

Hungary

Following the severe 2008 recession, Hungary's economy has expanded strongly, based on export recovery and macroeconomic stimulus. However, Hungary's income per capita remains among the lowest in the OECD area. This partly reflects a low level of productivity (productivity growth has decelerated since the crisis) and weak business investment in capital and human resources.

While growing in recent years, R&D intensity in Hungary, at 1.37% of GDP in 2014 (1), is still significantly below the OECD average, due to a lack of both private and public investment. Hungary has a strong industrial sector. However, business innovation capacities are mostly concentrated in foreign-owned companies and some large domestic companies (7). Public investment in research displays 33% of GERD (comparable to other European countries) (5a), and the national priorities are strongly influenced by EU programmes, especially structural funds.

The Government is committed to strengthen the research and higher education system by building a strategic framework and implementing reforms. In June 2013, the government adopted the National Research and Development and Innovation Strategy (2013-20). This Strategy aims to stimulate STI demand, establish an efficient support and funding system, and develop an ecosystem for start-ups.

Given the importance of EU programmes in Hungary, the National Smart Specialisation Strategy and all documents related to structural and social funds also have a key structuring effect on STI activities. The 2014 Higher Education Strategy also sets ambitious targets in terms of improving teaching and learning, developing world-class research, and enhancing higher education's contribution to innovation and economic development.

Hot Issues: Strengthening the public research system

Hungary's research infrastructure is considerably outdated, and below European quality standards, due to the low rate of investment in R&D, especially in equipment, machines and tools. In recent years, more emphasis has been put on addressing this crucial issue, with the aim of improving research excellence and raising the direct contribution of research to innovation and economic development. The need for greater public investment in research infrastructure is recognised in the new Economic Development and Innovation Operative Programme (EDIOP), which defines development priorities for 2014-20. The National Research Infrastructure Survey and Roadmap (NEKIFUT), carried out as part of the Government mid-term (2007-13) STI strategy, provided an assessment of the condition of the national research infrastructures and the necessary measures to take. Hungary's Smart Specialization Strategy (S3), adopted in November 2014, included an annex dedicated to research infrastructures. The annex contained an overview of Hungarian participation in large European research infrastructure projects and the development of national research infrastructures. The results of the NEKIFUT project and the S3 annex fed into the report 'Research Infrastructures in Hungary'. This report presented a national vision for research infrastructure, a proposed governance structure, and monitoring systems. The report was adopted by the government in 2014. Projects are currently being evaluated in which Hungary could participate, under the latest ESFRI Roadmap approved in December 2015. Hungary will for instance take part in the Extreme Light Infrastructure (ELI) programme. This will develop a super-laser, in collaboration with the European Union and the Czech and Romanian governments. By the end of 2016 Hungary joined to 9 ESFRI initiatives, embracing a wide spectrum of science and technology. The "university of national excellence" classification is awarded to HEIs with strong educational and research capacities and outstanding scientific results in more than one discipline. This qualification is valid for four years. The annual central budget available for institutional excellence for the 2013-16 period is USD 76 million PPP (HUF 9.9 billion). The New National Excellence Programme, introduced in 2016, provides integrated institutional and personal support: the successful applicant is awarded a scholarship, and the HEI the student is enrolled in, receives an amount equalling to 40% of the scholarship. The central budget of the programme for 2016 is USD 16 million PPP (2.2 billion HUF).

Improving the education system (in general or focusing on tertiary education)

There is further scope for improvement in several areas of the higher education system. The Higher Education Strategy, introduced in December 2014, orients the higher education system for the coming 15 years. The Strategy focuses on key issues such as performance-based teaching and learning, achieving world-class research, involving higher education in urban and regional development, making institutional changes, developing innovative management and adequately funding higher education. The Strategy aims to achieve world-class education and research by focusing on a limited number of research areas and establishing networks among HEIs, companies and foreign HEIs and research centres. The July 2014 amendment of the National Higher Education Act created the opportunity to introduce dual education (in the initial year of 2015, 19 HEIs launched 30 types of BSc program, in cooperation with almost 200 firms, and 440 students began their dual studies; the numbers in 2016: 21 HEIs, 35 programs, 349 partner firms and 644 freshmen). Recent actions have been taken to overcome the limited attractiveness of academic careers. The duration of Ph.D. programmes has been extended by one year, grants for PhDs were increased, and a new tutoring system was introduced. It was also decided to raise pay for teachers in three stages, with average increases of 15% in 2016, 5% in 2017 and 5% in 2018. This measure is expected to affect around 15,000 teachers, including 1600 researchers.

Targeting innovative entrepreneurship and SMEs

In 2013 SMEs in Hungary accounted for just under 60% of the R&D undertaken by business. In line with the importance of SMEs in business innovation, supporting SMEs has increasingly been a focus of Hungarian development and innovation policy. In the last few years, to create a favourable ecosystem for business innovation, more emphasis has been placed on clusters, technology parks, start-up companies, young entrepreneurs, incubation processes, access to credit, and risk capital for innovative projects. The recent Law on “Scientific Research, Development, and Innovation” supports the RDI-driven competitiveness of companies and the creation of high added-value jobs. The government encouraged the development of the Hungarian start-up ecosystem in the document entitled “Budapest Runway 2.0.2.0. – A Start-up Credo”, which was published in November 2013. This document envisions the Hungarian capital becoming the start-up centre of Central and Eastern Europe within a decade. Measure for building a competitive start-up and innovation ecosystem are proposed in four areas: i) education and training, ii) access to funds, iii) taxation and regulation, and, iv) the enabling environment. By launching the portfolio of call for proposals by the National Research, Development and Innovation Office in 2015, a wide spectrum of corporate RDI instruments have been opened up, including grants for advancing RDI activities of SMEs, obtaining industrial property rights, supporting knowledge transfer by innovation voucher, strengthening innovation ecosystem, supporting export-oriented development of innovative products and advancing prototyping and marketing activities. In 2016, various financial market tools will be introduced in the Hungarian policy mix, including tailored microcredit, combined loan/credit guarantee and venture capital investments. The Economic Development and Innovation Operational Programme (EDIOP) also allows co-funding a number of intermediary organisations such as incubators, accelerators and start-up companies for a total allocation of USD 38 million PPP (HUF 5 billion).

Selected Highlights: New challenges

Societal challenges are addressed in various national strategies related to STI (such as the First National Environmental Technology Innovation Strategy (NETIS)). But societal challenges still receive limited resources compared to research aimed at improving economic competitiveness. The National RDI Strategy (2013-20) states that compliance with global societal challenges is a horizontal priority in the elaboration of all RDI policy instruments. The list of global societal challenges includes research related to: water management, the agricultural and food industry, energy, the brain, integration of the Roma people, networks, diseases with public health implications, and healthy ageing. The 2014 Act LXXVI on scientific research, development and innovation stipulates that one of the criteria for selecting projects to be financed through the National Research, Development and Innovation (NKFI) Fund is their potential contribution to solving social, environmental or economic problems or managing the 'social challenges' identified by the Europe 2020 Innovation Union

programme. An adaptation of EU 2020 goals has been advanced by the Government Decree 1640/2014 accepting the National Smart Specialisation Strategy (S3). S3 has defined the inter-sectoral thematic priorities of RDI improvement policy. S3 priorities have been designed in order to match business RDI goals and at the same time, addressing the national socio-economic and environmental challenges. The Human Resources Development Operational Programme (HRDOP) contributes to addressing social inclusion and demographic challenges by improving human capital and the social environment. The document identifies societal challenges in relation to social cohesion and social integration, health and education as well as the need to improve the quality and quantity of human resources in public institutions, especially in connection with R&D. The Government has also developed specific strategies aimed directly at addressing societal challenges, in particular related to the environment (such as NETIS, mentioned above). Finally, some initiatives focus on exploring new promising scientific areas that could lead to new health treatments and economic opportunities. The national S3 set up the strategic framework for the portfolio of call for proposals, which have been launched by the National Research, Development and Technology Innovation Office (NKFIH) in the years 2015-16. The portfolio targets a wide range of RDI actors in order to improve corporate RDI activities, to reinforce public research infrastructure and capacities, to advance knowledge transfer and to increase international cooperation activities in the field of exploratory research and marketable product development. NKFIH also operates a robust national granting programme for exploratory research from all fields of sciences. NKFIH will launch USD 1.95 billion (HUF 551 billion) of funding (including structural funds and NKFI Fund) by the end of 2016. The Hungarian Brain Research Programme was launched in February 2014, with USD 43 million PPP (HUF 12 billion) of funding from the National Research, Development and Technology Innovation (NKFI) Fund. Support will be provided to research groups and the establishment of new research infrastructures during the programme's four year duration. The Bionic Innovation Centre deals with a new emerging engineering science, bionics, which sits at the interconnection between biology and electronics. This effort could result in new products such as biochips, as well as new therapies based on genetics.

STI policy governance

Fragmentation of the STI policy system and a weak culture of collaboration among different public actors have long been considered barriers to better co-ordination of national innovation policy. However, the government has remodelled these structures to obtain a better-focused system of STI ministries, institutions and business actors. In 2012, a single STI coordination body was created, the National Development Cabinet, followed in 2013 by the establishment of the National Science Policy and Innovation Board (NTIT). The new Law LXXVI on Scientific Research, Development, and Innovation, approved in November 2014, set out two significant changes to the structure of governance and funding of the Hungarian STI system. The first of these was the integration in January 2015 of the prerogatives of the former National Innovation Office (NIH), and the ministerial departments responsible for innovation policy, into one structure, the NKFIH. A formally concentrated policy control over the research, development and innovation system is an institutional novelty in the national policy planning, and has just been introduced in 2015 by setting up the NKFIH. A concentrated policy control manifested by the NKFIH has enabled to elaborate and manage the portfolio of call for proposals in the field of research, development and innovation improvement. The second change was the creation of the National Research, Development and Innovation Fund, coming from the merger of two former funds, the Hungarian Scientific Research Fund (OTKA) and the Research and Technological Innovation Fund (KTIA). Overall, these changes aim to ensure a more horizontal approach to the orientation and implementation of all STI policies. The National Research, Development and Innovation (RDI) Office is at the core of the research and innovation system and is in the position to implement strong horizontal and vertical coordination mechanisms with other relevant ministries, agencies, and research and innovation performers. Hungary has recently been involved in a Policy Support Facility (PSF) peer review, an instrument of the EU Horizon 2020 Programme. This review has been published in September 2016. Based on the suggestions of the peer review on the Hungarian RDI system further improvements of policy planning and revising of the forthcoming action plan will take place.

ICT and Internet infrastructures

Hungary's RTA in ICT is above the EU28 but below the OECD median. Internet infrastructures in

terms of fixed and wireless broadband subscriptions lag behind OECD standards. To address these gaps the government recently implemented several major programmes: In the Smart Specialization Strategy, ‘Infocommunication Technologies & Services’ are considered a horizontal priority, with a view to enabling the ICT services sector to enhance its innovation capabilities. The mission of the programme ‘Digital Hungary’ is to ensure, through coordinated government programmes, a more balanced development of the Hungarian ICT sector. These initiatives are complemented by significant efforts to develop ICT infrastructure. The National Infocommunication Strategy 2014-20 guides government action in areas such as fast internet connections for public institutions in rural areas, the construction and maintenance of a national backbone network, and a national wireless broadband network. One of the expected impacts of the EDIOP is to have a million households linked to the new generation broadband network, with high-speed internet coverage rolled out country-wide. For this to happen, Hungary has launched programmes such as the Super-Fast Internet Project (SIP), to encourage development of the Next Generation Access Network (NGA) by 2018. Hungary’s National Infocommunications Strategy also cites investments to promote the digital economy, including through the development of ICT services eligible for export. It plans to boost the electronic commerce market not only by reinforcing electronic payments, but also by promoting electronic invoicing and e-signatures. The National Strategy has allocated EUR 17 million to IT security with the aim of maximising protection of networks, IT infrastructure and public administration e-services, as well as disseminating information on digital risk management.

Technology transfers and commercialisation

The patenting performance of universities and PRIs is low by OECD standards, as is the relative share of public research funded by industry. Knowledge transfer and collaboration among companies is supported in the framework of the 2014-20 Economic Development and Innovation Operational Programme (EDIOP) via various calls for proposals (for intellectual property, prototypes and testing, introduction of innovations, etc.). The new 2014 Higher Education Strategy includes measures to foster collaborative RDI activities between HEIs and companies, as well as better tailoring curricula to the needs of the business sector. HEIs are expected to provide research and development services to the corporate sector, in particular SMEs. Reciprocally, HEIs must be given a significant role in the use of financial support targeted at SMEs. An incentive system should also be set up to involve corporate professionals in Ph.D. training and in research activities in HEIs. EDIOP scheme “Higher Education and Industrial Cooperation Centre” supports consortia of HEIs and industrial firms to implement joint research activities, in an aggregate amount of USD 129 million PPP (35.5 billion HUF). Government incentives for business research and innovation include a tax incentive for employing PhD researchers in companies. The government also adopted several measures, notably in the framework of the 2014-20 EDIOP and the National Smart Specialisation Strategy, to assist the purchase of innovation services by SMEs (through innovation vouchers), and support established consortia built on stable industry-academic partnerships. The total allocation for innovation vouchers was USD 11 million PPP (HUF 3 billion), and the allocation for consortia was USD 181 million PPP (HUF 50 billion).

Globalisation

Hungary is well integrated into international knowledge networks as reflected by the share of its scientific publications and patent applications produced with international co-authors and co-inventors. In addition, foreign affiliates play a key role in national R&D activities as they perform more than 50% of business R&D. As part of the foreign policy strategy of “Global Opening” announced in 2011, the Government has launched new initiatives to support internationalisation, including in the STI area. Under the Economic Development and Innovation Operational Programme (EDIOP) (2014-20) and the National RDI Fund, support is given to collaborative networks involving large companies so as to generate knowledge spillovers to SMEs and academic PRIs. While EDIOP funding particularly targets SMEs with international potential, a new start-up ecosystem programme is currently under development to encourage the internationalisation of SMEs. The Hungarian government has also paid particular attention to improving the integration of national HEIs into global academic networks. The Human Resource Development Operational Programme (2014-20) has two dedicated measures for that purpose: one for a better integration of higher education research into the European Research Area and accession to Horizon 2020 (through supporting research and service capacity building in an amount USD 58 million PPP [HUF 16 billion]), the other

“(Campus Mundi”) for a broader internationalisation of the higher education system. The Stipendium Hungaricum Scholarship Programme, launched in 2013, aims to increase the number of foreign students in Hungary and to encourage Hungarian higher education institutions to attract top foreign students (who numbered about 3000 in 2016/17). Eligibility for the Hungarian Eötvös State Scholarship will be extended to foreign researchers and academics from 2017. The Campus Mundi programme also provides merit-based scholarships for students’ outward mobility and introduced various initiatives to drive institutional improvements, raise Hungary’s position in international rankings, ensure participation in international education fairs, and increase the number of foreign students. The internationalisation of research and higher education is also promoted through Hungary’s participation in the European Framework Programme and broader access is being given to research infrastructures at the Hungarian Academy of Sciences.

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[6] https://www.innovationpolicyplatform.org/system/files/STIO%20Key%20messages_0.pdf

[7] http://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-innovation-outlook-2016/hungary_sti_in_outlook-2016-63-en

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[9] http://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-innovation-outlook-2016/methodological-annex-to-the-2016-oecd-sti-outlook-country-profiles_sti_in_outlook-2016-95-en

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