

## ICT Research and Innovation Challenges in Poland

The research and development structure, which Poland inherited after the communist system was characterized by high fragmentation (organizational and thematic), subdivided between industrial R&D centers, institutes of the Polish Academy of Sciences and universities. It concentrated predominantly on cognitive research with little attention to practical results. Activities were mainly financed from the state budget through grants of the Ministry of Science and Higher Education and participation of private companies was minimal.

The new challenges of globalization, Polish membership in the European Union and changes in the hierarchy of objectives related to functioning of science led to a need for a series of changes in this system. The responsibility for managing projects was transferred to two newly established institutions: The National Science Centre and The National Centre for Research and Development.

**The National Science Centre** (Narodowe Centrum Nauki – NCN) on periodical basis announces calls for proposals in basic research. The Center offers grants for the funding of research projects, including financing the purchase or construction of research equipment needed to carry out these projects. There is also significant money allocation for pre-doctoral and fresh PhD holders grants for the funding of research projects carried out by researchers starting a scientific career or the appointment of a new scientific teams.

The main task of the **National Centre for Research and Development** (Narodowe Centrum Badan i Rozwoju – NCBiR) is to manage and implement strategic scientific research and development programs, that translate directly into innovation development. It includes support for commercialization and other forms of transferring the scientific research results to the economy, ensuring solid conditions for scientists development, particularly the participation of young scientists in research programs and implementation of the international scientists mobility agenda.

Although by definition both centers are supposed to cover a broad range of disciplines, ICT topics are one of their main priorities. This preference was recommended by the Council of Ministers as it adopted the National ICT Development Plan for 2007-2013, considering information and communication technologies to be essential for the growth of country's economy.

Cooperation within the European Union has had a very strong impact on the advancement of ICT in Poland. The long-term **Framework Programs for Research and Technological Development** has been the EU's main financial instrument for supporting research and developing activities in Europe. Since 1999 Poland has been an active participant of these programs. For more than 10 years Polish scientific institutions, enterprises, organizations and individual researchers have been making an effort to prepare applications, participate in calls, negotiate, and finally implement accepted projects.

In the 5th Framework Program (1999–2002) Polish institutions participated in 1043 research projects and grants, 192 of which were coordinated by Poles. Overall 1324 research institutions, enterprises and fellows gained experience from participating in this program. In the 6th Framework Program (2002–2006) the number of projects with Polish participants increased to 1387 and the number of Polish scientific teams working on these projects amounted to 1878. Polish organizations coordinated 195 projects. The implementation of all these projects supported Polish research with total amount of more than 216 mln euro, among which the Information Society Technologies took ca 40 mln euro and new production processes and devices ca 26 mln euro.

Currently, the 7th Framework Program (2007 – 2013) is being realized. Polish teams are taking part or coordinating a number of important projects, such as the Self Powered Wireless

Sensor Network, Sharing Physical Resources - Mechanisms and Implementations for Wireless Networks, Carrier grade mesh networks, and others. Polish institutions have been also very active in creating the pan-European GÉANT network and services, which enable research communities across Europe and transform the way they collaborate on ground-breaking research. Now in its third term, the GÉANT project is responsible for the network and seeks to develop all aspects of European research and education networking.

In building GÉANT, Polish teams used experience from the PIONIER project. PIONIER is a nationwide broadband optical network, which forms a base for research and development in the area of information technology and telecommunications, computing sciences (grids, etc.), applications, and services for the Information Society. Built for last two decades with entirely domestic funds, it currently connects 21 Academic Network Centers of Metropolitan Area Networks (MAN) and 5 HPC (High Performance Computing) Centers. PIONIER was Europe's first national academic network with total length of over 4,000 km that utilized its own dark fiber optics and DWDM 10GE transmission.

Even though Polish participation in FP projects may seem objectively substantial, there are still inner opinions claiming it is still too low comparing with national R&D potential (however, the number of researchers per 1,000 economically active persons in Poland is 4.4, much less than the average EU-25 5.8). There are also numerous complaints related to difficulties in joining international teams dominated by researchers from “old” EU countries, overwhelming paperwork required for a proposal to be accepted and bureaucracy, which slows down completion of projects. It should be noted that the average cost of a Polish project is approximately half (50.1%) the average EU-25. The reason for this is significantly lower wages in Poland in the area of R&D.

The biggest boost to research and development in ICT came from the **Operational Program - Innovative Economy** (Program Operacyjny – Innowacyjna Gospodarka, 2007-2013). It is one of six national programs under the National Strategic Reference Framework of the National Cohesion Strategy, which are co-financed from EU resources. This program is directed mostly to all entrepreneurs who want to implement innovative projects connected with research and development, modern technologies, investments of high importance for the national economy or implementation and use of information and communication technologies.

This program is managed by the Polish Agency for Enterprise Development (Polska Agencja Rozwoju Przedsiębiorczości), which is responsible for the budget of 4 billion euro. The Agency reports to the Ministry of Regional Development and cedes implementation of projects in particular areas to the Ministry of Economy, Ministry of Science and Higher Education and the Ministry of Interior and Administration, which serve as so-called Intermediate Bodies.

ICT topics are essential part of Innovative Economy program and are present in all of eight priorities into which it is subdivided. They are evidently dominating in:

Priority I: Research and development of modern technologies (enhancing the significance of the education sector in the economy by means of realization B+R assignments)

Priority III: Capital for innovation (increasing the number of new, innovative companies, which have just been launched and enhancing access to the external financing sources of their operation)

Priority IV: Investment in innovative enterprises (upgrading the innovation level of the company by means of introducing modern solutions)

Priority V: Diffusion of innovations (providing the companies with high quality services intended to explore their innovative potential, creating advantageous conditions of cooperation between the companies, the research and development sector and business background institutions.)

Priority VIII: Information Society.

Supported projects range from multimillion ICT systems to providing pocket money for small enterprises, like “Voucher for Innovation” initiative, that offered three thousand euro to companies, which are willing to include some ICT procedures into their daily business. Enormous popularity gained measure VIII.2 (Support for implementation of electronic business – B2B), which attracted thousands of internet start-up companies.

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