

## Austria

Austria is a small and open advanced European economy which has seen rapid progress in its research and innovation system. Keeping up the dynamic development of the Austrian innovation system is an important task. After nearly two decades of sustained growth, the expansion of R&D expenditure has slowed in the aftermath of the financial crisis, and constraints on public R&D expenditure are tight in current budgets.

A major challenge is therefore to increase the efficiency of current spending and to continue structural and institutional reforms in research organisations and public administration while launching new initiatives to address some of the main bottlenecks perceived in the research, technology and innovation system. Innovation is critical for generating sustained productivity growth, especially in advanced economies. In Austria, labour productivity varies considerably across sectors. While it remains on a constant high level in manufacturing, services and construction sectors lag behind. Overall labour productivity slightly declined since 2013.

In 2011, the Austrian Council of Ministers announced its Research, Technology and Innovation (RTI) Strategy for 2011-20. The Action Plan for a Competitive Research Area, launched in 2015, presents the measures taken by the Federal Ministry of Science, Research and Economy in order to implement the RTI strategy.

### **Hot Issues: Strengthening the public research system**

Austria has a relatively strong science base with a stable level of public-sector R&D expenditure of 0.84% since 2009. Its share of top 500 universities per GDP is in the upper middle OECD range and international publications are in line with the OECD median. The new Federal Ministry for Science, Research and Economy (BMWFW), created through a merger of two Ministries, and the Ministry for Transport, Innovation and Technology (BMVIT) share responsibility for innovation policy. Major funding organisations are the Austrian Science Fund (FWF), focused on basic research, and the Austrian Research Promotion Agency (FFG), on applied and industrial research. In 2015, the Research and Technology Funding Act (FTFG), the legal basis of the FWF, was amended to modernise the latter's organisational structure and to speed up its decision making processes. The National Plan for Universities (2016-21) outlines the main goals for the further development of public universities. It aims for example at improving the quality of teaching, international linkages of HEIs, to foster attractive research careers (Post-Doc Track Pilot Programme), to strengthen social inclusion and to support basic research. The aforementioned Action Plan for a Competitive Research Area presents a roadmap of BMWFW's RTI policy measures. For example, the ministry renewed its Performance Agreement with the Austrian Academy of Sciences (OeAW) and signed a new one with the Institute of Science and Technology (IST) to further develop the research environment and to support young researchers with fellowships and grants. The strategy also includes a Gender Equality Action Plan to promote the proportion of women in science. Responsibility in research and innovation are addressed by the Alliance for Responsible Science, founded in 2015. To improve its research infrastructure, Austria takes an active part in the European Strategy Forum on Research Infrastructures (ESFRI) and is involved in several initiatives of the European Research Infrastructure Consortium (ERIC). Austria coordinates the ERIC on Biobanking and Biomolecular Resources Research Infrastructure (BBMRI). Universities are encouraged to collaborate on R&D infrastructure investment and use.

### **Addressing challenges of STI globalisation and increasing international cooperation**

Austria is very well embedded in European research activities and participates actively in European R&D funding programmes, particularly in Horizon 2020. R&D funding schemes are generally receptive to cofunding and partnerships from abroad. Until 2015, around 140 ERC grants have been awarded to scientists at Austrian institutions. Funding opportunities for collaboration with partners

from countries outside of Europe, however, are still scarce. To fill this gap, authorities implemented an STI internationalisation strategy “Beyond Europe” in 2015 to strengthen collaboration outside the EU and especially with emerging Asian countries. For the first call in 2015/16, USD 5.7 million PPP (EUR 4.6 million) have been allocated. The “GoInternational” programme, the main export promotion programme of the Austrian Chamber of Commerce, encourages internationalisation of innovative firms. One of the programme’s 25 instruments is the Export Cheque (2015-19) for technology-oriented enterprises that cofinances various of their business activities abroad. Austria is actively involved in EU activities, such as ERANET, Joint Programming Initiatives or Joint Technology Initiatives. The BMWFW endowed USD 4.9 million PPP (EUR 4 million) to the Global Incubator Network, launched in 2016. The network serves as a platform for international and Austrian start-ups, investors, business angels, and start-up agencies. The Research Location Austria marketing campaign has promoted the image of Austria as an attractive location for foreign R&D investment and foreign R&D projects.

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

The share of tertiary education expenditure per GDP and the share of adult population with tertiary education attainment are below the OECD median while technology problem solving skills of adults and performance of 15 year-old students in science are at the OECD median. The recent Work Programme of the Austrian Government 2013/18 endorses the objective to spend 2% of GDP on higher education by 2020. Against the backdrop of increased international competition, Austria is preparing for a potential lack of human resources for STI. The Austrian RTI Strategy addresses this issue with a number of measures. The teacher training model from 2014 aims to increase the quality of teaching in Austria by providing more academically founded theory and practice for teacher training. The “New Secondary School Initiative” is a major educational reform while the MINT Programme aims to improve education in mathematics, computer science, science and engineering. “Research Skills for the Economy” (Forschungskompetenzen für die Wirtschaft) is an initiative to build R&D skills. Further, the “Lifelong Learning Strategy” and the “Lifelong Guidance Strategy” aim to increase access to formal lifelong learning for the broader population. Joint ministerial programmes such as “Jugend innovativ”, “Sparkling Science” and “Innovation Generation” aim to stimulate interest in and skills for STI among young people.

### **Addressing societal challenges (including inclusiveness)**

Like other advanced countries, Austria faces social challenges related to ageing, health, income inequality and climate change, which the government intends to address through STI. Austria has joined seven out of ten EU Joint Programming Initiatives (JPIs). New products and services in bio-, pharmaceutical and medical sciences are well positioned to address societal challenges, such as demographic change, youth unemployment and quality of life. In this context the BMWFW currently works on the implementation of an upcoming comprehensive strategy (Life Science Location Austria) that shall address policy issues along the whole life science value chain, from basic science to commercialisation. BMVIT has renewed the programmes for future Information and Communication Technology, future Mobility and future Energy Systems (Renewable Energies, Efficiency, Biobased Industry) and launched a programme Industry 4.0.

### **Selected Highlights: New challenges**

Austria’s technology advantage in environmentrelated technologies, measured by patent family applications, has decreased in the past years. The RTA in biotechnologies, however, has increased compared to the early 2000s. The Austrian government’s intents to expand this advantage by developing a “Bio-Economy Strategy” that should support i) the optimised use of research programmes; ii) interdisciplinary and cross-sectoral research and innovation; iii) cooperation and knowledge transfer among science, economy, and society; and iv) the advancement of institutional framework conditions supporting collaboration in European and international research programmes. The “Energy Research Initiative” (ERI) based on the 2010 “Energy Strategy” will support technology development for the production of renewable energy sources and the storage of CO<sub>2</sub>. The “Cleantech Initiative” provides risk capital for innovative enterprises in energy and environmental technologies. The governmentowned AWS Bank’s capital injection of USD 8.2 million PPP (EUR 6.9

million) is expected to leverage around USD 42 million PPP (EUR 35 million) in funding. “EMobility” is an initiative to develop a more sustainable and efficient transport system.

### **New sources of growth**

The “Manufacturing of the Future” (2011-20) initiative has a budget of USD 7080 million PPP (EUR 86-98 million) to strengthen Austrian manufacturing through research on future technologies and processes. Austria does not yet have a technology advantage in biotechnology and ICT. The “Biotechnology Action Plan” bundles existing initiatives with new measures to promote the development of biotechnology with a budget of USD 60 million PPP (EUR 74 million) (201315).

### **STI policy governance**

GERD was 3.10% of GDP in 2015 and is estimated to stay in this range in 2016 (Austrian Research and Technology Report 2016). This puts Austria well ahead of the EU28 and OECD averages. The government also supports the ambition to raise GERD to 3.76% of GDP by 2020, with up to 70% funded by business. With the adoption of the RTI Strategy in 2011, a task force comprising all relevant ministries was established to oversee its implementation. It issued a comprehensive plan in November 2013. The Austrian Council for Research and Technology Development is tasked with monitoring the implementation of the STI strategy. A concept for innovation-related public procurement was adopted in 2012, with the Ministry of Science, Research and Economy and the Ministry for Transport, Innovation and Technology jointly overseeing its implementation. After 2012, an additional evaluation of the Christian Doppler Research Association and its funding programmes for CD Labs and JR Centres has been carried out in 2016. Impact assessments of FWF’s Doctoral Programme (DKs), the Erwin Schrödinger Programme (since 1984), and the R&D Competences for Industry Programme (since 2011) have been completed by 2014 and 2015, respectively. With regard to Open Access, the FWF has published guidelines on open access for publicly funded research. Furthermore, the University of Vienna, the Technical University of Vienna and the FWF support the funding of arXiv.org, a platform managed by Cornell University providing open access to more than one million online publications and e-prints in physics, mathematics, computer science, quantitative biology, quantitative finance and statistics.

### **ICT and Internet infrastructures**

While Austria’s ICT investment as a share of GDP is among the top OECD performers, levels of public and private use of ICT infrastructures lag behind the OECD median. The new Austrian Centre for Digital Humanities (ACDH), operative since January 2015, is a centre for the digitalisation of research materials and tries to bridge the gap between investment and use of ICTs by fostering digital methods in the various fields of the humanities. Digitalisation and open data facilitate international research cooperation, and make it more cost and time-efficient. The ACDH has a total budget of USD 2 million PPP (EUR 1.6 million) for the period 2014 to 2016. Moreover, “ICT of the Future” is an ongoing funding programme (2011-20) to support technology development and innovation in ICT applications linked to societal challenges.

### **Technology transfers and commercialisation**

Industry-science linkages have improved in recent years, with an increasing share of public research funded by industry. However, patents filed by universities and public labs lag behind the OECD median. Longstanding initiatives to promote strategic industry-science collaboration include the competence centres for excellent technologies (COMET), cooperation and innovation networks (COINNet), as well as the Christian Doppler (CD) Laboratories. The Josef Ressel Centres programme (started in 2012) applies the principles of the CD Labs in local contexts. The Laura Bassi centres of expertise support a forum for skilled female and male researchers from academia and the private sector to work together. In 2014, the BMWF established Knowledge Transfer Centres promoting technology transfer incentives between universities, other research organisations and the private sector, as announced in the Austrian RTI strategy. Measures include the appointment of transfer co-ordinators at universities, new patent funding promotion schemes to bear registration fees, and a new competitive prototype funding scheme to support the commercialisation of promising and recently patented or patentable research results from universities. Authorities revised the Patent and

Trademark Law in 2013 with amendments in force since 2014. Based on the new regulation, the Austrian Patent Office is the court of first instance, the Higher Regional Court of Vienna (Oberlandesgericht Wien) the second, and the Supreme Court (Oberster Gerichtshof) is the third instance. Concerning IPR, the BMVIT and the BMWFV established a comprehensive strategy in 2016 to increase awareness and knowledge of IPR, to better exploit and monitor them, and to provide transparent support structures and procedures including international enforcement.

### **Innovation in firms**

Foreign MNEs contribute much to the R&D performed by large companies. BERD is mainly concentrated in manufacturing industry in large companies and foreign affiliates, and grew constantly since 2009. In 2014, it accounted for 2.17% of GDP, a very high level compared to other OECD member states. Although Austria has a conducive business environment for entrepreneurship according to the ease of entrepreneurship index, the supply of venture capital still lags behind the OECD median. However, many innovative, R&Dperforming SMEs are competitive in niche export markets. In 2014, a revision of the SME loan guarantees scheme led to simplified funding procedures for SMEs. The revised Loan guarantees scheme, provided by the Austrian Business Service (Austria Wirtschaftsservice aws) aims at reducing the administrative burden and at harmonising existing and new guidelines to support young entrepreneurs. With the same objective, the Austrian government has recently implemented the “Alternativfinanzierungsgesetz (AltFG)” to improve the regulatory framework for alternative financing in Austria. Policy measures focus on facilitating crowd-investing by eliminating legal barriers and adjusting collateral requirements. Projects can be directly issued by an entrepreneur or the company and indirectly via an intermediary, such as a crowdfunding platform.

### **Clusters and regional policies**

Automotive Cluster Styria, founded in 1995, was Austria’s first ‘example’ of cluster policy. Almost every federal state (Bundesland) runs cluster initiatives or incubators to link companies and research institutions around thematic priorities. Nationwide, there are more than 100 innovation infrastructure sites (Impulszentren). A national platform for clusters was established in 2008 to create a structured and cooperative forum for regional and national clusters. Around 55 cluster initiatives with around 10 000 partners and 20 technology parks participate in the platform. In 2014, the focus will be on enabling technologies and societal challenges.

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**BERD:** <http://innovationpolicyplatform.org/STICharting/BERD.htm?iso=AT> [2]

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**RTA:** <http://innovationpolicyplatform.org/STICharting/RTA.htm?iso=AT> [4]

**Other STI Outlook Resources:** [e-Outlook Homepage](#) [5]

[STIO Highlights](#) [6]

[Printable Austria 2016 Country Profile](#) [7]

[STIO Country Profiles Reader’s Guide](#) [8]

[Methodological Annex to the 2016 OECD STIO Country Profiles](#) [9]

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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](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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