

## **The role of EU financial support in governmental policy and the Triple Helix dynamic in the post-accession period in Hungary**

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### **Introduction**

Developing synergic networks among universities / academies, big companies and small and medium enterprises is one of the most important steps for a developing economy. As the OECD report says<sup>1</sup> “The participation of knowledge institutions (mainly the universities and the Academy of Sciences, which plays a major role in the Hungarian research landscape) in innovation has improved but remains insufficient”. Hungary has built up a solid core of high – quality scientific research, produces a respectable scientific output at costs well below the European average, and offers some promising examples of co-operation between businesses, firms and publicly funded public research organisations in some industries and regions. However, this relatively large sector of public research organisations could contribute more to innovation in terms of the utilisation of specialised human resources, and in market-driven fundamental research. Fulfilling this task requires a research infrastructure of sufficiently high quality.

In this paper we analyse how governmental support has fostered the establishment and growth of networks. We shall introduce here 3 different types of support system for network building constructions. We concentrate on co-operations in the health and life science sector. In this paper we show these networks, and point out their structures and finance systems. The network types introduced in this paper are the following: knowledge centres, platforms, clusters and the Hungarian Pole Program. Knowledge centres were the first programs that encouraged network building around universities, and cooperation between industry and universities. Technology platforms integrate all stakeholders in a thematic area, and formulate the vision, strategy and implementation plan; while the innovation clusters realise actual projects, connected to the clusters’ strategy (part of the Pole Program).

After introducing these systems, we illustrate the results of these networks and the specific patterns of their interconnections.

### **1 Funds for innovation in Hungary**

The innovation networks that we are going to analyse in this paper are fundamentally based on 2 different types of financial support: the Technology Innovation and Research Fund and the Structural Funds and Cohesion Fund.

Act XC, approved by the Hungarian Parliament on November 10, 2003, established the Research and Technological Innovation Fund, which provides stable and reliable financing for RTDI activities. The independent government Fund is intended to promote demand driven innovation and knowledge based competitiveness in companies. The Fund is financed by mandatory contributions from all companies registered in Hungary, matched annually by the government budget. The so-called innovation contribution, based on (adjusted) net turnover, for medium size and large companies grew from 0.2% in 2004 to 0.3% by 2006. Micro-enterprises and small-size enterprises are exempt from paying a contribution. Direct R&D expenditures, both intramural and from public R&D units, can be deducted from the contribution, thus stimulating innovation. Company payments into the transparent, specified RTDI Fund shall be used for the direct or indirect benefit of the private sector, as stipulated in the legislation.. It is also a legal requirement that Fund resources shall be spent on competitive tenders, and at least 25% should go on regional innovation.<sup>2</sup>

Strategic issues related to the Fund shall be addressed by the Research and Technological Innovation Council. The majority of the members of the Council shall consist of non-governmental representatives from economic and scientific communities. The Council shall have the right of approval concerning the establishment of the utilisation plan, and the strategy for the proposals for the Fund, including determination of the means and tools of funding and decision-making relevant to the provision of financial assistance. The various competitive schemes include Regional University Knowledge Centres and National Technology Platform programs.

The other source is Structural Funds and Cohesion Fund. The Structural Funds finance multi-annual programmes, which constitute development strategies in which regions, Member States and the European Commission work in partnership, taking into account those guidelines laid down by the Commission which apply throughout the Union. They work on economic and social structures. A special solidarity Fund, the Cohesion Fund, was set up in 1993 to help the four least prosperous Member States: Greece, Portugal, Ireland

and Spain. It provides assistance for these countries in financing major projects in the fields of environment and transport.

There was a turning point in the development of Hungary on the 1st of January of 2007. Hungary was granted the opportunity to make proper use of a total of EUR 22.4 billion from the Structural Funds and Cohesion Fund of the European Union, in order to strengthen those areas of development that were proven successful over the previous 15 years.

Envisioning wider employment and economic growth, the Government intends to put the country onto a new and sustainable course of development through the New Hungary Development Plan. However, the Government can achieve its goals only through the active co-operation of businesses, municipalities, non-governmental organisations and churches successfully applying and utilising available funds. Hungary is on the threshold of a historical opportunity. Between 2007 and 2013, the country is eligible for a development fund of EUR 22.4 billion to re-align itself with developed countries. In order to qualify for this support Hungary has been required to formulate a seven year plan for development. This has been named the New Hungary Development Plan (NHDP (2006), and amounts to a seven year national strategy for advancement. It is a development policy that sets out the strategic areas in which the country would like to concentrate EU development resources. It represents a huge investment in infrastructure in Hungary, and the funds are to be allocated to many different projects. These individual projects will stimulate further investment and jobs, which in turn will assist the development and convergence of the nation.

## **2 Péter Pázmány Programme - Regional Knowledge Centers (RKC)**

The Hungarian government realized (in 2004) that the subsidizing of innovation-oriented R&D at universities is very important. The commercialization of these R&D results is essential as well. With the support of the “Pázmány Péter Program”, industry and universities can cooperate and develop products/services/technologies together. This increases the regional and national competitiveness of the country.<sup>3</sup>

The main goal of the Péter Pázmány Programme is to establish Regional Knowledge Centers (RKC) to exploit research and development results in close cooperation with the industrial sector.

The aim of the programme is to establish professional and regional centers of excellence in cooperation with companies and other research organizations in order to manage innovative projects, focused on research and development at an international level. These research centers shall cooperate effectively with the industrial sector, and stimulate the technological and economical development of their regions.

The task of the Knowledge Centres supported is to transfer R&D results to marketable new products and technologies. The National Office for Research and Technology announced a call for proposals in October 2004 for the first time, to establish and support the operation of Regional University Knowledge Centres. There were 3 calls (2004, 2005, 2006). The total number of projects is 19. The total budget is around 33 million Euro. There were 4 RKC's in the field of health and life sciences.

- *Szentágothai János RKC (SZJT)*
  - The consortium, consisting of 4 major partners, has been supplemented by 4 small- and medium-size ventures, and the 4-year operation of the consortium has been specified to include ca. 270 activities. In addition to research programmes, a change to the innovation approach in the university sphere, and the improvement of technological transfer are highlighted by the Knowledge Centre. The aim of the Szentágothai János Regional University Knowledge Centre is to combine information technology and molecular medicine in the efficient development of research & development. The Knowledge Centre intends to bring about a change in approach in the short term within the university sphere, to enable the valuable basic research activity to create marketable products. With the creation of competitive employment opportunities, it contributes to the reversal of the brain drain, and establishes a critical innovative mass, which may obtain a decisive market position in the region. It has created an incubator house in the medium term, through investors independent of the support, where it will place the base labs and newly established ventures utilising the development results.<sup>4</sup>
- *MEDIPOLISZ RKC*
  - This is an innovative research development and recruitment training consortium in the Trans-Danubian Region. It serves as the base for the health-industrial pole-program, earmarked by the National Development Plan as a regional priority. Industrial investments in the region are significantly behind compared to the national average, therefore state and company-financed research was basically discontinued. „There is no scientific research institute and academic support (of the Hungarian Academy of Sciences) has been held back as well. The Faculty of General Medicine of the University of Pécs (PTE) with the addition of the Pharmacology major, has been accredited as an “Excellence Centerre” and it has a significant, internationally acclaimed academic research team that, besides English, German and Hungarian language graduate education, ensures the education and training of fifty new PhD. students every year.

These experts, subsequently joined by other faculties of PTE and the University of Kaposvár, ensure a solid basis for cooperation with economic partners and for development-oriented research. The strategic program of the Knowledge Centre is the development of new products, the extension of competitive, innovative enterprises, the development of knowledge-based product structures, and the creation of new job opportunities, as well as the education and training of the recruits.<sup>5</sup>

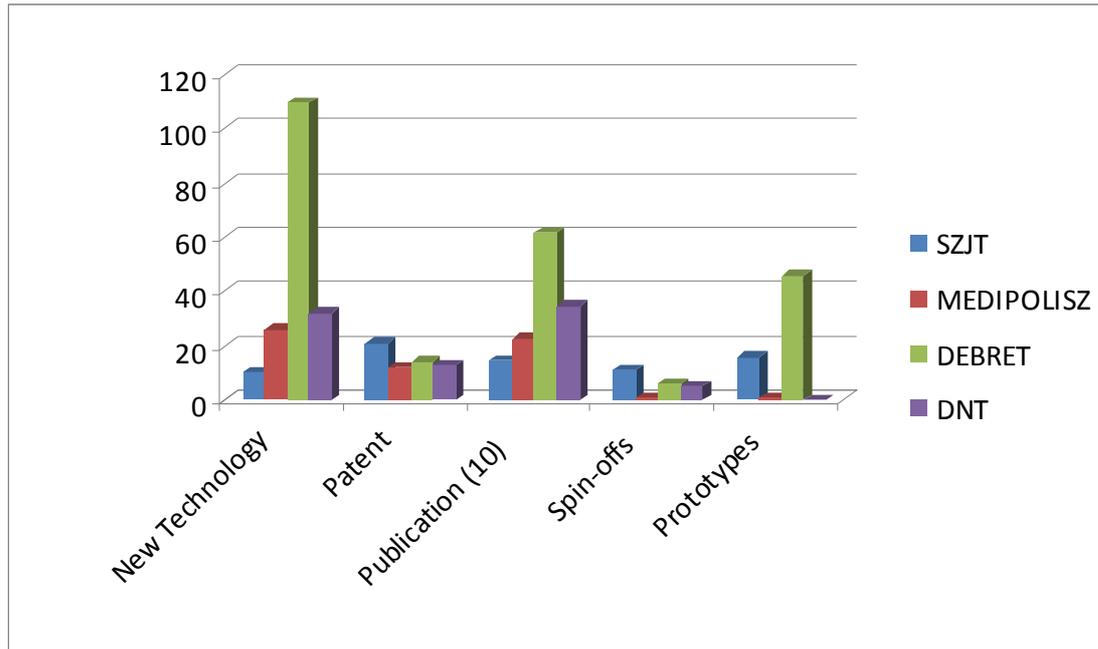
- *GENOMNANOTECH RKC (DEBRET)*
  - With the dynamic development of applied research in the fields of genomics, nanotechnology, and biotechnology, carried out within the GENOMNANOTECH Regional University Knowledge Centre project, as well as with the creation of a new industrial culture and a significant number of jobs, the University of Debrecen will become a key player in the region as regards life sciences and related interdisciplinary research. Based on core research, as well as on applied research and development, the mission of the Knowledge Centre is to achieve the critical mass lacking not only in the region but also at an international level. A long-term objective of Genomnanotech Debrecen is to become a centre for the biotechnology industry in Hungary, which will create a new industrial culture in the Northern Great Plain Region and in Hungary, by supplying high value-added products.<sup>6</sup>
- *Szeged Neurobiological RKC (DNT)*
  - The main task was to organize the human aspect of the R&D work, and to concentrate human resources. All of the relevant research groups of the City and the University were successfully incorporated into a common neurobiological research project. Many research groups that previously did not know each other well, and were not familiar with each other's projects and methods cooperate very well in SNKC on a given task. SNKC has been organized across the institutions and facilities. This could be the reason for the successful collaboration of the 4 departments of the Biological Research Centre of Szeged of the Hungarian Academy of Sciences (BRC-HAS) and 4 faculties of the university in solving neurobiological problems. SNKC has had a unifying role, and some new research groups and small enterprises have been added to it. High level infrastructure is a must if one is to be successful in life sciences. To improve cooperation, and to concentrate on "cutting edge" technologies, we constructed the new Research Center and Incubator Building (RCIB). Cooperation with various pharmaceutical companies has been intensified. Due to the industrial partner EGIS PLC making a high contribution to the project, fruitful cooperation has evolved between EGIS PLC and SNKC.<sup>7</sup>

## 2.2 *The results of RKC's*

How successful were these knowledge centres, or how can we measure their success? The diagram below illustrates the results of these projects. Each knowledge centres won between 4,4 and 6,3 million euros. Unfortunately the indicators that show their results vary, but new technologies, patents, publications, number of spin-offs and prototypes are common indicators in all these RKC's. As you can see from figure 1. the success of these projects is beyond question. However, the number of indicators is not the most important thing. We cannot establish clearly what results might have been achieved based only on the traditional research system, without this specific program. The most important, and salient success of the projects, is that they made conscious the necessity for co-operation between the various players involved, and helped these new networks to develop as functioning active dynamic networks.

Editors note...what does the y axis show?

Figure 1: Results of RKC's



Source: Based on the final reports of RKC's made by the authors

### 3 National Technology Platform<sup>8</sup> (NTP)

The National Technology Platform is a cooperation which formulates the strategic research agenda and its implementation plan.<sup>9</sup> The main goal of NTPs has been to establish platforms in important sectors (ICT, biotechnology, nanotechnology etc.) These sectors can achieve a market leading position (at an international level); they have high growth potential, economic and/or social need, an existing knowledge base in Hungary and may have positive knock-on effects on the rest of the economy.

The Characteristics of the programme are the following. It has a bottom-up approach. It includes all relevant stakeholders but gives priority to industry. Ensuring critical mass is an important step. The NTPs by definition are connected to knowledge/competence centres and clusters. NTPs are characterised by evidence based strategic planning and connection to governmental partners. To achieve these goals, The National Office for Research and Technology made 2 calls for proposals :

1. Call (2007, 10 winner / 400 million Ft ~ 1,5 million €);
2. Call (2008, 10 winner / 360 million Ft ~ 1,3 million €).

The maximum contribution requested was ~ € 1,5 thousand per project, and the maximum duration of the projects was 2 years. The financial basis of the program was Technology Innovation and Research Fund. The platforms must have Strategic Research Plans prepared and on the basis of the Strategic Research Plans they had to prepare Implementation Plans.

- Innovative Medicines National Technology Platform in Hungary
  - The aim of the project is to find the main barriers, and forge co-operation between the players in the medicine developing process, and o achieve two main targets. The first one is to guarantee a high quality environment for medical R&D in Hungary. The second one is to establish a connection to EU Innovative Medicine Initiatives. The consortium includes all interested players: industry, authorities, research and educational institutes, clinical centers and patient organisations. The project is open to new members.
- The Hungarian Biotechnology Association:
  - (HBA) was established by Hungary's leading human biotechnology companies, with the aim of promoting the development and representation of the Hungarian biotechnology sector. The Association's major objectives include obtaining support for the continued development of national life sciences, and the commercialization of scientific achievements, as well as representing both Hungary and its members at international exhibitions and conferences.
- National Genomics Platform
  - The aim of the project is to assist in the usage of genomic science's results in life and health sciences, the biotechnology industry, medicine and ICT. The platform aims not only at the adoption of genome science in Hungary, but to produce internationally competitive products.

The platform assists in the optimal exploitation of infrastructures and the development of new skills in the genomic field.

- National Technology Platform for Integrated Micro and Nanosystems
  - The Hungarian National Technology Platform for Integrated Micro/Nanosystems (IMNTP) was established in March 2008. The operation and structure of IMNTP is similar to the European platforms, and is in line with the work programs of the European Nanoelectronics Initiative Advisory Council (ENIAC) and the European Photovoltaic Technology Platform (EU PV). The main objective of the Platform is to assist in the networking of domestic stakeholders and integrate them into the European initiatives by mapping out the possibilities and facilities and using matchmaking activities.

The 4 platforms introduced above have established a meta-cooperation for competitive medical research in Hungary. Despite Hungary having a strong tradition in medical research, its performance currently falls way short of its potential. Based on the suggestions of the European IMI Strategic Research Agenda, the 4 platforms signed an agreement to address the bottlenecks.

#### **4 Hungarian Pole programme and Cluster development**

The Hungarian Pole Program is a comprehensive economic development program funded by Structural Fund sources, with a strong focus on the 8 pole cities in Hungary (Budapest, Miskolc, Debrecen, Szeged, Pécs, Székesfehérvár, Veszprém, Győr). The Pole Program is defined in the New Hungary Development Plan (NHDP), which is the 7-year comprehensive framework program of Hungary, funded by the Structural Funds and the Cohesion Fund of the European Union between 2007 and 2013. The Program is a strong coordination mechanism for the operational programs (OPs) of the NHDP, which are the thematic strategies of the key sectors and the 7 regions in Hungary. The Pole Program rests

on two pillars, as accepted in the concept of the Program by the Government.

Cluster development pillar: Support of clusters and cooperation of companies focusing on export-oriented, innovative and high value-added activities, mainly based around SMEs. OPs concerned in the cluster development pillar:

- Economic Development OP
- Regional OPs
- Social Renewal OP

The objectives of the Pole Program will be achieved through the improvement of the business environment and cluster development. EUR 564 million worth of support has been granted. The accreditation call for innovation clusters was published in May 2008. The accreditation call aims at selecting the most developed clusters.

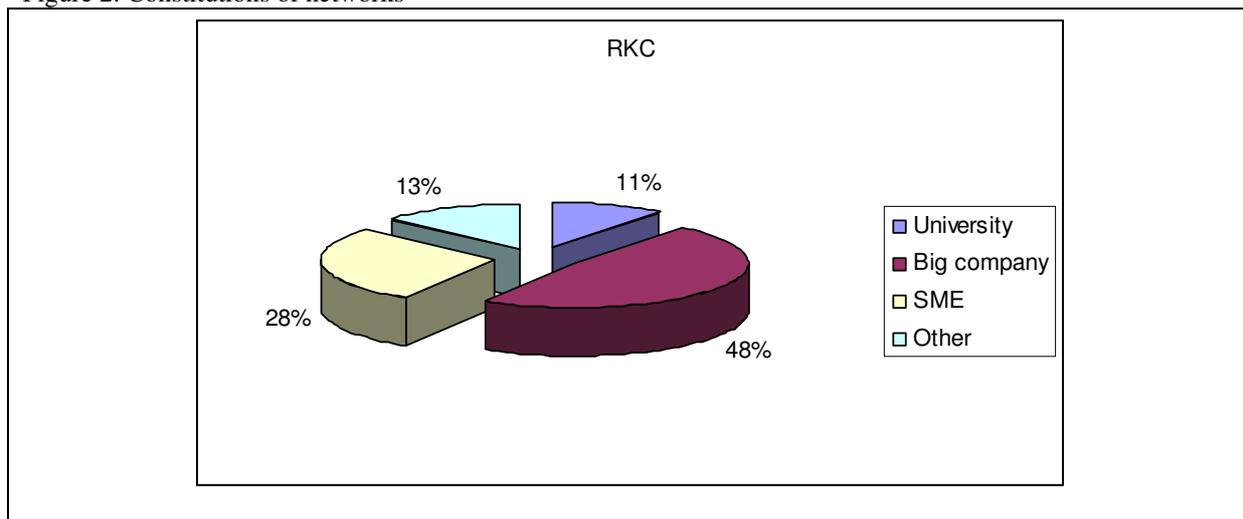
- Biotechnology Innovation Base Ltd.
  - The Biotechnology Innovation Base is an association, founded in Summer 2005, and it works in the framework of the Cluster of Health Industry of Pécs, Centre for Quality of Life. It has 19 members and 8-10 partner companies. It is considered a comparative advantage in the region (South-Transdanubium) that a high technology medical industry based on biotechnological research is already in place. In addition, biotechnological companies stemming from a long-established academic knowledge base have been working side by side in mutual support, and in professional and business co-operation for decades.
- Hungarian Medical Instrument Producers and service providers cluster (MediCluster)
  - The Cluster was established in 2006 with the longterm aim of supporting its members in the compilation of Hungarian medical product lists (machines, specifications); in the listing of exportable products; in the organization of joint representation and distributors; in the creation of joint brochures and promotion campaigns. Currently it consists of 21 members – all of them are SMEs. It is a network of profit-oriented and non-profit companies and institutions engaged in development, sales and services related to medical devices, or involved in import activity and associated business and technical consulting. The total turnover of Hungarian medical manufacturers is estimated at around Ft 10 billion, with the major companies forming the MediCluster, generating sales exceeding Ft 7 billion in 2007, of which more than 3% came from exports. The cluster operates with a flat hierarchy and in a spirit of trust and economic collaboration between its members. The organisations participating in the cluster include key players in the Hungarian medical technology sector. These companies are Hungarian-owned and involved in the development, production, distribution and promotion of medical technology with the aim of providing high-quality medical solutions for social benefit.<sup>10</sup>
- Pharmapolis Debrecen Innovative Pharmaceutical Cluster<sup>11</sup>

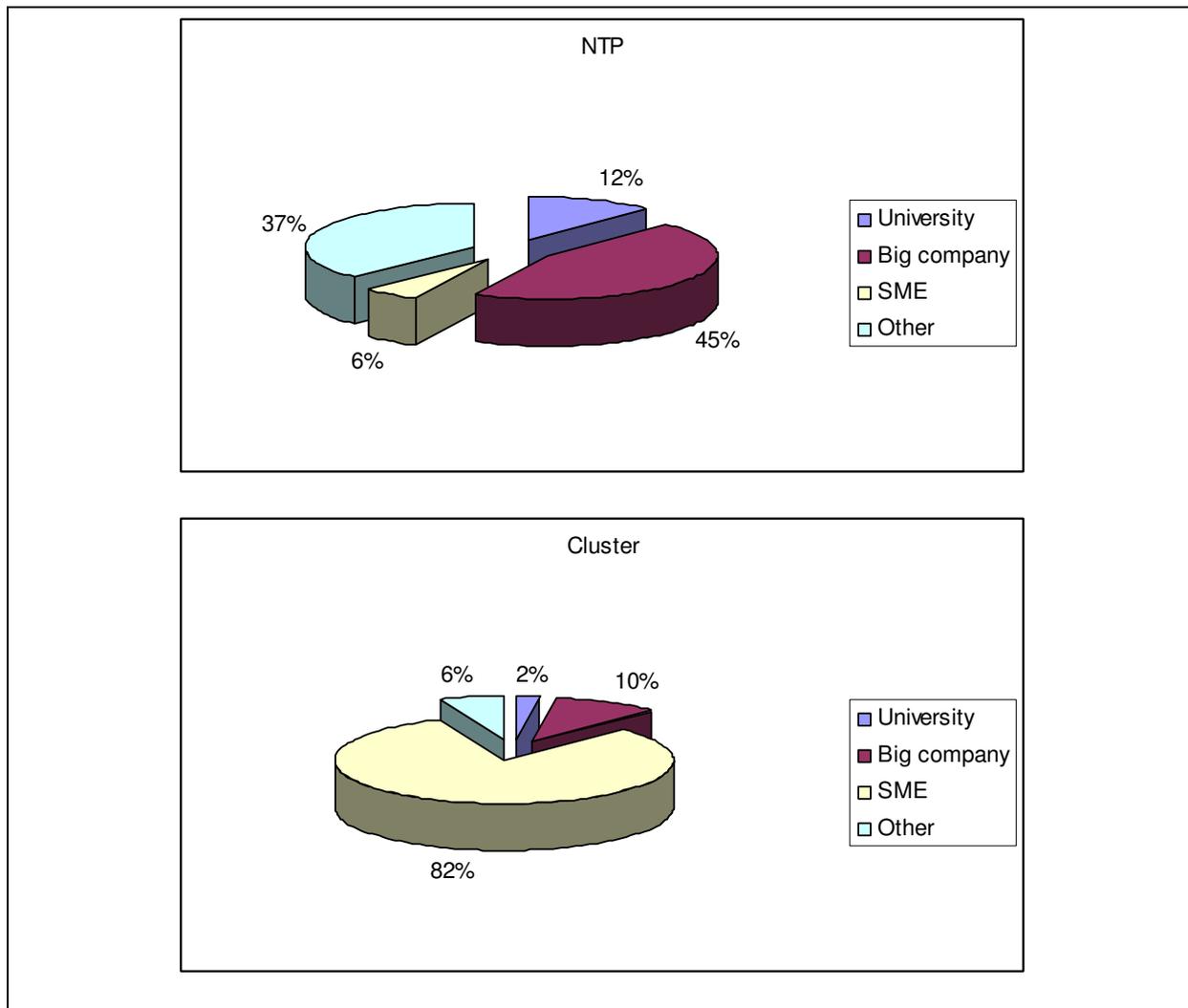
- The establishment of the Pharmapolis Innovative Pharmaceutical Cluster represents the general interests of the economic sectors present in Debrecen, and the stakeholders in the pharmaceutical industry, as well as the City Council of Debrecen of County Rank, the Chamber of Commerce and Industry of Hajdú-Bihar and the University of Debrecen. Through this they can cooperate in the promotion of industrial networking, supported by the profits of the region. The cluster consists of 25 founding members – 19 SMEs, 1 large domestic company in the drug industry, 3 higher education/research institutions, 1 chamber of commerce and industry, and 1 leading regional curing and prevention institution. The objective of the Pharmapolis Cluster is varied; it wishes to strengthen the less developed elements in the innovative chain of the Hungarian pharmaceutical industry, as required by the export interests of economic stakeholders, and it also wishes to contribute to the improvement of European innovative capacities. They wish to achieve these goals by adopting the pharmacy-specific elements of the European Technological Platforms. The development areas are radioimaging (PET based), Central Nervous System Diseases (Parkinson, Alzheimer, ALS), Metabolic Diseases, Immunological Disorders and Cancer.
- Medical Biotechnology Innovation Cluster (OBIK)<sup>12</sup>
  - The Medical Biotechnology Innovation Cluster was established in 2005. Currently it consists of 35 members – 30 are SMEs. The aim of the Cluster is to create a network of complementary companies active in the field of personalised diagnostics and therapy for malignant and inflammatory diseases, and in the area of regenerative stem cell therapies. The basis of this is an affordable, world-class health care service, and a development network in the Central Hungarian region under an international brand. The main targets of the cluster are the introduction and elaboration of new biochemical, molecular-biological, biotechnological and genetic methods and procedures for the prevention, diagnosis and treatment of diseases, and the development of personalized, molecularly based diagnostic methods.

## 5 Different types of member in the networks

The three networks we introduced have different overall aims that require different constitutions of members. The figures below show the specific weight of universities, big companies and SMEs in the consortias. SMEs have the largest proportion in Cluster, whereas the big companies are predominant in NTPs. The universities' percentage is about the same in RKC and NTPs, but represent only 2% in clusters. This pattern suggests more intensive cooperation is required among these different types of network.

Figure 2: Constitutions of networks





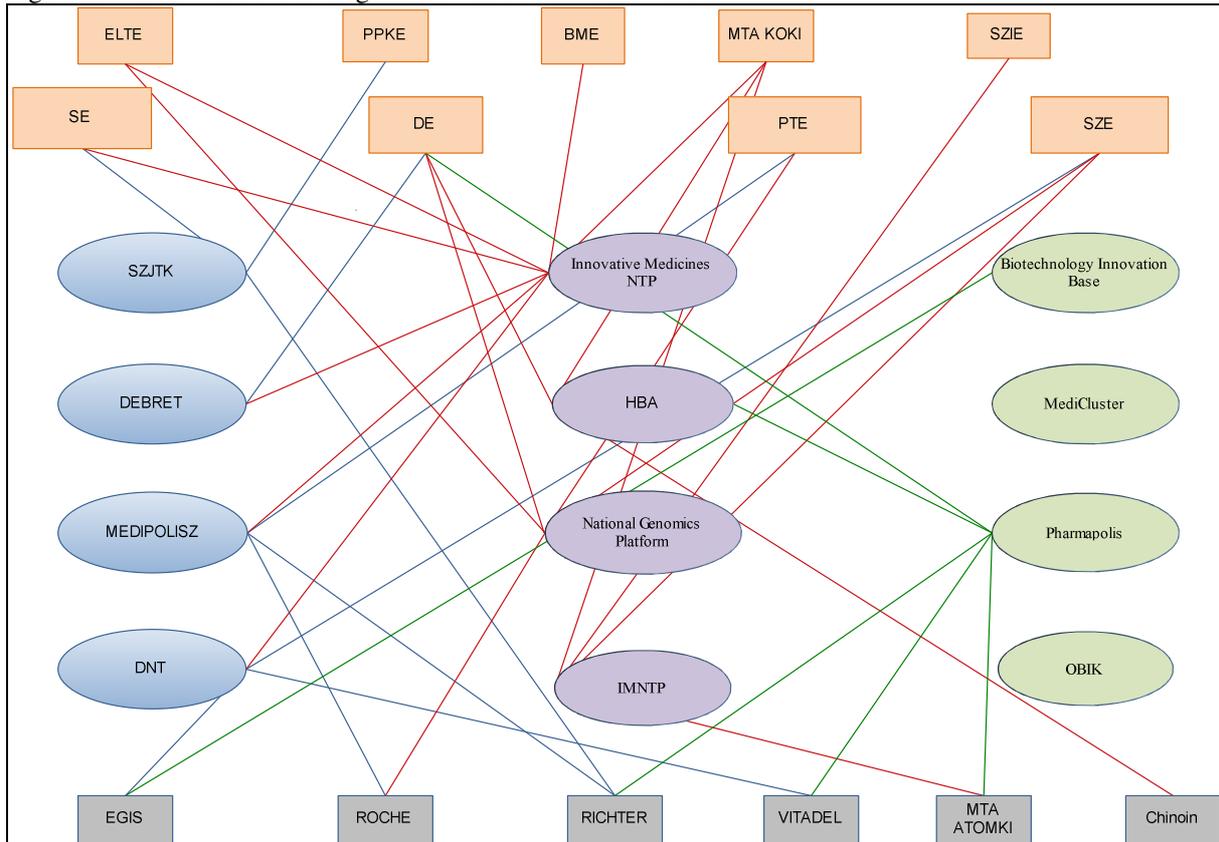
## 6 The networks' of networks

The regional knowledge centres introduced above, together with the technology platforms and clusters, are similar in that all of them aim to develop network activity. During the study we looked for connections among their networks, and among members of these consortia. The numbers of members in the consortia ranged between 10 and 60. We have picked out those members that were connected to at least 2 other projects. Some of them have only one link but they are important enough to be shown on the diagram. SMEs were usually project specific, which is why we didn't point them out on the diagram, as they were connected to only one project/member.. The biggest networks have been established around the universities. There are 4 medical universities in Hungary:

1. Semmelweis University, Faculty of Medicine,
2. University of Debrecen, Faculty of Medicine,
3. University of Pécs, Faculty of Medicine,
4. University of Szeged, Albert Szent-Györgyi Medical University.

Figure 3 shows that these universities are not connected directly. The main connection points are knowledge centres. Originally, the RKC's were established to encourage stronger cooperation between universities and industry. Platforms have the most integrative functions (Innovative Medicines NTP has 7 connections to the others) and clusters have the fewest connections. That is why it is important to improve cooperation between the platforms and the clusters.<sup>13</sup> This development has great potential in that clusters are built up mostly from SMEs (82%) while in RKC's and NTP's big companies represent more than 40%.

Figure 3: Interconnections among the members of different networks



## Summary

There are 3 fundamentally different types of network building programmes in Hungary. Regional Knowledge Centres, National Technology Platforms and accredited clusters. We pulled together the projects in the health and life science sector to illustrate the level of networks in this field. We intended to analyse the results of the projects, but data was only available for Regional knowledge centres. That is why we were not able to measure the success of the networks, and were able to look only at their extension. We hoped to find that the universities have a central role. But the result is slightly different. Universities definitely have an important role, but they are connected to each other indirectly. Regional Knowledge Centres and National Technology platforms have an essential role in activating the networks. Also, big pharmaceutical companies have a catalysing role in these networks. Based on this study, we found that in clusters – especially in this field – universities are usually absent. We didn't mention anything about the efficiency of these networks, as we only wanted to show the potential for better cooperation.

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