often with Hungarian owners). In the region of Northern Hungary this phenomenon is to be followed with attention, for due to the geographical location of the region and the increasingly favourable infrastructural potentials, a close cooperation with the district of Kosice may carry serious potentials for an economic revival.

In the past years the number of R+D+I projects as well as the number of SMEs involved have significantly increased as a result of initiatives supporting innovation activities at the national and international levels. These initiatives exert a positive influence on the development of both regional and innovation awareness.

In the region of Northern Hungary there are significant differences between the different economic sectors. The mechanical and machine industries as well as the raw material producing industries have traditions of several years or even decades in the region, and the majority of the companies in these industries are active participants of innovation and R+D efforts. They maintain close connections with their suppliers and customers, taking advantage of the benefits of the various information channels and thus improving collaboration and efficiency. Both research institutes and the university are important partners for these companies in their innovation activities.

The environmental industry (sector) is playing an increasingly important role in the region. Even in the SMEs sector there are numerous companies involved in research, technical and technological developments related to the field. Developing partnerships shows continuity at regional and national levels.

The food industry has shown a small decline in Northern Hungary since 2004; however innovation activities are present also in this industry.

It can be stated that in the region of Northern Hungary the system of innovation conditions is increasingly favourable, although the extent of national subsidies is still low according to

<sup>9</sup> [www.norrisproject.eu](http://www.norrisproject.eu)

those asked. This is a problem first of all in the opinion of enterprises developing products, whose developments respond primarily to market demand. Unfortunately, only part of the Hungarian companies is acquainted with international innovation trends and patents, excepting the companies in foreign ownership. Among the information channels mostly professional journals and exhibitions and fairs are regarded by the respondents as useful.

The greatest problem in the regional innovation system can be found in the fact that the companies do not have sufficient confidence either in the organisations involved, or in the organisations appearing on the innovation supply side. There is a lack of day-to-day efficient collaboration; although due to the initiatives mentioned above the situation seems to be slightly improving recently. In this area the institutions on the supply side and the organisations involved carry outstanding responsibility in maintaining the newly established cooperation forms in the long term and in winning the confidence of SMEs both for the sphere of research and for higher education.

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