12. R&D in the Czech Republic

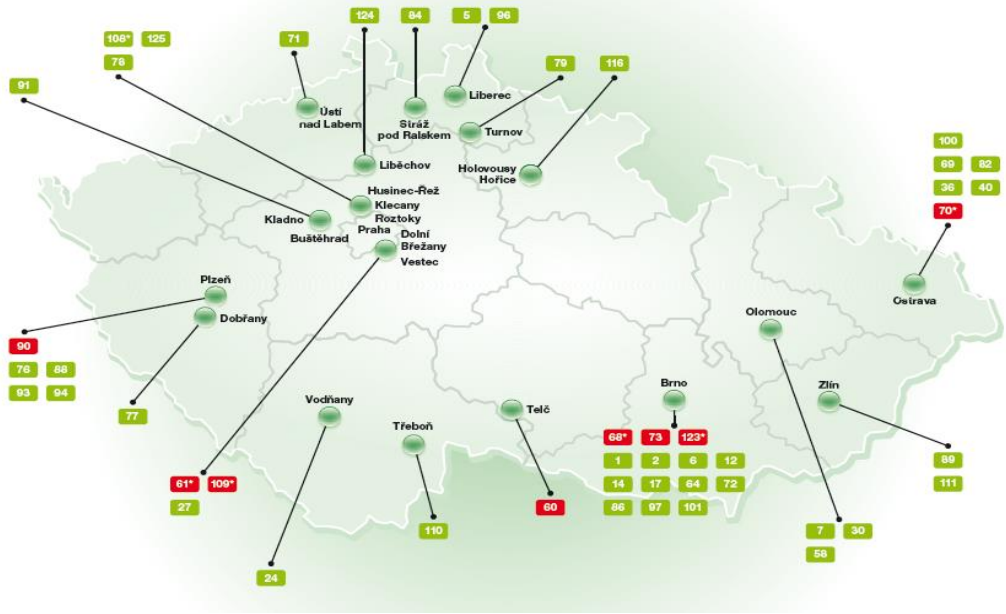
THE CZECH REPUBLIC: THE SKILLS HUB OF CENTRAL EUROPE

The Czech Republic is home to a motivated workforce with a high degree of responsiveness to training and interest in continual professional and personal growth. The Czech Republic is already recognized as a prime location for European services-sector expansion and hosts an increasing number of business-support, research and customer-oriented services including expert solution centers, data processing and call centers as well as regional headquarters, value-added distribution centers and technology parks. Employment in high-tech services and manufacturing is also very prominent in the Czech Republic, providing input for the innovation activities of other firms in all sectors of the economy.

Research Centers Financed by the Operational Programme Research and Development for Innovations

The Operational Programme promoting the competitiveness of the Czech Republic and its RDI potential was aimed at the EU regional policy objectives, in the country in the period 2007-2013. The total budget of more than EUR 2.1 billion was funneled to technical support for universities, commercialization of R&D, technical assistance and, above all, construction of new R&D infrastructure. Approximately two thirds of these funds were used to construct eight large infrastructure facilities considered the European Centres of Excellence (Priority Axis 1) and forty regional R&D centres (Priority Axis 2). The European Centres of Excellence focus mainly on the international collaboration and application of results. The regional centers supported by OP RDI are also conducting exceptional research with a strong connection to the application sphere and thus help to strengthen the competitiveness of their respective regions.

Map of projects belonging to Priority axis 1 (red) and 2



Priority axis 1 (red), Priority axis 2 available upon request

60. Centre of Excellence Telc	(http://cet.arcchip.cz/)
61. Extreme Light Infrastructure	(http://cet.arcchip.cz/)
68. Central European Institute of Technology	(http://www.ceitec.cz/)
70. IT4Innovations Centre of Excellence	(http://www.it4i.cz/)
73. Center for Global Climate Change Impacts Studies	(http://www.czechglobe.cz)
90. New Technologies for Information Society	(http://www.ntis.zcu.cz/)
109. Biotechnology and Biomedicine Centre of the Academy of Sciences and Charles University	(http://www.biocev.eu/)
123. St. Anne´s University Hospital Brno - International Clinical Research Center	(http://www.fnusa-icrc.org/cs/)

Selected OP RDI Center Profiles

The Central European Institute of Technology (CEITEC) is a multidisciplinary science centre focused on life sciences and advanced materials and technologies whose aim is to establish itself as a recognized centre for basic as well as applied research. It is a consortium whose partners include the most prominent universities and research institutes in Brno, and it benefits from the support of the Region of South Moravia and the City of Brno. CEITEC offers state-of-the-art infrastructure for research divided into 61 groups and seven programmes: Advanced Nanotechnologies and Microtechnologies, Advanced Materials, Structural Biology, Genomics and Proteomics of Plant Systems, Molecular Medicine, Brain and Mind Research, and Molecular Veterinary Medicine. Modern laboratories with an area of 25,000 m^2 and nearly 700 special instruments and unique facilities will arise in Brno in 2016.

www.ceitec.cz

Extreme Light Infrastructure (ELI) is part of a new generation of large European research facilities with the main goal of creating laser equipment with unique parameters. ELI's research projects will cover the interaction of light with matter at an intensity level ten times higher than current achievable values. ELI will provide ultra-short laser pulses of a few femtoseconds (10-15 fs) duration with performance up to 10 PW. The ELI Beamlines facility in the Czech Republic will create a portfolio of unique radiation sources covering photons in a broad spectrum of wavelengths as well as accelerated electrons, protons and ions for interdisciplinary applications in physics, medicine, biology and materials science. Specific applications are in cancer treatment, 3D diagnostic methods and material structures, among other areas. These state-of-the-art sources will be driven by ultra-intense lasers with the possibility of synchronizing them in unique combinations with near-absolute precision. Two other centers will be set up in Hungary (ELI Attosecond – ultra-short optical pulses) and Romania (ELI Nuclear Physics – photonuclear physics).

www.eli-beams.eu

BIOCEV is a joint project of six institutes of the Academy of Sciences of the Czech Republic (Institute of Molecular Genetics, Institute of Biotechnology, Institute of Microbiology, Institute of Physiology, Institute of Experimental Medicine, and Institute of Macromolecular Chemistry) and two faculties of Charles University in Prague (Faculty of Science and 1st Faculty of Medicine). The project's goal is to establish a European Centre of Excellence in biomedicine and biotechnology. The project builds upon three pillars of the knowledge triangle: teaching and education, research and development, and transfer of research results into practice. Among the main aims of R&D in Biocev are detailed study of cellular mechanisms at the molecular level, research and development of novel therapeutic strategies, early diagnostics, biologically active agents including chemotherapeutics, protein engineering and other technologies with impact on the quality of life, development of knowledge economy and the competitiveness of the Czech Republic.

www.biocev.eu

The **IT4Innovations** (IT4I) National Supercomputing Centre is a research institution of the VSB - Technical University of Ostrava (TUO). The centre's first part of the supercomputer, Anselm, was installed in temporary mobile units in May 2013. Its theoretical computing performance is 94 TFLOPs. The Salomon supercomputer, which is the 40th most powerful supercomputer in the world, was put into operation in July 2015. Both supercomputers are permanently placed in a new building on the TUO's grounds. In addition to operating the supercomputer, the IT4Innovations National Supercomputing Centre conducts excellent research in the field of IT, particularly in the areas of high-performance computing and embedded systems.

www.it4i.cz

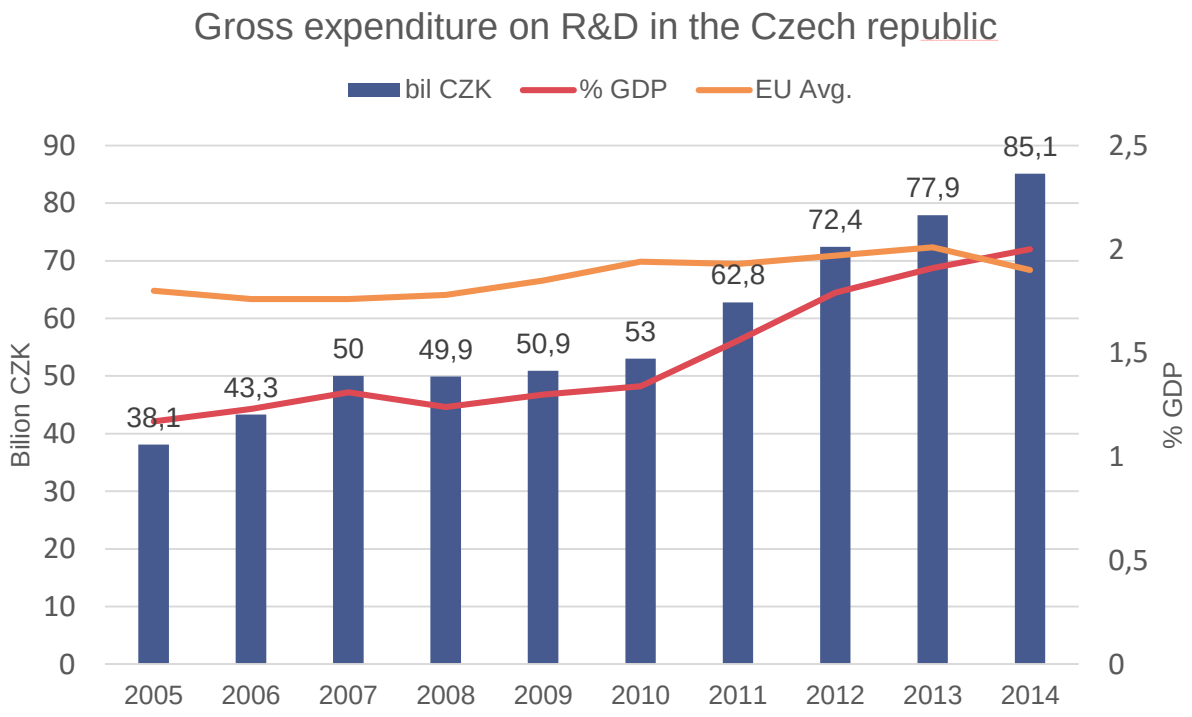
The International Clinical Research Centre of St. Anne's University Hospital Brno (FNUSA-ICRC) is a new-generation science and research centre focusing on finding new methods, technologies and medicaments for effective prevention, early diagnostics and individualized treatment of cardiovascular and neurological diseases. The centre is based on the hospital's successful, long-term cooperation with Mayo Clinic (USA) and other partners both in the Czech Republic and abroad. Areas of research at the ICRC includes cardiovascular and transplant surgery, heart-failure treatment and transplant programmes, interventional cardiology and acute coronary syndromes, cardiac and central nervous system electrophysiology and pacing, cardiovascular and metabolic disorders, development of new methods and interventions to reduce risk factors, tissue engineering in cardiovascular research, cerebrovascular disease research, neuroepidemiology and several research platforms.

http://www.fnusa-icrc.org/cz/

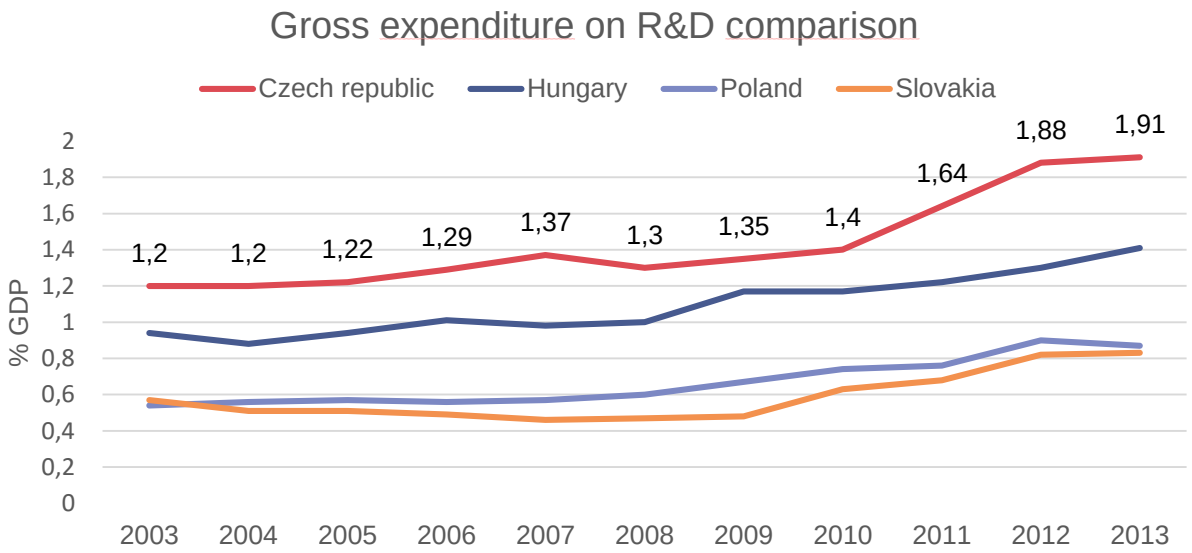
INVESTMENT IN RESEARCH AND DEVELOPMENT

Spending on R&D in the Czech Republic has increased from 0.95% of GDP in 1995 to 2% of GDP in 2014. In 2004 the country became a member of the EU and gained access to a variety of European funds and programmes. Today total expenditure on R&D ranks among the highest in Central and Eastern Europe and ranks higher than the EU28 average.

Total R&D spending in the Czech Republic more than doubled over the past ten years. Total R&D spending (*GERD – gross expenditure on R&D)* is the most well-known and most frequently used indicator for international comparison of research and development. It represents the sum of R&D expenditures from public, private (business or non-business), and foreign sources.



Source: stats.oecd.org, 2016



Source: Eurostat, 2016

SCIENCE AND TECHNOLOGY PARKS

At the science and technology parks, young, innovative firms cross paths with well-established companies with a shared interest in research and development. Within the context of science and technology parks, the Czech Republic supports cooperation between the research and business spheres through the Operational Programmes from EU Structural Funds (see Fact Sheet No. 5). There are tens of science and technology parks located across the Czech Republic.

The South Moravian Innovation Centre (JIC)

The centre's main activities cover support for innovative start-up companies, connecting research and business, and support and infrastructure for mature innovative companies. The centre's portfolio of programmes includes JIC ENTER (for aspiring entrepreneurs with innovative ideas), JIC STARCUBE (an international accelerator for start-ups in the IoT and ICT security fields), JIC MASTER (for companies and start-ups which would like to rapidly grow and expand abroad) and JIC PLATINN (a coaching programme for owners of companies in South Moravia). The centre has also launched a venture fund called JIC Ventures. Among other things, JIC has supported over 200 technologically oriented firms and over 300 collaborations between firms and scientists. Since 2010, the centre has accelerated 62 start-ups with a total investment of CZK 122 million and it is currently taking care of more than 60 companies with 300 employees. The success of JIC has also been acknowledged on the international level. In 2014, its programme for start-up companies claimed first place in the Young Entrepreneurship Competition at the European Business Network congress held in Spain. In addition, the JIC STARCUBE programme was listed in the European Accelerator Report 2014 among the top 20 most active accelerators in Europe.

Innovation Support Centre VSB-TUO

Innovation support centre is a university department whose activities are focused on following areas:

1. University engagement in high quality educational, scientific and research projects, especially those funded by European subsidies. CPI looks up subsidy opportunities, takes part in projects preparation and realization, including coordination of their effective management.

2. Commercialization of selected university know-how, especially through intellectual property rights enforcement and through activities supporting innovative entrepreneurship. Within this area, CPI runs Business Incubator.

3. Coordination of popularization of science and technology in favor of VŠB-TUO. In connection with it, CPI carries out a function of Regional coordinator for supporting technical and science branches in Moravian-Silesian region.

Ostrava Science and Technology Park

The most important purpose of the project is to create a top-level workplace in the region in co-operation with universities and science and research institutes for the co-ordination of scientific and technological development in companies, and for the transfer of advanced technologies, with the objective to attract important international investors in the field of high-technology, as well as to commercialize the results of scientific research.

Technology Innovation Centre

The main objective of the Technology Innovation Centre is implementing strategy of the economic development of the Zlín Region, design conditions for the establishment and development of innovation enterprises for using R&D results in enterprising practice while stressing high-tech technologies and for the development of new lines, technologies and services. Next objective is the development of support tools of innovation activities enabling stimulation of the economic growth and prosperity of the region, increase of competitiveness of local firms and contribution to creating and sustainability of highly-qualified jobs.

SELECTED INVESTORS IN CZECH R&D

A growing proportion of FDI is flowing into R&D activities in the Czech Republic. While many R&D activities have been spun off from manufacturing operations, such as Matsushita's R&D center in Plzen, companies are increasingly establishing R&D centers in the Czech Republic without first having a manufacturing presence. Companies such as GE Aviation, Honeywell, RedHat, Roper Industries, Rockwell Automation, Ricardo, ST Microelectronics, Olympus and AMI Semiconductor provide good examples of such investments. Many companies have also established effective cooperation with Czech universities and research institutes.

Case Study: Honeywell

The Czech Republic is the cornerstone of Honeywell's global engineering strategy in Europe. The Prague Laboratory opened in 1993 and the Brno Design Center followed ten years later. In 2006, the Brno Design Center was integrated into Honeywell Technology Solutions' international network of research, development and engineering centers. Honeywell also has two manufacturing sites in the Czech Republic: Aerospace in Olomouc and Environmental and Combustion Controls in Brno. More than 4,000 professionals work for Honeywell in the Czech Republic.