



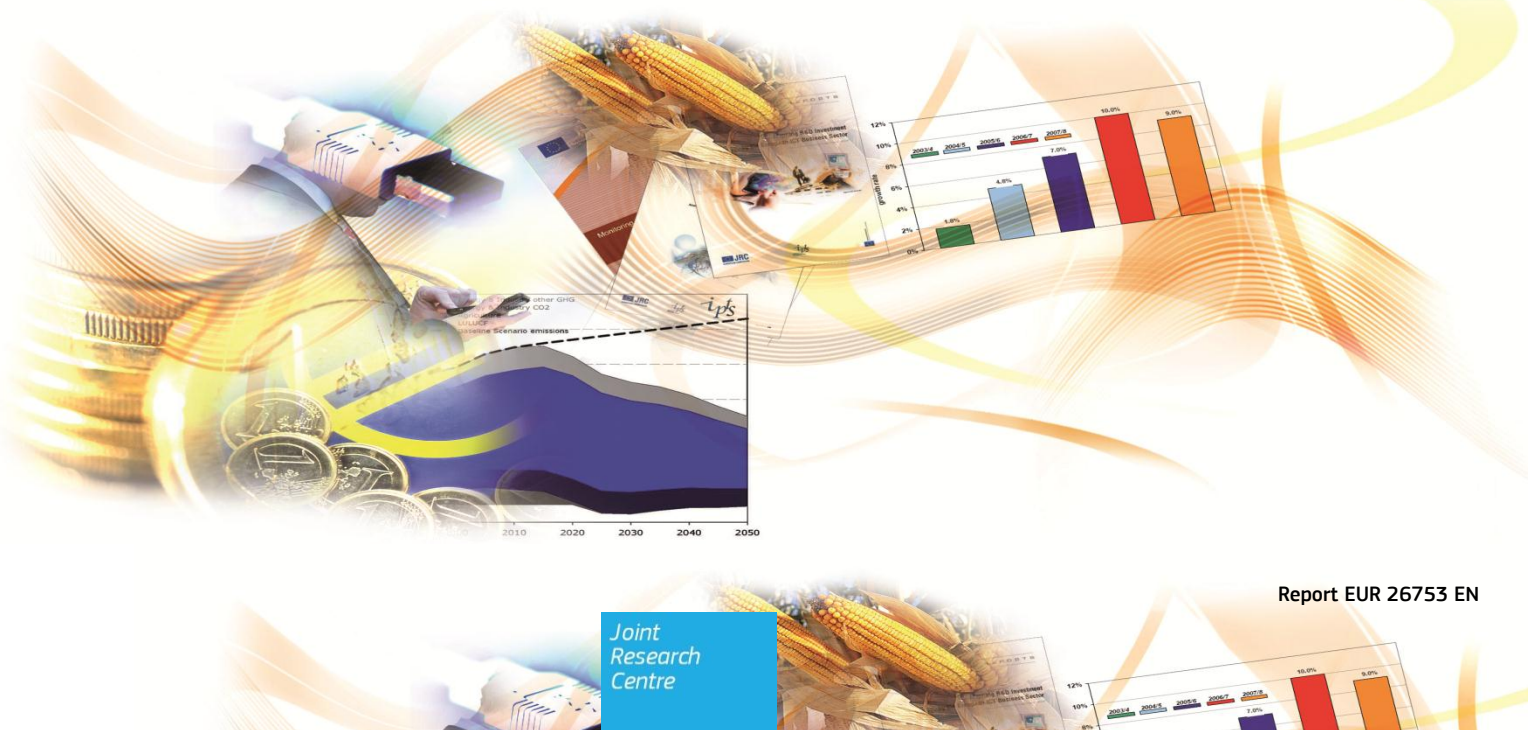
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Abstract

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

- national progress in addressing Research and Innovation system challenges;
- national progress in addressing the 5 ERA priorities;
- the progress at Member State level towards achieving the Innovation Union;
- the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);
- as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.

The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

ACKNOWLEDGMENTS AND FURTHER INFORMATION

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). [ERAWATCH](#) is a joint initiative of the European Commission's [Directorate General for Research and Innovation](#) and [Joint Research Centre](#).

The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefitted from the comments and suggestions of Alexander Kleibrink from JRC-IPTS. The contributions and comments from DG-RTD and EW-NCP, namely, Ingeborg Schachner-Nedherer are also gratefully acknowledged.

The report is currently only published in electronic format and is available on the [ERAWATCH website](#). Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

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EXECUTIVE SUMMARY

Austria is one of the smaller and richer EU Member States representing only 1.7% of EU's total population (2013). It has a GDP per capita and growth prospects well above the EU-27 average. The Austrian economy focuses on low- and medium-technology and applied R&D. After the downturn of the economic and financial crisis the Austrian economy experienced a fast recovery. The GDP share of gross domestic expenditure on R&D (GERD) stood at 2.84% (2012, Eurostat) and was comparable to innovation leaders in the EU. Austrian businesses finance and perform most of the local R&D. However, R&D is increasingly financed via public funds.

The structural bottlenecks for growth of the Austrian science and innovation system and the overall economy are the following:

- a weak human capital basis for innovation expressed by a comparatively low tertiary educational attainment;
- a low number enterprises conducting research and a strong concentration of R&D expenditure;
- improvable quality of university research and excellence orientation of publicly financed research;
- competition bottlenecks as regards competition intensity and low start-up dynamics in specific industries;
- deficits in labour participation with respect to the labour quotas of women, elderly and migrants.

These bottlenecks continue to limit the ability of the system to successfully catch up with innovation leaders in the EU as outlined in the national RTI strategy, launched in 2011. The strategy addresses several weak points, but a few challenges remain open, namely:

- no roadmap with budgetary indications and responsibilities safeguarding a successful implementation of the strategy;
- consideration of the grand and societal challenges in RTI funding is still expandable and current governance structures are not fully adequate for horizontal implementation, e.g. coordination between federal and Länder levels or across federal ministries;
- too little emphasis on systemic evaluations of RTI interventions, despite a well-developed RTI evaluation culture and evaluation of individual measures.

In the wake of the national elections in 2013, a new grand coalition government has recently been formed. Among other changes foreseen in the coalition agreement, all tasks and budgets of the former Ministry of Science and Research (BMWF) and the Ministry of Economy, Family and Youth (BMWFJ) are now governed by a the new Ministry of Science, Research and Economy (BMWFV).

Well-known structural deficits such as the lack of venture capital remain, as evidenced by the IUS 2013. Most of these deficits, however, are at the focus of public interventions. To date, the share of implemented policy measures and initiatives associated with the strategy is fairly high. This is due to the fact that roughly a third of all associated measures have been already in place before the strategy's official launch. The current emphasis of public intervention is located in the

areas of innovation finance, innovation capacity of firms as well as educational reforms. In contrast, relatively little focus is put on the strategy's priority on efficiency of policy governance.

Despite the fact that encouraging private R&D is essential to reach the 3.76% R&D target of the national strategy by 2020, public policies did not succeed in stimulating further increases in business R&D and innovation in the last three years. This is not surprising, however, because the available portfolio of instruments is already advanced, and the share of public financing of R&D in the business enterprise sector is among the highest in Europe.

As regards priorities and progress towards realisation of the ERA, Austrian RTI policy is generally on a good track, with very few exceptions. As regards commitments and progress on the Innovation Union, these largely overlap with ERA priorities.

Main strength of the system and policies are: Austria has comparatively high-quality standards with regard to allocation of public funds and awarding processes where suitable (in particular, in basic and excellent sciences) and continues to improve these standards. Similarly, cross-border RTI cooperation is well established in Austria at the level of researchers, organisations from industry and academia, funding agencies and government, but has tight budgets. Gender monitoring and mainstreaming are main concerns of policy, also with respect to women in science and innovation, and such policies appear effective. Policies on knowledge transfer are well established, policies on (green) innovation procurement and open access are emerging.

Main weaknesses of the system and policies are: Consideration of grand and societal challenges in public funding remains relatively scarce. There is no national strategy as regards world-class research infrastructures and there is an under provision of funds for the latter. Notwithstanding a net loss of (top) academics and inventors in the past decade, Austria is an open economy, also in terms of its labour market. It is a preferred destination country for higher education, but the science system still lacks career opportunities for young researchers and a high excellence orientation of funds. Similarly, a coherent migration strategy that accounts for the weak human capital basis for innovation is only underway. Lastly, again, preliminary evidence suggests that new and existing policies are not effective in incentivizing additional R&D and innovation activities in Austrian SMEs, nor do they substantially encourage venture capital availability, notwithstanding massive policy efforts in the last years, e.g. via tax support.

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1 BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM¹

Austria is one of the small and rich EU Member States representing only 1.7% of EU's total population (2013) but with a GDP per capita of €36,400 (2012) well above the EU-27 average (2012: 25,500). Its total GDP amounts to €307bn in 2012 and an estimated €314bn and €325bn in 2013 and 2014, respectively. This accounts for 2.4% of the EU's total GDP in 2012. The Austrian economy experienced a fast recovery from the crisis. While most recent GDP changes showed only moderate growth of 0.9% in 2012, rate forecasts for 2013 and 2014 predict a rise well above 2% and 3%, respectively. Good overall condition of the Austrian economy and growth prospects therefore both range well above EU-27 averages (2012: -0.4%; 2013 estimate: 1.5%).

With regard to R&D funding, the estimated GDP share of gross domestic expenditure on R&D (GERD) in 2012 stood at 2.84% (EU-27: 2.06%). This constitutes a weak increase relative to 2011 (2.77%). Here, only very few Member States among the innovation leaders show higher current GERD per GDP percentages, namely Sweden, Denmark and Germany. By performing sectors, business expenditure on R&D (BERD) as a share of Austrian GDP stood at 1.95% in 2012. This is significantly higher than EU-27 average (1.3%). Thus, businesses performed on 69% of total GERD. In addition, government intramural expenditure (GOVERD) and expenditure on higher education R&D (HERD) accounted for 0.15% and 0.73% of GDP in 2012. Again, comparison with EU-27 yields relatively lower average rates for HERD (0.49%), but higher rates for GOVERD (0.26%). In this context, the Austrian private sector finances an estimated 43.8% of overall R&D expenditure in 2012 (EU-27: 2011: 54.9%), while the public share in GERD finance is 40.4% (EU-27: 2011: 33.4%). More specifically, the estimated public contribution in 2013 breaks down to €3.09bn spent at national level (roughly 85%), a total of €0.43bn spent by Federal States and €0.11bn spent by other public entities (local governments, professional chambers or social security institutions). The considerable share of GERD financed from abroad is 15.2% in 2012, in particular by MNUs with Austrian subsidiaries. This is significantly higher than the EU-27 average (2011: 9.2%), but has been decreasing in the last few years (2005: 19%). In sum, post-crisis years 2010 to 2012 show a minor shift from private to public R&D sources of finance and, thus, provides first evidence on counter-cyclical R&D expenditure policies in Austria. Nevertheless, overall economic performance and outlook will make it difficult to comply with R&D goals outlined in the national RTI strategy and national reform programme for Europe 2020, e.g. the GERD aim of 3.76% of GDP by 2020.

Human resources in science and technology (HRST) account for 41.9% of the Austrian working population in 2012 (aged 25 to 64 years), which is fairly close to an average of 42.9% in the EU-27, but comparatively lower than among innovation leaders and followers. Similarly, tertiary educational attainment of only 16.5% among the adult population (aged 15-64) in Austria is much lower than European averages of 23.6% in 2011. This difference is mainly driven by the cohort of young adults between 25 to 34, comparatively high drop-out rates in tertiary education (e.g. ISCED 5A, 2010: Austria: 30% vs. EU-21: 40%) as well as an attractive and elaborated

¹ Most recent data available from EUROSTAT, if not stated differently.

upper secondary education system unique to Austria. In 2011, 61,170 full-time equivalents (FTEs) were active in R&D, of which 68.8% were employed in the business sector, 26.3% in the higher education sector, 4.2% in the government sector, including public research organisations (PROs), and 0.7% in the private non-profit sector.

Average turnover from innovation by Austrian businesses is at 11.2% (EU-27: 13.3%) according to the Community Innovation Survey (CIS) 2008. This means a loss of more than 2% when compared to 2006 and no significant change (12%) compared to 2010 (most recent data available). In addition, the overall rate of innovating firms in Austria is around 56%, both in 2008 (EU-27: 51%) and 2010, and is mainly driven by the innovation activity of larger companies in manufacturing rather than service sectors. In turn, arguably, this makes a 10% increase of R&D active companies by 2013, as proposed in the national RTI strategy, fairly unlikely. At the industry level, Austrian knowledge and R&D intensive sectors accounted for an average innovation intensity of around 5.4% in 2010 (more specifically, 5.1% in science-based services; 5.6% in science-based industries/manufacturing), i.e. firm R&D expenditure by total turnover. Again, this is significantly lower than average intensities in these sectors among innovation leader economies (Germany: 6.4%; Finland: 7.3%; Sweden: 7.2%).

Other output performance measures further indicate a continuous low- and medium-tech and applied R&D orientation of the innovation and science system: High-tech patent applications at the European Patent Office (EPO) per capita stood at approximately 10.2 in 2010 (EU-27: 2009: 19 p.c.) and Austria's high-tech share in total exports accounted for 12.7% in 2012 (EU-27: 15.6%). Austria only outperforms innovation leaders in terms of community trademarks and designs (intensities) filled by companies and individuals. As regards scientific performance, scientists in Austria increasingly publish within the top 10% scientific publications worldwide in terms of citations. However, national growth in high-quality publications does not exceed growth among innovation leaders and, hence, makes catching up with innovation leaders unlikely.

The design of RTI governance structures was fundamentally reshaped at the beginning of the century. It has not changed significantly over the previous 3 years (see Fig. 1).

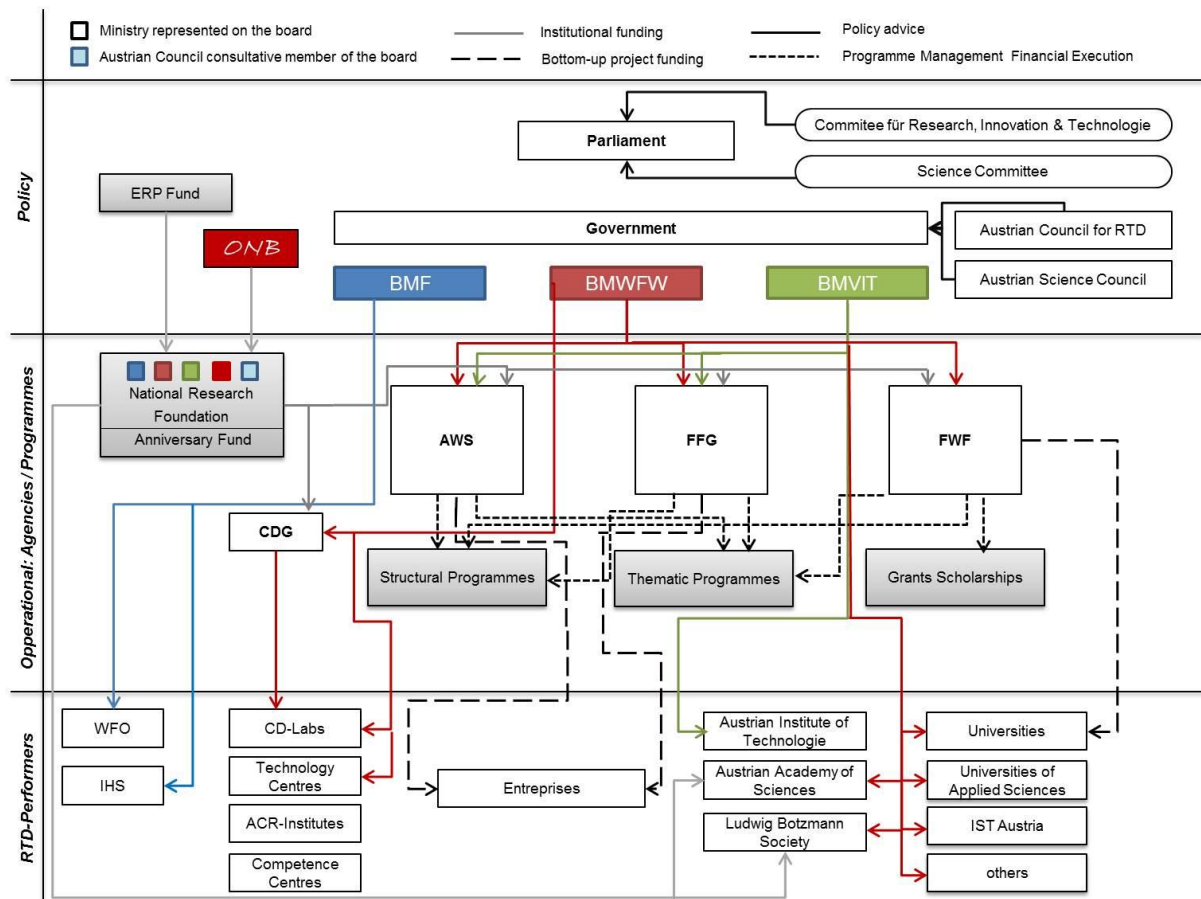
In early 2011 the Austrian RTI strategy "Becoming an Innovation Leader: Realising Potentials, Increasing Dynamics, Creating the Future" has been published. This strategy builds on exchanges of ideas among the most relevant stakeholders and an analysis of the innovation system as a whole: The Austrian "Research Dialogue" (2008), the "System Evaluation" of the R&D support and funding system (2009), and the strategic recommendations of the Austrian Council for Research and Technology Development (2010). It introduces a coordinated vision and strategy across all ministries in charge of RTI. In order to avoid duplication and to better address horizontal policies, as well as ensure the strategy's overall implementation, a task force of senior officials was installed in mid-2011. It has established a total of nine (inter-ministerial) working groups active in 2012. In addition, the Austrian Council for Research and Technology Development ("Rat für Forschung und Technologieentwicklung") as an independent STI advisory body has the main task to monitor progress of the strategy's implementation and reports to the Parliament (National Council) on an annual basis. As regards policy advice on the general progress of the science system, in particular its higher education institutions, the Austrian Science Council is the main advisory body in charge.

However, the latest coalition agreement of the new government signed in December 2013 foresees an important adjustment of the existing RTI governance structures: Science and innovation policies and all budgets formerly governed by the Ministry of Science and Research (BMWF) and parts of the former of the Ministry of Economy, Family and Youth (BMWFJ) are now headed by a new Ministry of Science, Research and Economy (BMFWF). Critics argue that

this institutional merger may limit independence and reduce budgets dedicated to (basic) sciences and may further increase alignment of innovation and science policies with industrial policies in Austria.

The need for coordination of governance levels in Austria's Federal system is limited because, as argued before, policy actors on national level distribute the majority of public funds available within the science and innovation system. However, as far as formal coordination of RTI policies on national and Federal State levels indeed occurs, it is organised on the RTI platform Austria ("Plattform FTI-Österreich"), a semi-annual conference involving stakeholders on all levels, first launched by the Austrian Council for Research and Technology Development in 2007. In addition, several ministries regularly meet with representatives from Federal States, or information exchange takes place on an informal but regular basis. Enhanced commitment of Austrian regions to smart specialization activities could also help to finetune and coordinate policies launched on multiple levels in medium-term.

Figure 1. Structure of the Austrian Research System



Legend: ÖNB (Austrian Federal Reserve), BMF (Ministry of Finance), BMWFW (Ministry of Science, Research and Economy), BMVIT (Ministry of Transport, Innovation and Technology), AWS (Austria Business Service), FFG (Austrian Research Promotion Agency), FWF (Austrian Science Fund), CDG (Christian Doppler Research Society), WFO (Austrian Institute of Economic Research), IHS (Institute for Advanced Studies), ACR-Institutes (Austrian Cooperative Research Institutes), IST Austria (Institute of Science and Technology Austria)

2 RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

2.1 National economic and political context

After the downturn resulting from the economic and financial crisis the Austrian economy experienced a fast recovery in 2010 and 2011, but only moderate growth in 2012. Most recent forecasts for 2013 and 2014, however, again predict a rise.

General public consolidation efforts have led to a first budgetary stability agreement launched in mid-2012. This became necessary due to public debt limit laws established on national level at the end of 2011 and a stability agreement signed among Federal States within Austria in May 2012.² Both, even though not constitutionally fixed, request balanced public budgets on all government levels by 2016/2017. Hence, these efforts also put pressure on specific budgets dedicated to R&D.

In recent years, the fluctuation of Ministers of Science and Research in charge in Austria has accelerated. In December 2013, in the wake of the new coalition agreement, Reinhold Mitterlehner became the new Federal Minister of Science, Research and Economy, „ The Minister now heads the new Ministry of Science, Research and Economy (see section 1).

In addition, in early 2012, a reform of laws governing competition and cartels was introduced by the Federal Ministry of Economy, Family and Youth (BMWFJ) and the Federal Ministry of Justice (BMJ) that strengthens the role of government agencies and increases transparency of regulatory and antitrust procedures. In turn, according to the Austrian Council for Research and Technology Development (2012), expected higher levels of competition may also serve as a new impetus to innovation activities in the Austrian economy in the medium and long term. The 2013 coalition agreement of the new government announces further reforms as regards competition in the near future, among others, (1) prescription abolishment of antitrust breaches during merger control cases, (2) earmarking antitrust fines for finance of consumer protection initiatives, and (3) reversal of burden of proof as regards price-setting abuses in specific (energy) sectors.

Implementation of on-going, public budgeting reform progresses in accordance with its major milestones in 2009 and 2013 (“Haushaltsrechtsreform”). More specifically, January 2013 saw the implementation of the second stage of the reformed budget law with – next to gender budgeting and a general reorganisation of the federal budget – the so called performance budgeting being introduced into the budgets of all federal ministries and providing mechanisms for a goal-oriented budget management. This includes a perennial plan for both resources and goals. With the general reorganisation of the federal budget away from cameralistics ministries and the

² This most recent agreement among Federal States sanctions excess deficits. Surcharges are distributed among those Federal States that comply with deficit rules.

departments gain more control over their budget (e.g. setting up reserves) in exchange for more public control over the effectiveness of their resource management.

2.2 Funding trends

2.2.1. Funding flows

The Austrian government's strategic goal is to continue increasing the R&D ratio over the next decade to up to 3.76% in 2020. After almost a decade of constant growth, R&D funding from the public sector reached its highest level ever in 2013 (in absolute terms: €3.62bn), with a 40.4% share in total Austrian R&D funding (2012: 40.4%). In particular, contributions from federal government in 2012 grew by more than 8% over 2011, while contributions from regional governments grew only by 2%.

Austrian RTI policy also aims to achieve a distribution of public and private financing by 2020 in which one-third is public and the other two-thirds are private.³ This has led to continuous modifications of the research premium⁴ and a number of other, indirect and direct strategic measures, in particular those that address incentives for private R&D activities. Here, national strategy corresponds to the EU's Barcelona target that two-thirds of R&D spending should come from the private sector, but it further specifies a 25% increase in the number of Austrian businesses performing R&D by 2020. However, even though more than 60% of Austrian R&D (2012: estimate) is currently funded by the industry sector, i.e. by Austrian businesses and foreign funding of multinationals, the recent shift towards public funds, as highlighted before, makes a successful change in overall funding structures less likely.

The allocation of funds to applied and experimental research (rather than basic research) may serve as a very rough proxy for public and private allocation of funds to innovation activities. Roughly 80% (81%) of performed GERD in 2011(2009) were allocated to innovation related R&D in the overall system according to this proxy. In the public sector, HEIs and PROs, this share was about 50% of all performed R&D, while in the private sector innovation related R&D was close to 95%.

Table 1. Basic indicators for R&D investments

	2009	2010	2011	2012	EU (2012)
GDP growth rate	-3.8	1.8	2.8	0.9	-0.4
GERD (% of GDP)	2.71	2.8	2.77	2.84	2.06
GERD (euro per capita)	895.2	952.8	984.8	1,035.	525.8

³ More precisely, the national STI strategy is in some places even more ambitious and states that "in accordance with the international model, to increase this to 70% wherever possible".

⁴ In 2011, the research premium had been increased from 8 to 10%, while simultaneously disposing tax allowances under § 4 Para 4 of the Austrian Income Tax Act.

				6	
GBAORD - Total R&D appropriations (€ million)	2,150	2,270	2,336	2,471	86,310
R&D funded by Business Enterprise Sector (% of GDP)	1.27	1.25	1.28	1.24	1.12 (2011)
R&D performed by HEIs (% of GERD)	26	26	26	26	24
R&D performed by Government Sector (% of GERD)	5	5	5	5	12
R&D performed by Business Enterprise Sector (% of GERD)	68	68	69	69	63
Share of competitive vs. institutional public funding for R&D	28.9* (2008)	-	-	-	
Venture Capital as % of GDP (<i>Eurostat table code tin00141</i>)	0.013	0.01	0.008	0.008	0.025
Employment in high- and medium-high-technology manufacturing sectors as share of total employment (<i>Eurostat table code tin00141</i>)	5	5.2	5.5	-	5.6 (2011)
Employment in knowledge-intensive service sectors as share of total employment (<i>Eurostat table code tsc00012</i>)	36.5	37.1	36.1	-	38.9 (2011)
Turnover from Innovation as % of total turnover (<i>Eurostat table code tsdec340</i>)	11.2 (2008)	-	-	-	13.3 (2008)

*Source: Steen (2012).

2.2.2. Funding mechanisms

2.2.2.1 Competitive vs. institutional public funding

In general, public funds in Austria are more often distributed via institutional than via competitive modes,⁵ roughly accounting for 2/3 and 1/3, respectively, of allocated funding. According to the IU Competitiveness Report (2011), national public funding performed in the higher education sector is mostly institutional (including general university funds), i.e. accounting for more than 90% of all institutional funding in Austria. Competitive (project-based) funding is relatively scarce in the higher education sector, whereas more than 60% of these public funds are performed by Austrian businesses. In turn, only a very small fraction of institutional funds is performed in government and private non-profit R&D sectors. This top-ranks Austria internationally next to Switzerland, Denmark and Germany with regard to the emphasis on institutional funding in higher education, at least for the latest data available.⁶ In contrast, institutional funding in countries such as the Netherlands, Belgium or Korea is more often

⁵ The share of project-based funding in total public funds in Austria almost doubled between 2000 and 2008. For further details please refer to Steen (2012).

⁶ Cf. OECD (2011).

performed in government and private non-profit sectors; Higher education institutions (HEIs) in these countries more frequently receive public competitive funding for their R&D activities. However, it should be noted that some of these trends in funding modes are due to size and structures of publicly financed R&D performing sectors in these countries.

2.2.2.2 Government direct vs indirect R&D funding

Direct R&D subsidies via competitive funds have been mostly ring-fenced during and after the crisis and, thus, (with a few exceptions) remain on comparative levels since 2010. Direct R&D subsidies for Austrian businesses account for roughly 11% of total R&D performed in the private sector in 2009, but increased significantly above EU averages in the last decade (2002: 5,6%; EU-28, 2010: 7%). Budgets and policies that support scientific excellence have also been ring-fenced, e.g. continuation of funding for the Institute of Science and Technology Austria (IST), established in 2009, and the industry co-funded Austrian Institute of Technology (AIT). The Austrian Science Fund (FWF) as a main funder of basic research in Austria and with a total grant portfolio of €195.2m in 2011 and 2012 will refinance and stabilise the budget in 2013 with own financial savings. Therefore, it does not fully depend on public budget and consolidation efforts.

Starting in 2011, additional annual funds (“Offensivmittel”) of €80m have been directed to the science system, largely benefiting (institutional) global university funds, e.g. financing the provision of admission place at universities of applied sciences. For 2013 to 2015 budgetary provisions foresee further annual amounts of €150m. These will feed into universities’ institutional finance and will be mostly distributed on the basis of performance criteria. Thus, in sum, increased HEI funding in most recent years has likely further strengthened the already existing emphasis on institutional rather than competitive funding in Austria.

With regard to indirect government support to businesses, the ceiling of the research premium for the acquisition of R&D has been increased from €100,000 to €1m, effective as of 2012. At the same time, eligibility criteria and criteria enforcement have been tightened. Thus, at present, it is difficult to assess whether these most recent tax incentive changes will alter the overall balance between R&D subsidies and tax incentives. Latest available data for 2011 implies that roughly half of government’s funding for business R&D is direct, while all other is indirect, i.e. each accounting roughly for 1% of GDP.⁷

2.2.3 Thematic versus generic funding

In general, Austrian policy seems to continue funding a broad spectrum of technological fields and industries (using a large variety of policy instruments) rather than concentrating resources on key priorities (see also section 4.3). Direct, mostly bottom-up based institution financing and indirect funding via the research premium are common in the R&D policy mix, whereas thematic or structural programmes are limited in scope.

However, the most recent coalition agreement of the new government emphasizes the role of thematic funding for grand challenges such as life quality, energy, mobility, health, demographic

⁷ Cf. OECD Science, Technology and Industry Scoreboard (2013).

change as well as social innovation, but it does not outline specific budgets nor does it identify institutions in charge. Furthermore, “living labs” (to be established) are considered a mechanism connecting consumers, businesses, scientists in policy dialogue and articulation for future innovation and societal demands.

2.2.4 Innovation funding

Again, the allocation of funds to applied and experimental research (rather than basic research) may serve as a very rough proxy for public and private allocation of funds to innovation activities. In 2011(2009), 46(48)% of total R&D performed at HEIs (63(79)% at PROs) - financed mainly via public sources - were dedicated to this type of research activity, arguably closer linked to innovation. As the majority of public funds flow into HEIs, approximately half of the public funds target innovation related R&D. In the private sector close to 95% of the R&D performed was applied or experimental. Thus, roughly 80% of performed GERD in 2011 were allocated to this type of R&D in the overall system according to this proxy.

Similarly, allocation of funds to innovation activities can also be assessed via 1) analysis of the funding portfolios of core funding agencies, or 2) identification of specific ministries, in particular those mainly targeting applied R&D and innovation activities.

First, in Austria, the Ministry of Transport, Innovation and Technology (BMVIT) as well as the Ministry of the Economy, Family and Youth (BMWFI) tend to focus their funds on innovation rather than research activities, and often linking STI policy goals to industrial and sectoral ones. 20% of federal R&D funds in 2012 and 2013 came from these two Ministries, while most funds (70%) were held by the former Ministry of Science and Research (BMWFI) and therefore less likely dedicated to innovation. However, with the institutional changes after the federal elections as regards STI governance at the end of 2013 (i.e. BMWFI establishment), a clear separation of budgets will not be possible any more.

Second, the main funding target of the FFG is support to innovation and bridging to markets.⁸ Here, the difficulty, again, is to identify those measures in the portfolio targeting knowledge and technology (KT) transfer, e.g. support to prototype building within the COIN programme. FFG spent €81.7m in 2012 on KT transfer programmes which accounts for roughly 20% of its total annual funds. However, other lines of funding could also be focused on innovation support, namely, “thematic” or “bottom-up” ones such as innovation voucher and innovation voucher plus funding schemes. Arguably, most of the SME funding activities of the FFG should also be classified as innovation funding, e.g. start-up vouchers. FFG’s total budget in 2012(2011) was €112(109)m, excluding credits and guarantees. Thus, the overall innovation share of FFG and FFG funds stood at 5 to 10% in 2012.

To sum up, one should consider the proxy based on type of R&D conducted as an upper bound estimate for Austria, while allocation of budgets across ministries as well as portfolio analysis of main funding agencies represents lower bound estimates.

⁸ FFG’s overall budget accounted for roughly 17% of GBAORD in 2012

2.3 Research and Innovation system changes

In the course of implementation of the national RTI strategy, a task force of senior officials was installed in mid-2011. It has established a total of nine inter-ministerial working groups active in 2012. Two of these working groups focus on thematic priorities outlined in the strategy, namely “climate change and scarce resources” and “quality of life and demographic change”. Another seven working groups review existing and create new policy measures in the areas of human potential, research infrastructures, knowledge transfer and start-ups, business enterprise research, the international and European dimensions of research agendas, and international rankings.

The structural reform of the Austrian Academy of the Sciences (ÖAW), Austria's largest non-university R&D organisation, continued in 2011 and is still on the policy agenda. On the basis of a strategic development plan for the ÖAW a multi-annual performance agreement has been concluded with the Federal Ministry of Science and Research (BMWF) which comprises the period of 2012-2014.

This agreement and associated organisational changes foresee a concentration of ÖAW's research activities on six major thematic priority research areas: European identities and protection and interpretation of cultural heritage; demographic change, migration and integration of people in heterogeneous innovative societies; bio-medical fundamental research; molecular plant biology; applied mathematics including modelling and bio-informatics; quantum optics and quantum information. In addition, the formerly 63 research units of the ÖAW have been concentrated to 29 institutes (16 for the Humanities and 13 for the Natural Sciences).

A global budget of €224m has been agreed for the three-year period of the performance contract (plus additional dedicated funds for fellowships and international programmes as well as membership fees). This results in a deficit of around €38m to €40m due to liabilities of previous years and increasing personnel costs. Accordingly, a reduction of ÖAW's total R&D staff in the coming years can be expected.

One year after the agreement's conclusion (2012) 14 institutes and research groups of the ÖAW have been shifted and integrated into a number of universities. E.g. the ÖAW-Institute of Limnology was transferred to the University of Innsbruck and the ÖAW-Institute of Integrated Sensor Systems by the Technical University of Vienna.

In October 2012, the ÖAW decided to renew its organisational structure by separating the learning society (“Gelehrten-gesellschaft”) from its research performing organisation (“Forschungsträgereinrichtung”) under a common roof of the ÖAW, thus setting up two organisational parts that may act in an autonomous way as well as reducing potential conflicts of interest across organisational sections. Both sections will be equipped with a separate budget and, accordingly, separate performance agreements with the BMWF.

For a discussion on the re-structuring RDTI policy competences at federal level in the wake of the 2013 national election please refer to section 1.

2.4 Recent Policy developments

With regard to the modernisation of the Austrian education system and better coordination between the education and innovation spheres, current initiatives address adverse early and social selection in primary schools and permeability⁹ in the overall education system (e.g. dual training initiatives). This includes, among other, the reform of the new secondary school (“Neue Mittelschule”)¹⁰ replacing the grammar school (“Hauptschule”) by 2019, and the “Lehre mit Matura” programme, i.e. assistance for graduation examination of apprentices that gives university access, launched in 2011 and 2009, respectively.

At the level of HEIs, structured doctoral programmes have been introduced (“Doktoratskolleg”), with an additional budget of €18m of Austrian Science Fund (FWF) funds, as well as a new, but small-scale grant scheme for excellent post-docs (“sub auspiciis Praesidentis”, €9,000 for 2 years). These initiatives complement existing (post-) doctoral fellowship programmes mainly run by the Austrian Academy of the Sciences (ÖAW) and “Initiativkolleg” initiated and financed by individual universities. In addition, excellence-in-teaching prizes at public universities (“Ars docendi”) will be awarded annually, starting in 2013.¹¹ The recent coalition agreement of the new government also foresees an additional 2,500 (post-) doctoral grants in research institutions dedicated to basic science and excellence (FWF, ÖAW and IST Austria) as well as increased funding for academic talent and 10 new endowed professorships in applied sciences (both FFG).

More importantly, core elements of the ‘higher education plan’ (“Hochschulplan”) by the Minister of Science and Research launched in 2011 foresee a radical reform of the financing systems of universities in the years to come. This includes enhanced incentives for third-party funding and private co-finance (e.g. sponsoring and donations); access and capacity limitations for certain fields of study; a re-introduction of tuition fees and compensation payment for non-Austrian students (the latter as a response to “asymmetric mobility” patterns in Austria). More specifically, at the end of 2012 (December), semester tuition fees for students with long study periods of more than €350 were introduced (effective as of summer 2013) – after long controversial public discussion. Non-Austrian students from third countries have to pay twice the amount of nationals, but may be able to get tax reimbursement for fees (cf. coalition agreement 2013). Total fees collected by higher education institutions (HEIs) will amount to approximately €5m. The potentially adverse effect of higher fees on social selectivity at HEI entry level is also likely reduced by a simultaneous increase of publicly financed student grants by a total of €2.5m. Access and capacity limitations for certain fields of study and corresponding reallocation of resources and funds are currently being integrated in the overall HEI performance contracts (2013 to 2015). E.g. capacity planning foresees an expansion of up to

⁹ Efforts currently focus on improved information services to students and young professionals such as the online portals “MaturantInnenberatung” or the “studienchecker”.

¹⁰ This school type foresees a differentiation between basic general education and advanced general education in the field of German, mathematics and a first foreign language in the last 2 years. The assessment of advanced general education should correspond to the Gymnasium qualification level and, thus, should make the transfer into higher secondary schools easier. Team teaching and additional six hours of school education are foreseen to attain this qualification level.

¹¹ This is a joint initiative by the BMWF, the Assembly of Universities (“Universitätenkonferenz“, UNIKO) and the Austrian Student Representatives (ÖH).

4000 student places available at universities of applied sciences in the next 3 years (and 50,000 new places by 2018 according to the recent coalition agreement).

Another line of educational measures focuses on the quality of teacher education in primary school: All future teachers will have to study at universities (within the framework of the programme “PädagogInnenbildung NEU”). Primary schools are now obliged to increasingly hire foreign-born teachers in order to reduce drop-out rates of immigrant pupils. In addition, the faster recognition (“Nostrifizierung”) of foreign diploma or training qualifications has been implemented, e.g. the EU-driven initiative “ENIC NARIC AUSTRIA”, and proves relatively successful so far.¹²

The latter measures link to the overarching policy ambition to increase participation of presently underrepresented groups in the science and innovation system. This not only seeks to activate migrants, but women and elderly as human resources for R&D (see section 5.3 and 5.4). Recent initiatives in the context of enhancing human resources for R&D also included additional funding by the BMWF for 2011 and 2012 aimed to strengthen participation in MINT subjects, with a total amount of €40m. Other new, ministerial initiatives seek to improve cooperation between secondary and tertiary education systems via direct contacts of pupils and researchers (“Young Science” networks or the pre-university programme “Sparkling Science”), enhance skills training of existing R&D staff in small medium enterprises (SMEs) as well as increase female participation in industry innovation in the long-run (“FEMtech internships” providing scholarships to female MINT students).

Notably, the national government currently aims to improve financing conditions for innovation and support to newly founded businesses, in particular innovative SMEs and high-tech start-ups.

In this context Austria has expanded and will expand the existing portfolio of and budget for entrepreneurship policies, in particular venture financing conditions. €15m of (public) risk capital were contributed to a semi-public European Business Angel Fund in 2013 fostering growth of young innovative entrepreneurs, a fund with a total budget of €45m.¹³ Another €65m will feed into a purely public fund for early stage capital (“Gründerfonds”) during the next 6 years. Most recent, small-scale policies to foster start-up activities also include, among other, awards and prizes for (female) entrepreneurs, e.g. “Phönix” and “Phönix Women” (both initiated by BMWF).

The coalition agreement signed in December 2013 foresees several measures reducing red tape for Austrian entrepreneurship and general funding processes, e.g. online-registration processes of start-up businesses should be expanded and accelerated as well as general R&D funding rules for financing administrative/overhead costs will be introduced. Furthermore, it seeks to improve legal framework conditions of finance and SME access to capital markets. First, draft regulation for crowdfunding activities is already due beginning of 2014 as well future regulation will further encourage employee participation models in firm profits. Second, the agreement aims to enhance equity capital formation via the abolition of capital transaction tax by 2016, and establishment of a coordination platform focused on equity formation and financial literacy of Austrian SMEs. Third, new activities of the Austria Business Service (aws) will ease access and expand (credit) guarantees for innovative companies, in particular SMEs, e.g. existing guarantee caps are likely to increase in the future as well as acceptance of guarantees with higher risk profile. Fourth, future regulation also aims to simplify IPO and public listing of Austrian SMEs, and, hence, provide

¹² In the first half year 2011, 1,036 foreign diplomas were approved; for the same period in 2012, already 1,239 were approved.

¹³ Cf. BMF (2012).

easier access to capital on stock markets. Fifth, legal changes will further attempt to incentivize private co-finance of science and innovation (e.g. endowment and public trust regulation as well as creation of favourable (tax) framework conditions for private equity investors).

Lastly, the coalition agreement foresees a renewal of the “headquarter” initiative encouraging MNU’s R&D activities in Austria and funded by FFG. This initiative aims to (re-)strengthen R&D financed from abroad, foreign-owned innovation and employment activities in Austria as well as an increased public income from tax collection. However, it should be noted that a similar predecessor initiative (“headquarter programme”) had been in fact negatively evaluated¹⁴ because public funds did not affect location and R&D choices of MNEs and, thus, policy expectations on the measure’s impact were not fully realistic or too high.

¹⁴ Cf. Technopolis (2011).

2.5 National Reform Programme 2013 and R&I

Among the country-specific recommendations outlined in the NRF 2013¹⁵ only recommendations # 2,3,4,5 and 6 likely have an immediate effect on the performance and structures of the Austrian science and innovation system. Accordingly, this section discusses in greater detail and assesses recommendations # 3,4 and 5. For an assessment of recommendations # 2 and 6 please refer to the general remarks on recent changes in competition policy as well as education finance and budgetary reform outlined in above section 2.1.

Country-specific recommendation # 3 (among other objectives) aims to “enhance older workers' employability [...] in order to ensure that the effective retirement age is rising”. Similarly, recommendation # 4 targets a higher labour market participation of women by “reducing the high gender pay gap and enhancing full-time employment opportunities for women, in particular through the provision of additional care services for dependants.” One main issue at stake in country-specific recommendation # 5 is education, in particular educational outcomes, of disadvantaged young people as well as drop-outs from higher education tracks. In this way, all these recommendations largely focus on maximizing and cultivating the labour market and innovation potential (“reserves”) among women, elder persons and people with migrant backgrounds.

Several recent policy measures address gender specific aspects in NRF recommendation #4 because e.g. the Austrian economy and society shows a much stronger persistence of traditional gender roles than in most other OECD countries, at least in the last decade.¹⁶

More recently, a “National Action Plan for Gender Equality” in the labour market has been introduced, and a “Charter for a Better Reconciliation of Family and Work”¹⁷ was adopted. The Plan covers the period 2010-2013, with four strategic goals: i) providing gender-sensitive career guidance and diversifying education paths and career choices; ii) reducing gender-specific differences in employment, and supporting transitions to full-time employment; iii) promoting more women in leadership positions; and iv) reducing the gender pay gap. This plan contains a package of 55 measures, of which 32 have already been implemented.

However, this legal framework and recent policy effort leave open the issue of voluntary trade-offs by women and men between work and family responsibilities. Such trade-offs are found not only in Austria, but also in similar countries such as Denmark, the Netherlands and Sweden and will affect future GDP per capita growth according to a recent study of the OECD.¹⁸ E.g. part-time work take-ups by women do not decline in Austria, but are on the increase. Again, the National Action Plan for Gender Equality mainly promotes full-time labour force employment of women, and, thus, falls short addressing parent and family incentives, i.e. trade-offs outside

¹⁵ Cf. National Reform Programme 2013, http://ec.europa.eu/europe2020/pdf/nd/nrp2013_austria_en.pdf.

¹⁶ Women spend more than twice as much time caring for children and/or elderly per week than men, the largest difference among OECD countries (OECD, 2011).

¹⁷ The Charter is a statement of public commitment to family-friendly measures in companies and organisations. It was co-signed in 2012 by the Federal Ministry of Economy, Family and Youth, the Social Partners and the Federation of Austrian Industries. Additionally, Austrian enterprises are increasingly taking part in “Work and Family Audits” which aim to help companies develop a family friendly corporate culture. These audits have been run successfully in large companies and are now being extended to SMEs.

¹⁸ Cf. OECD (2012).

the gender dimension. Although total public family benefits accounted for roughly 3% of GDP in 2009 (only topped by public benefits in France and Sweden), policy efforts should be rebalanced in this respect, e.g. increase availability of high-quality childcare facilities, also in rural regions.

Second, with respect to the elder workforce and their continued labour market participation, the large majority of Austrian workers retire once they are eligible for a pension. The tendency is to retire as early as feasible may reflect workers' preferences, partly because there is a lack of attractive and health preserving and health preserving work conditions at old age.¹⁹ Policy initiatives to make work more attractive have been taken during recent years at different government levels and driven by different Federal ministries. However, these measures have been relatively unrelated to each other, and greater coordination could make policy bundles much more effective.

Third, immigration in general contributes to Austrian labour force growth and skill supply. However, certain migrant groups tend to suffer from important shortcomings in their human capital, which tends to be passed on to their children, especially given the important role of the family in Austrian education.²⁰ Policymakers have taken several important initiatives in this area, in particular aiming to improve the situation for those children with migrant background. In general, the proportion of migrants attending schools providing a university entrance qualification – and with high STI policy relevance – is also below average.

Curbing early drop-out rates seems a key policy target in this area. The proportion of school drop-outs in Austria is lower than the EU average for natives, but higher for migrants. E.g. nearly 15% of pupils who do not speak German at home and completed their 8th grade in 2010, did not continue their education. Only 4% of German-speaking pupils were in this situation.²¹ New policy initiatives include youth and apprentice coaching, free-of-charge programmes to provide qualifications to pupils who have not completed schooling (second-chance education), and training guarantees for students who have not found company based apprenticeships (by training them in dedicated public facilities). Early results from these initiatives are rather encouraging: Between 2007 and 2010, Austria succeeded in reducing the average school drop-out rates more than in the other EU countries (despite starting from a lower average level) and reduced the rates for migrant children – while these rates increased in the EU. Arguably, one main caveat of these specific education policy measures is that they cannot fully avoid early streaming of migrant children to less demanding education streams before they have developed.

2.6 Recent evaluations, consultations, foresight exercises

Seven major evaluations relevant to federal policy and publicly accessible have been undertaken between late 2011 and early 2013.²² One evaluation already published in 2011 is:

- Evaluation of the Elise Richter and Hertha Firnberg Austrian Science Fund programmes (on behalf of the Federal Ministry of Science and Research):²³ The programmes target

¹⁹ Cf. Gönenc et al. (2013).

²⁰ Cf. EC (2012).

²¹ Cf. Statistik Austria (2012).

²² Cf. BMWF, BMVIT and BMWFJ (2013).

²³ Cf. Pohn-Weidinger and Grasenick / Convelop (2011).

highly-qualified female university graduates from all disciplines at their early scientific career enabling application for a domestic or international professorships, and offer e.g. support after maternity leave or career coaching; total annual budget for both programmes accounts for approximately €6m. The survey-based assessment compares subjective perceptions of grant owners to unsuccessful applicants and concludes with an overall positive evaluation of programme design and impact across groups of respondents. However, also due to structural problems at Austrian universities, only about 1/3 of all female grant holders manage transition to permanent research positions in the long-run, i.e. programme objectives are not fully met in this respect.

The key evaluations published in 2012 and 2013 are:

- An interim evaluation of the Services Initiative (on behalf of the Federal Ministry of Economy, Family and Youth):²⁴ The initiative aims to increase innovation and job creation in all Austrian services, but effectively focuses on information services and technologies. Funds mainly complement application-oriented project funding as part of FFG's general funding programmes, and the COIN "Cooperation & Networks" line of structural programmes. The evaluation recommends to reconsider and revise target group and awareness measures of the initiative, but in general recommends its continuation.
- Qualitative evaluation of the European Space Policy Institute (ESPI) aims to assess the policy influence and relevance of this policy think tank based in Vienna, e.g. its media coverage.²⁵ E.g. with the director being seconded by ESA, and the treasurer by the Austrian authorities, the institute seems not fully independent. Note also, that quality of (publication) output varied significantly across the evaluation period (2004 to 2011), partly due to a high fluctuation of staff, and policy influence was limited. Hence, the evaluation suggests, among others, a) to narrow down the existing spread of ESPI's topics which is considered as too broad by interviewees, and b) to expand and continue training and reviewing of research executed by junior researchers at ESPI.
- Quantitative and qualitative evaluation of the IV2S and (interim) IV2Splus strategic programmes (on behalf of the Federal Ministry of Transport, Innovation and Technology (BMVIT)).²⁶ The programme provides public R&D grants in the area of mobility and transportation technologies aiming to improve competitiveness and research cooperation on firm-level as well as provision of efficient and environmentally-sound transport solutions on the society as a whole. The overall positive assessment argues that public funds seem to encourage scientific output, but, to a much smaller degree (roughly 10% of all projects funded) leads to successful economic transfer e.g. patent output. Similarly, too few SMEs are involved according to the current allocation of funds and as foreseen in the objectives of the programme.
- An interim evaluation of the Austrian security research programme KIRAS (on behalf of the BMVIT), the latter focusing on public support to security research:²⁷ Two main areas for improvement were identified, namely, a) management complexity increased once content sharing and building on each other's ideas across KIRAS projects occurred, and b) further coordination need for public and private customers/procurers when multiple

²⁴ Cf. Warta and Good (2012).

²⁵ Cf. Kaufmann et al. (2012).

²⁶ Cf. Oberholzner et al. / KMU Austria (2012).

²⁷ Cf. Pfirrmann et al. (2012)

agencies and ministries are involved. Both aspects should be anticipated when selecting and designing projects (a) and when aligning project interests of the different parties (b).

- An interim evaluation of the regional contact points (RCP), commissioned by the BMWF:²⁸ Since Austria's accession to the EU, the Austrian RCPs provide information and advice services to regional stakeholders in science, industry and administration in terms of EU Research Framework Programmes and other European programmes participation. On the basis of quantitative and qualitative assessment (including an online user survey) the evaluation documents a client-centred approach of services offered and reasonable satisfaction among users; regional access seems to create additional value. However, given the changes in customer structures (less university scientists, but a clear focus on SMEs) the evaluation recommends the establishment of minimum competences for European programmes in the province's innovation agencies, i.e. budget cuts between 20% and 50%, depending on the RCP in question.
- Ex-post (methodologically advanced) quantitative evaluation of the competence centers Kplus and K_ind/K_net as one of Austria's largest structure programmes (on behalf of the BMVIT and BMWFJ):²⁹ Public support these competence centers of more than €800m in the period 1998 to 2009 mainly sought to increase interaction and cooperation between industry and the sciences, frequently with regional anchoring of such R&D activities. The overall assessment of the programmes is mostly negative. (Causal) programme effects using a difference-in-difference approach show that companies funded through the K-programmes represent an extremely positive select group from the Austrian company landscape. Comparison of R&D expenditure intensity (share of R&D expenditure in total turnover) of the K-companies during the period 2002 and 2009 shows an absolute decline, while the control group – starting from a low level – recorded an increase of R&D expenditure intensity. Similarly, the policy scheme neither induced additional industry-science cooperation at large nor did it generate large international knowledge spillover from foreign industry participation. For the R&D personnel intensity of companies (share of R&D employees among total employees) and with regard to the profile-building at the technically oriented universities involved, however, some positive effects are reported.

2.7 Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

Only 3 out of 9 Federal States have registered on the Smart Specialisation Platform, namely Lower Austria, Upper Austria and Vienna. All other Federal States have also developed economic and innovation strategies, but are not officially registered on the S3 Platform at present, e.g. Styria, Tyrol or Carinthia.³⁰ Having a smart specialisation in place is a pre-condition for Austrian federal states to be able to spend European Regional Development Funds on R&I (based on new “ex ante conditionality” clause); in this context, Austria will have but one national

²⁸ Cf. Good and Radauer (2013).

²⁹ Cf. Schibany et al. (2013). Note that many of the companies and research institutions which have participated in a K-programme are now part of a COMET centre (i.e. COMET is the follow-up scheme).

³⁰ Cf. Styrian Government (2011), Tyrolean Government (2013) and Carinthian Government (2009).

operational programme for all ESIF (with regional chapters).³¹ Similarly, the BMWF (now BMWFW) has supported the S3 Platform from its beginning and has been a strong partner for both the EC and the Platform in (1) translating the RIS3 concept for practical use throughout the EU, (2) mutual learning exercises and (3) spreading the concept in the macro-regional context, e.g. the EU Danube Strategy. Strategy development in many of these regions has been co-financed with EU funds (e.g. under the Regional Innovation and Technology Transfer Strategies (RITTS) programme).

- The regional government of Lower Austria has a dedicated Economic Strategy Lower Austria 2015³² launched in 2010. It also includes an updated innovation strategy. Based on a SWOT and comparative regional analysis the latter identifies a number of strategic “technopoles” (clusters) and sets out explicit RTI targets, e.g. an increase of regional human resources in science and technology by 2015. Thus, it is based on a rather comprehensive assessment of the region’s strength and weaknesses. The strategy was mostly developed bottom-up with SMEs located in the region. In addition, it lists a number of on-going or planned policy measures encouraging regional R&D, e.g. training for R&D staff in SMEs and coaching services for entrepreneurial ventures. Furthermore, in 2012 Lower Austria started to develop its own research, technology and innovation strategy. This process is currently in its 2nd stage, asking for input through an online forum and a dedicated website (<http://www.wissenschaft-noe.at/index.php/forum.html>). A basic concept has already been published.³³
- Similarly, Upper Austria has launched regional economic and science strategy (“Innovatives OÖ 2010plus”³⁴) for the period 2010-2013, but there is no outline of an update post 2013 so far. The existing strategy focuses on 5 main thematic fields and sets out specific targets for each and across themes, e.g. an increase of regional R&D expenditures or being among the top 3 innovative regions in Austria by 2013. It also lists in greater detail a wide range of policy initiatives relevant to the regional innovation system. The strategy has a dedicated total programme budget of €150m for the three-year period (another €300m is intended to come from federal funds and industry investment). In addition, the existing R&D funding agreement between the national funding agency FFG and Upper Austria, first established in 2006, was prolonged in 2010 and is an important milestone for the strategy’s implementation. The agreement involves funds from FFG’s basic programme and is complemented by regional public funds dedicated to eco-, cooperative and start-up innovation.
- Styria also has its own economic strategy called “Styria 2020” that is building on growth through innovation. Five main strategies are combined in this document to increase the general level of innovativeness in Styria: location development and management, internationalisation, human resources, entrepreneurship and growth, and innovation, development and research. With regard to the latter three main objectives were agreed upon: increase the number of Styrian companies with regular innovation activities, improved framework conditions for knowledge and technology transfer, increase the number of Styrian companies in national and European research funding programmes, and improved knowledge in Styrian companies regarding IPR. The strategy also

³¹http://www.oerok.gv.at/fileadmin/Bilder/3.Reiter-Regionalpolitik/2.EU-Kohaesionspolitik_2014/_EFRE/IWB_EFRE_AT_Draft_2.0_2014-02-05_inkl_Anhang.pdf

³² Cf. Lower Austrian Government (2010).

³³ Cf. Upper Austrian Government (2012).

³⁴ Online information platform at <http://www.ooe2010plus.at/index.php>.

acknowledges the increasing relevance of service sector innovations. In September 2013, the Tyrolean government passed the Tyrolean “Research and Innovation Strategy” including seven main fields of activities and various objectives such as intensifying the cooperation of industry and academia in Tyrol, developing a coherent concept of regional specialisations, recruitment of top researchers, increased knowledge and technology transfer. As part of this strategy, Tyrol plans to introduce its own Council for Research and Innovation for strategic issues and a coordinator for regional innovation activities at the operational level.

At the national level, the BMFWF uses the smart specialisation concept to support a “lead institution initiative” that aims at empowering universities and STI institutions to team up with regional planners and lead companies to become strong expert partners in regional smart specialisation. In their three-year performance contracts, 15 out of 22 public universities agreed to develop regional/location concepts (“Standortkonzepte”) in relation with their internationalisation strategy and development plans. For example, the Alpe Adriatic University of Klagenfurt identified three “orbits of co-operation”, starting from their local network, touching upon the greater Alpe-Adriatic region (reaching out to neighbouring regions in Austria, Italy and Slovenia) towards their international partners.

To date (end of 2013), none of the three regional authorities has registered on the Smart Specialisation Platform has undergone peer-review in the process organised by the S3 Platform since the beginning of 2012. However, Upper Austria was recently branded a “model demonstrator region” by the EC and also joined the Vanguard Initiative of European industrial regions for smart specialisation in December 2013.. However, the Austrian government, more specifically, the BMWF (now BMFWF) together with Joanneum Research, took an active role as leading/coordinating country in a recent OECD-TIP project on smart specialisation.³⁵ This led (among other things) to the development of a self-assessment tool for mobilising and profiling regions anywhere in Europe. In general, regional strategies and activities of regional funding agencies in Austria complement and adjust to RTI policies and activities on national and EU levels. Nevertheless, multilevel governance structures have led to significant overlap of activities and limited horizontal coordination in some specific areas: E.g. there are currently more than 40 cluster initiatives run on federal state and national levels, but virtually no funds available for innovation clusters that span across federal states.³⁶

³⁵ The project website as well as draft synthesis report: <https://community.oecd.org/community/smartspecialisation>. The self-assessment tool can be accessed via www.era.gv.at (available in Czech, English, German and Spanish).

³⁶ Cf. Aiginger et al. (2009).

3 PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM

3.1 National Research and Innovation policy

Results from the Innovation Union Scoreboard (2013) and earlier versions have shown that the basic order of EU Member States has largely stayed unchanged since the benchmark was introduced in 2010: the group comprising the “innovation leaders” includes four to five countries (Sweden, Denmark, Germany and Finland). Austria is positioned among a group of nine “innovation followers” (namely, Belgium, United Kingdom, Netherlands, Luxembourg, Ireland, France, Slovenia, Cyprus and Estonia), but has the policy ambition to catch-up with Innovation Leaders in long term (cf. national RTI strategy).

Austria occupied 9th place in the 2012 and continues to do so in 2013 rankings of the Summary Innovation Index (SII). Yet a closer look shows that great caution must be exercised when interpreting these rankings (as well as possible position changes): in terms of the SII values, the seven countries in the group of innovation followers, among other Austria, differ by only 0.08, but the value for rank 4 (Finland) is almost 0.03 higher than the one for rank 5 (the Netherlands), i.e. the one-rank transition between the Innovation Leaders and Innovation Followers. In turn, even minor changes in the data can (and do) result in noticeable changes in the relative position for innovation followers.³⁷ Notwithstanding these methodological caveats of the IUS assessment, it must be noted that Austria has been unable to catch up with or even reduce distance to innovation leaders in the past 3 years, i.e. since the launch of the national RTI strategy. Currently, only the Netherlands among follower nations seem to close up with the group of innovation leaders, partly because Finland lost some ground in the meantime.

Table 2. Innovation Union Scoreboard assessment of the performance of the Austrian research and innovation system, values relative to the EU27 (EU27 = 100) in 2013

HUMAN RESOURCES	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	153
Percentage population aged 30-34 having completed tertiary education	69
Youth aged 20-24 upper secondary level education	107
OPEN, EXCELLENT AND ATTRACTIVE RESEARCH SYSTEMS	
International scientific co-publications per million population	393
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	100
Non-EU doctorate students	44
FINANCE AND SUPPORT	

³⁷ Cf. BMWF, BMVIT and BMWFJ (2012, 2013).

R&D expenditure in the public sector as % of GDP	116
Venture capital investments	24
FIRM ACTIVITIES	
R&D expenditure in the business sector as % of GDP	147
Non-R&D innovation expenditures	63
LINKAGES & ENTREPRENEURSHIP	
SMEs innovating in-house	114
Innovative SMEs collaborating with each others	175
Public-private scientific co-publications per million population	164
INTELLECTUAL ASSETS	
PCT patents applications per billion GDP (in PPS€)	131
PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)	136
Community trademarks	174
Community designs	179
INNOVATORS	
SMEs introducing product/process innovations	110
SMEs introducing marketing/organisational innovations	105
ECONOMIC EFFECTS	
Employment in knowledge-intensive activities	103
Contribution medium/high-tech product exports to trade balance	102
Knowledge-intensive services exports as % total service exports	49
Sales of new to market and new to firm innovations	83
License and patent revenues from abroad as % of GDP	32

Source: Innovation Union Scoreboard (2013: 46).

3.2 Structural challenges of the national R&I system

In 2010, the Austrian Institute of Economic Research listed among the supply-side structural bottlenecks for growth.³⁸

1. *a weak human capital basis for innovation*, expressed by a low tertiary education rate; a low number of science and engineering graduates (especially women) and a strong concentration on traditional crafts;
2. *deficits in R&D* concerning a low number of research conducting enterprises and a strong concentration of R&D expenditure on relatively few companies (MNEs); improvable quality of university research and low volume of university-based basic research;
3. *competition bottlenecks* expressed by a low competition intensity in certain service sectors (liberal professions, energy sector, banking and insurance sector, crafts, estate agents and property management, pharmacies, railways); sporadic limited competition in the productive sector (e.g. through cartel formation); low start-up dynamics of innovative companies to advance competition intensity in established industries;

³⁸ Cf. Ederer and Janger (2010).

4. *deficits in labour participation* concerning the labour quota of women, elderly and migrants, and low qualification of persons with a migration background.

These bottlenecks continue to limit the ability of the Austrian innovation and science system to successfully catch up with innovation leaders in the EU as outlined in the national RTI strategy (see next section).

3.3 Meeting structural challenges

By and large these structural challenges are common knowledge. Thus, it was not surprising that many of them were openly addressed by the Austrian Federal Government's Strategy for Research, Technology and Innovation for the next decade (March, 2011). It addresses measures to strengthen national research structures with a focus on excellence, to foster the innovative capacity of companies, enable thematic priority setting, raise the efficiency of governance, and to link research, technology and innovation to the education system. The strategy should also help to mobilise research, technology and innovation for tackling the grand challenges of society and the economy. Hence, with its 2020 perspective, the national strategy is explicitly embedded in Europe's 2020 growth strategy and contributes to the implementation of the Innovation Union.

In the government's RTI strategy quite a substantial number of structural challenges are featured which the national innovation system is confronted with. Among them are several which – from a systemic RTI perspective – constitute major bottlenecks for a prosperous future RTI development, such as

- a strained university system with unfavourable student-to-teacher ratios, limited scientific career options (no sufficient tenure track), and especially a persistently low number of S&E graduates: A fact which is aggravated by a declining age cohort of pupils between 15 and 19 years of age, a definitive gender imbalance in S&E studies and, thus, low entry and high drop-out rates in tertiary education;
- a relatively narrow financial base for fundamental research, accompanied by deficiencies in medium and large-scale research infrastructures and in competitive research funding, and characterised by little differentiation of research profiles at and between universities and insufficient cooperation between universities and non-university research organisations, as well as between universities and universities of applied sciences; in turn, PROs and HEIs in the Austrian science system are not top-ranked in international rankings³⁹ and, thus, do not largely attract global talent in R&D and science;
- a stagnating share of R&D financing from the business-enterprise sector (with increasing R&D expenditure in absolute terms), faced with a slightly but steadily declining share of corporate R&D funding from abroad (although still from a high level), partially balanced by transfer of a relatively high amount of public funds into the corporate R&D sector (compared to the EU average), well based on a developed science-industry cooperation portfolio, but with little impact on structural economic change in terms of added-value and high-tech orientation;

³⁹ E.g. according to the most recent Times Higher Education Ranking (2012), the first Austrian university, i.e. University of Vienna, ranks only 162nd.

- low dynamics in increasing the intensity of private equity and venture capital in the formation of technology-based, innovative firms (although improvements are expected soon), aggravated by a deficient regulatory (VC) framework, administrative hurdles in the areas of enterprise formation and service regulations, and characterised by a hardly developed entrepreneurship culture (which gets little support from innovation-related education and training curricula), a weak competition policy with yet few concrete actions and outputs concerning demand-side policies and measures, innovation procurement, service and public sector innovation (beyond eGovernance, which is fairly well developed in Austria) as well as social innovation.

In addition, there are a number of challenges which are not highlighted in the strategy:⁴⁰

- first of all, there is no roadmap with budgetary indications and responsibilities, which would be required to implement the activities proposed in the strategy;
- consideration of the grand and societal challenges in RTI funding is still expandable – although eventually beginning;
- limited vertical RTI governance coordination is not addressed, i.e. insufficient coordination of RTI strategies and policies across national and federal state levels.
- current RTI governance insufficiently establishes continuous dialogue in the nexus of policy, society and science stakeholders aimed at increasing participation and acceptance.

Table 3. Challenges and effectiveness of policy response

Challenges	Policy measures/actions addressing the challenge	Assessment in terms of appropriateness, efficiency and effectiveness
1. A weak human capital basis for innovation	<ul style="list-style-type: none"> • introduction of structured doctoral programmes • initiatives launched to increase quality of teacher education (e.g. “PädagogInnenbildung NEU”); • access to and support for dual training schemes widened 	<p>+ weakly increasing number of new doctorates and population share with tertiary education in the last few years</p> <p>+/- no systematic evaluation of educational reforms available to date, partly because too early for an assessment of effects</p> <p>- Only few measures are geared towards excellence of the science system or scientific career prospects of young academics.</p>
2. Deficits in R&D and innovation on firm-level	<ul style="list-style-type: none"> • indirect support via R&D tax credit system in place • some direct R&D support schemes explicitly address or prioritize applicant companies not innovating or 	<p>- SME innovation activities reduced in ultimate years (IUS, 2013); BERD share in GERD stagnated</p> <p>+ however, coalition agreement foresees further improvement of innovation finance</p>

⁴⁰ Cf. Schuch (2011, 2012); Austrian Council for Research and Technology Development (2012).

	conducting R&D	conditions, and - renewal of “headquarter/R&D” initiative also aiming to attract MNU innovation activities
3. Competition bottlenecks	<ul style="list-style-type: none"> • first revision of existing antitrust laws launched in 2011 • public support for start-ups via venture capital activities expanded 	<p>+/- no systematic assessment of past reforms available as regards competition and innovation impacts</p> <p>- notwithstanding public VC initiatives, current entrepreneurial dynamics in the innovation system remain low when compared to dynamics among innovation leaders and followers; venture capital availability stagnated</p> <p>+ additional antitrust reforms and expansion of existing entrepreneurship policies (e.g. red tape reduction) foreseen by recent coalition agreement</p>
4. Deficits in labour participation	<ul style="list-style-type: none"> • gender dimension is high priority in all key policy documents (RTI strategy, coalition agreement), systematic policies in place • set of specific policies addressing high-skilled migration (e.g. RWR visa card scheme, but also recent introduction of (foreign) student fees) 	<p>+ women participation increased significantly in the last years, however, starting from a low basis</p> <p>- net migration of mobile academics close to zero (1996-2011), but loss of high quality talent and net loss of mobile inventors (2001-2010);⁴¹ Migratory schemes will undergo revision according to coalition agreement, coherent migration strategy only underway</p> <p>- systematic policies as regards elderly participation are scarce</p>

⁴¹ Cf. EFI (2014).

4 NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

4.1 Strengthening the knowledge base and reducing fragmentation

Promoting excellence in education and skills development

This section assesses a) in how far Austria has and supports an open labour market, in particular for foreign scientists entering the innovation and research system, b) in how far Austrian educational policies are geared towards excellence, e.g. provision and design of doctoral training programmes, and the level of integration in EU level educational initiatives.

With regard to a), several support initiatives and laws enhance research mobility of Austrian and foreign scientists in order to pursue international science or industry careers in Austria (see below). This can also be seen by comparatively high foreign student and scientists shares in human resources for science and technology (HRST) with some 16% (EU average: 8%, EU labour force survey 2007). However, these foreign born HRST often live for only a short time in Austria, i.e. between 35% and 40% live in Austria for less than 10 years (compared to approximately 30% in the EU average). Similarly, most recent data on academic and inventor mobility flows provides evidence on a net brain drain (see section 5.3 for details).

Introduction of the "Rot-Weiß-Rot"(RWR) visa card and work permit targets the whole labour market, not particularly the labour market for researchers. Moreover, in course of the amendment of the law on occupation of foreigners in 2011, students from third countries are allowed to enter into an additional occupation (10 resp. 20 hours per week depending on the progress of study) and graduate students are allowed to stay in Austria for 6 months after graduation to look for a job. If they find a job, they receive the RWR card provided that their gross salary is above €1,900 per month. Additionally, Austria has implemented the Scientific Visa Directive 2005/71/EC and recommendations 2005/762/EC and 2005/761/EC. General immigration procedures for researchers from all over the world have been facilitated in 2008.

At the federal level, a variety of grants and scholarships supports incoming as well as outgoing PhD students as well as post-doc researchers. Although these measures are implemented by different organisations, information is accessible through a single web-based platform: <http://www.grants.at>. Moreover, since 2007, the Talent Programme by the Federal Ministry for Transport, Innovation and Technology (BMVIT) and the Austrian Research Promotion Agency (FFG) aims at attracting Austrian expatriates as well foreign researchers to pursue their career in Austria.⁴² The Talent Programme provides information about job opportunities as well as organisational and financial support in the preparation of a relocation to Austria. Similarly, since 2011, the Career Grants Programme aims to attract leading Austrian researchers from abroad as an integral part of the Ministry of Transport, Innovation and Technology (BMVIT)'s Talents Initiative. Here, significant financial support covers interview grants, relocation grant as well as

⁴² The original programme, "Brainpower Austria", was renamed in 2011.

dual career grant for spouses of mobile researchers, not located in Austria at the time of job application.

Since 2009, Austrian university laws require public research institutions to advertise for research positions internationally.⁴³ Frequently this also leads to publication of vacancies in the public research sector on EURAXESS Jobs. However, it is up to autonomous research institutions in Austria to publish job vacancies in English, systematically establish selection panels, establish clear and transparent rules for the composition of selection panels etc. Academic inbreeding in public research institutions (i.e. the practice of hiring internal candidates) is the result of the informal favouritism of internal candidates despite formal provisions for open recruitment, but is not frequently observed in Austria. Here, transparent procedures and advertisement standards, which are regularly checked, often prevent academic inbreeding and assure fair and international recruitment.

However, currently there is no official national system in place to establish the equivalence of foreign academic ranks (e.g. professor, senior lecturer) with national ones, whether tenured or non-tenured. In contrast, such decisions are mostly taken on a case-to-case basis in Austria. Language barriers for students as well as for employment of foreign university researchers persists as most Master programmes and courses are still held in German, notwithstanding the fact that Austrian foreign-born researchers are frequently from German-speaking neighbouring countries as well strong cultural ties with surrounding former communist countries. The same is true for higher level courses.

Austrian researchers are only allowed to move their publicly-funded grant to another ERA country to a fairly moderate extent as portability largely depends on the specific research funding organisation. In general, grant portability is frequently limited to individual grant merits rather than organization associated grants. Additionally, scientist affiliation to a recognised institution is often more relevant than residency criteria with regard to individual grant portability. As a best practice example in the EU, grants allocated by the FWF (Austrian Science Funds) are very flexible in this respect, while for instance the Vienna Science and Technology Fund (WWTF) is much more restrictive in this respect, because it has a local/regional mission (directed to the science and innovation location Vienna). At the very end, it is a matter of negotiation and is decided on a case-to-case basis. Research fellowships and programmes administered by the Austrian Academy of Sciences (ÖAW) may be used either domestically or abroad, i.e. APART, DOC and DOC-fFORTE Programmes. Since 2006, approximately 20% of fellows have used their grants to perform their research project or doctoral thesis at a research institution abroad. The “D-A-CH”-agreement between the main (basic) science funds from Austria (A), Germany (D) and Switzerland (CH) allows grant portability between these 3 countries to a very high extent. This can be considered as EU-wide best practice among funding agencies funding across borders.

To sum up, Austria is a relatively open funding and innovation system, in particular in terms of the availability of public funds to foreign researchers (Peuckert et al., 2012), but also with regard to grant portability for research abroad. Recent initiatives have contributed to the process of opening up. Austria is also seemingly dedicated to practice open recruitment. This finds support in the wide-ranging evidence on advertising positions internationally.

With regard to excellence in higher education, structured doctoral programmes have been introduced (“Doktoratskolleg”) already in 2011. Lately, additional funds of €18m by the Austrian Science Fund (FWF) went into the latter programmes, as well as a new, but small-scale grant

⁴³ Revision of/amendment to the original 2002 laws, Bundesgesetzes BGBl. I Nr. 81/2009.

scheme for excellent post-docs (“sub auspiciis Praesidentis”, €9,000 for 2 years) has been launched on federal level. These initiatives complement existing (post-) doctoral fellowship programmes mainly run by the Austrian Academy of the Sciences (ÖAW) and doctoral “Initiativkollegs” initiated and financed by individual universities. Additionally, excellence-in-teaching prizes at public universities (“Ars docendi”) are awarded annually, starting in 2013. Since 2010, the Marietta Blau grant aims at generating internationally competitive PhD diplomas in Austria. It offers financial support to highly-qualified doctoral candidates at Austrian universities for carrying out the abroad part of their doctoral programme (6-12 months).

On EU policy level, Austria is among early adopters in the assignment of the European Charter for Researchers. In this way, more than 30 Austrian research institutions have already signed the Charter & Code, including universities, public research organisations as well as funding agencies. Additionally, broad implementation of their principles at Austrian universities was part of the negotiations for performance agreements 2010-12 with universities. Regarding implementation within the human resource strategy 4 researchers framework, the medical university of Graz, as the first institution in Austria, recently has been acknowledged as “human resources excellence in research” following the EC’s five stage certification process. The Austrian Science Fund (FWF), the University of Natural Resources and Life Sciences (BOKU) and the University of Salzburg have followed up and received this logo lately.

To sum up, considerable effort is directed to improvement of the human capital basis for innovation by Austrian RTI policy, in particular for early stage scientists. Nevertheless, it is too early for a full-fledged assessment of the medium and long-term effects of current reforms such as the structured doctoral programmes by the FWF. However, most importantly, notwithstanding a few low-budget initiatives and a recent upward trend mentioned before, excellence orientation of funds for the Austrian science system is still comparatively low. This also holds true for funds dedicated to and quality of doctoral training in terms of “research excellence” and “attractive institutional environments”. E.g. the excellence cluster initiative is long-planned, but not implemented yet. In addition, existing career paths in science and organisational HEI structures are not fully internationally competitive and, thus, not very attractive to excellent young scientists. With regard to “industry exposure” as well as “quality assurance” Austrian training in general meets principle standards on EU level.

Research Infrastructures

Austria participates in international large-scale research programmes and infrastructures such as CERN, ESO, EMBL, EMBC, ESRF, ILL, ELETTRA, IASA, WMO, IARC. In addition, Austria is a member of so far 10 ESFRI infrastructures (BBMRI, European Social Survey, CLARIN, E-ELT, SHARE, ESRF upgrade, ILL upgrade, DARIAH, CESSDA and PRACE). Austria is the host country of two of the aforementioned international Research infrastructures (BBMRI and IASA).

Most of the existing smaller or medium-scale infrastructure on national level is hosted by the HEI sector and is mainly used by the hosting institutions and, thus, sometimes not open for national or international research cooperation. Most of the Austrian infrastructure is commonly located in the disciplinary fields of life sciences, nano- and material sciences. Similarly, a national roadmap for the building of new infrastructures has not been approved so far, but is currently being developed. Realisation of major national research infrastructures are based on commitments within performance agreements with Austrian HEIs and PROs.

This public consultation on research infrastructures (RI) and a repository of RI in Austria have been commissioned by the Austrian Council for Research and Technology Development to create pressure in favour of a faster resolution of this issue and to facilitate decisions on further financial commitments. Accordingly, the Austrian Council for Research and Technology Development published specific recommendations regarding the further improvement of national infrastructures,⁴⁴ among other things, the establishment of a national infrastructure contact point and revision of financing structures (i.e. three main streams of finance, namely, via institutional funding, infrastructure funding programmes for medium size RI and a national budget line explicitly dedicated to large-scale RIs).

To sum up, building world-class infrastructures in Austria has not ranked very high on the policy agenda in the last decade but is considered a topic and joint mission to be executed on EU level. However, in February 2014, a National Infrastructure Roadmap 2014-2020 has been launched and published by one of the task forces implementing the overall national strategy (cf. highlight section). Roughly 6.4% per annum of national investments were dedicated to RIs (as share of GBAORD) according to the latest available data (2007).⁴⁵

4.2 Getting good ideas to market

Improving access to finance

In general, there is a lack of private risk capital to finance small, young enterprises with high growth potential, expected to have an effect on employment and structural economic change. Thus, the creation of legal conditions for a crowding-in of private risk capital providers is perceived as valuable, but these changes are only underway (cf. coalition agreement, also refer to section 2.4).

According to public budgetary provisions for 2013,⁴⁶ €15m of (public) risk capital will contribute to a semi-public European Business Angel Fund fostering growth of young innovative entrepreneurs, a fund with a total budget of roughly €45m, i.e. a public private leverage ratio of 1:3. Here the expected average investment amounts to €150,000 up to 300,000 per start-up. Once these start-ups are sold or have their initial public offering, the scheme foresees that (public) sales revenues will feed into additional venture capital investment. The financing scheme also provides know-how and expertise of more than 160 business angels to entrepreneurs, the former organized by in a Austria Business Service (aws) network.

Launched in 2012 and 2013, two main public funds have been established on federal level, both managed by the aws. €110m will feed into purely public funds, mostly on the basis of equity shares in start-ups. An amount of €65m of these funds will be provided specifically for early stage capital (“Gründerfonds”) during the next 6 years and as an alternative financing instrument to purely private investment funds. Average (publicly-held) equity amounts from €100,000 up to €1m per start-up.

Funding support well-tailored to the needs of companies, particularly SMEs, is in place: A major component of Austrian total funding is “indirect” funding and, thus, allocating funds to innovative firms broadly/non-selective (i.e. independent of firm size), using a common system of

⁴⁴ (http://www.rat-fte.at/tl_files/uploads/Empfehlungen/111124_Empfehlung_Forschungsinfrastruktur.pdf)

⁴⁵ Schuch, 2011. estimate by the EW country correspondent.

⁴⁶ Cf. BMF (2012).

R&D tax credit (“research premium”). The system itself keeps bureaucracy in Austria to a minimum, compared to selection processes associated with direct funding effort, both for the public administration as well as company applying for funds. The ceiling of this research premium for the acquisition of R&D has recently been increased from €100,000 to €1m, effective as of 2012, while eligibility criteria have been tightened.

However, to sum up, overall trend suggest that the share of innovative companies among all SMEs has, nevertheless, slightly declined in Austria during the last decade (2001-2011, IU country profile 2013). A topical as well as systematic evaluation of the tax instrument and other subsidies to support SME innovation in Austria is, to the best of our knowledge, also not available at present. The situation for start-up (venture capital) finance remains difficult according to the latest data (i.e. VC shares in GDP stagnated in 2012, please refer to section 2.2.1, Table 1).

Protect and enhance the value of intellectual property and boosting creativity

Knowledge transfer, knowledge sharing and open access are well established in Austria. E.g. there are various measures in place aiming at academia-industry transfer of knowledge and technology in the Austrian innovation system. In general, the latter measures, all established during the last decade, are considered effective and have led to a high level of transfer activities. Austria ranks 3rd among OECD countries in this respect. Maybe due to the “saturation” of this set of policies, only few new initiatives have been introduced in the last three years. Notwithstanding the existing variety of instruments in place and related to knowledge circulation, the access and transfer topic remains, however, high on the policy agenda. This is testified by the recent establishment (2011) of an inter-ministerial working group “knowledge transfer and start-ups” in the course of the national RTI strategy implementation, and according to a recent assessment of this strategy by the Austrian Council for Research and Technology Development (2012) that identified a policy emphasis on “innovation capacity of firms”, in particular knowledge and technology transfer.

First, there are various measures in place aiming at academia-industry transfer of knowledge and technology (e.g. COMET, COIN, BRIDGE or Christian Doppler Laboratories programmes) in the Austrian innovation system. In general, these measures, all established during the last decade, are considered effective and have led to a high level of transfer activities. Among the latest support measures in this respect are the thematic programme “Leuchttürme eMobilität” (Lighthouses of E-mobility), the Josef Ressel Centres, the Laura Bassi Centres of Expertise and the Intelligent Production Initiative.

More specifically, however, technology and knowledge transfer involving SMEs and respective, recently evaluated programmes and schemes (e.g. Josef Ressel and Laura Bassi Centres) still leave room for improvement and require evidence-based modifications or strategic reorientation (uni:invent and COMET). In addition, notwithstanding a positive evaluation, the temporary budget halt for the BRIDGE programme is a step in the wrong direction. The programme “bridges” the gap between basic and applied science.

The Austrian funding portfolio is still focused on technological research and technology transfer, while only recently more emphasis has been directed towards non-technological innovations in manufacturing and in the service sector, e.g. small-scale voucher schemes for the creative industries. Public sector innovation and social innovations are not tackled by the existing funding portfolio.

Second, like the majority of EU countries, Austria also addresses knowledge and IPR transfer on national level through overarching laws on the research system, obliging both research funders and public research organisations to play a full role in supporting national innovation and competitiveness (ERALAW 2011). Researchers from public organisations are entitled to patent their inventions, provided that their employer is not willing to file the patent application themselves. Austria has special regulations, based on soft law, that guide research funding organisations when supporting academic spin-offs agglomerated in special centres ("AplusB" Centres). These guidelines offer advice on a variety of relevant areas, including management, eligibility, and funding for such activities (ERALAW 2011).

However, the current role of the Austrian Patent Office (APO) as the main stakeholder of public IPR activities has been negatively assessed in 2013: The respective qualitative evaluation was based on an international comparison with other national offices and commissioned by the Austrian Council for Research and Technology Development.⁴⁷ It argued that the APO does not seem to work on a fully balanced cost-benefit structure and with relatively less service orientation towards customers.

With regard to public support of IP management across borders, a national contact point (NCP) has been designated in 2010. The NCP's tasks include the coordination of measures regarding knowledge transfer between public research organisations and the private sector, including tackling trans-national issues, in liaison with similar contact points in other Member States. The NCP is assisted by the Federal Ministry of Economy, Family and Youth, the Federal Ministry of Transport, Innovation and Technology, and the Austria Wirtschaftsservice (AWS). More specifically, in order to follow up the IP Recommendation, the Austrian National Contact Point concentrates on the following tasks: Reviewing and reporting on measures taken in Austria to implement the Recommendation and Code of Practice; analysing IP data; inspecting, cleaning and modelling data with the goal of highlighting useful information; conferences and workshops to enhance collaboration between universities and industry; and it settles legal issues (consolidation of model contracts, development of guidelines www.ipag.at).

Notably, Austria is the first MS to ratify the Agreement on a Unified Patent Court in August 2013 and after signing the preliminary Agreement in February the same year. The "Comprehensive EU Patent Package" consists of three parts: two regulations on the EU Patent (substantive and procedural patent protection regulation and regulation concerning the translation of patents) as well as an international agreement on the creation of a unified patent jurisdiction. The Unified Patent Court will be responsible for disputes relating to future unitary patents as well as existing "classic" European patents, making it easier for inventors and companies to protect their patents. However, it is far too early to assess the impact of the Unified Patent on the Austrian science and innovation system.

Third, regarding open access, all major Austrian research funders are signatories of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2007), notwithstanding the absence of an explicit national policy on open access or a policy to create a national repository for all institutions. Additionally, "the awareness of open access in Austrian autonomous institutions is small but growing very fast" (EU Commission, 2012: National open access and preservation policies in Europe) and the HEIs' umbrella organisation Universities Austria (the Austrian Universities' Conference) ratified the European Universities Association's "Recommendations from the EUA Working Group on Open Access". In 2010, Universities

⁴⁷ Cf. Oxfirst (2013).

Austria also published its recommendations for the enhancement of open access policies in Austria and the University of Vienna declared officially to implement a policy.

E.g. the Austrian science fund (FWF) has developed an open access policy for all research programs they finance: i.e. FWF expects the results of the research it supports to be made public and when possible published in a digital form, and to be made open access within six months (twelve in the case of books). It offers money to Austrian scientific publishers so that books also can be used in open access if the FWF has supported the research (costs for open access publishing are covered up to three years after the end of the project). Similarly, the Austrian Academy of Sciences (ÖAW) has developed an open access policy and created a repository.

Most recently (2012), the "Open Access Network Austria" (<http://www.oana.at/en/home/>) was established as a joint activity under the organisational umbrella of the Austrian Science Fund (FWF) and 'The Austrian Rectors' Conference (UNIKO). Additionally, the network comprises representatives of all public universities and many private universities, universities of applied sciences, non-university research institutions, and funding agencies. Its main tasks include the coordination of and recommendations for the Austrian OA-task/ activities of the research institutions, funding organizations and research policies (incl. taking into account international developments) as well as positioning towards the information providers (mainly publishing houses).

Public procurement

Innovation-oriented public procurement policies in Austria were substantially activated by European deliberations and initiatives. Even though procurement guidelines reflecting the EC's handbook and good practices of state-owned enterprises have been issued, the Austrian approach towards innovation-oriented public procurement is mission-oriented (and frequently also geared towards lead-markets), but rather based on voluntary standards, i.e. still being in an experimental policy phase.

However, a couple of initiatives and strategic documents have been launched in the meantime. As an example, the 'IÖB Servicestelle', to promote public procurement for innovation has been established. Another initiative addressed green procurement in 2010, i.e. the "Austrian Actionplan for Sustainable Public Procurement" initiated by the Federal government and coordinated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management.⁴⁸ The most important measures of this action plan are: the establishment of expert groups for the development of social core criteria and for dismantling budgetary barriers; extending the knowledge base regarding the effects of sustainable procurement; diffusion of the latter and information sharing; monitoring and evaluation of the action plan. Interestingly, the plan also highlights piloting of green procurement activities by a centralized procurement agency in one of Austria's regions (namely, Vorarlberg).

Similarly, in 2012, the federal government adopted an "Action Plan on Public Procurement Promoting Innovation" ("Leitkonzept für eine innovationsfördernde öffentliche Beschaffung"). The process towards this strategy was conducted by the Ministry of Economy, Family and Youth (BMWFJ) and the Ministry of Transport, Innovation and Technology (BMVIT). The main objectives of the Action Plan are: To encourage industry to develop and deliver innovative goods/services (reference or leading markets) and to supply public bodies and citizens with advanced and (eco-)efficient goods/services. In implementing this strategy, preferential

⁴⁸ Cf. BMLFUW (2010).

treatment is given to the following actions: establishing a service point at the Federal Procurement Agency (BBG) (conducted in September 2013) and corresponding PPPI centers of competence, launching pilot projects and addressing innovation as a secondary procurement objective (in analogy to ecological, social and SME-related issues) in the legal framework (Bundesvergabegesetz) (conducted in July 2013).

Additionally, 2013 also saw the “greening” of some of the existing national procurement regulation. Since this year procurers on federal level are obliged by national laws to account for EC regulation on energy efficiency.⁴⁹

Note further that Austrian agencies with a focus on green procurement also cooperate with institutions in several other MS (among others, Sweden and Germany) in the context of the ECOPOL project funded under FP7.⁵⁰ In order to accelerate eco- innovation policies and to implement concrete policy measures on innovative green public procurement, the ECOPOL project makes recommendations for the deployment of eco- innovative policies and the consumer behaviour of public authorities.

4.3 Working in partnership to address societal challenges

In general, Austrian policy seems to continue funding a broad spectrum of technological fields and industries (using a large variety of policy instruments) rather than concentrating resources on key priorities which, therefore cannot be identified, even though streamlining efforts on the existing funding portfolio were recommended in the last NIS evaluation. Direct, mostly bottom-up based institution financing and indirect funding via the research premium are common in the R&D policy mix, whereas thematic and/or structural programmes are limited in scope. Notwithstanding efforts by the task force implementing the national RTI strategy since 2011 (and its respective working group) to address grand challenges, a coherent horizontal (cross-ministerial) theme management is currently missing in Austrian RTI governance. In addition, most policies directed towards grand challenges lack continuous evaluation as well as identification of new challenges on national level is not based on systematic assessment.

However, with its 2020 perspective, the national strategy is explicitly embedded in Europe’s 2020 growth strategy and contributes to the implementation of the Innovation Union. In this way, Austria engages in several joint cross-border collaborations on EU and international levels, among many other schemes, in European Innovation Partnerships (EIP):

- Austria is represented in the Steering Board of the EIP on Smart Cities and Communities .
- In the EIP on Active and Healthy Aging⁵¹ Austria participates in 38 of the total 179 initiatives (i.e. 20%) active in 2013. Austrian stakeholders in these EIP typically take over important functions within initiatives: In 34 out of the 38 initiatives it is either a “member of the action group” or a “reference site” for the specific initiative. Additionally, of the 20 scheduled initiatives for the period 2014-2015 Austria will be involved in 6 forthcoming ones (i.e. 25%).

⁴⁹ National law: BVergG, §80a; EC Directive on Energy Efficiency EU (2012/27/EU).

⁵⁰ Website: http://www.ecopol-project.eu/en/about_.

⁵¹ <https://webgate.ec.europa.eu/eipaha/>.

- Austria's role in the EIP Raw Materials is also comparatively strong.⁵² The Austrian Minister of Economy is a member of the high level steering group and Austrian industry and science stakeholders engage in several of the 5 operational groups and related work packages.
- To date, Austria does not actively participate in EIP Water, i.e. it is not involved in the nine action groups selected mid-2013. Similarly, EIP Agricultural Productivity and Sustainability is only emerging⁵³ and it is not clear at this stage to what degree individual MS will commit resources to the processes and initiatives. Operational groups have not been established yet.

Austria is also involved in a large number of ERA-NETs, which contribute not only to a more efficient allocation of funding but also to enhanced cross-border relations with researchers from other EU Member States. In addition, Austria made recent commitments to a number of Joint Programming Initiatives (JPIs) focusing mainly on grand challenges such as an aging society or climate change (e.g. initiatives “More Years, Better Lives”, “Healthy Diet for a healthy life”, “Water Challenges”). It also participates in a number of international ERA-NETs to fund research activities with third country partners, e.g. ERAfrica since early 2013.

Austria is also involved in almost all Joint Programming Initiatives (JPIs) and is leading the JPI Urban Europe on Sustainable Urbanization. However, provision of sufficient funding for these initiatives on national level seemingly is difficult.⁵⁴

In 2013, a multilateral platform among German-speaking nutrition stakeholders from Austrian, Suisse and German research organisations and agencies has been recently established (“FoodDACH”), with the long-term goal to become one of the next knowledge and innovation communities (KICs) on EU level. The latter initiative will also involve public and private from the existing EU consortia “Foodbest” and seven additional countries.

To sum up, Austria is an active and very important player in a variety of EU level initiatives and cross-border research cooperation addressing grand challenges.

4.4 Maximising social and territorial cohesion

Currently, again, there is no explicit national smart specialization strategy in place, but more recently a few national initiatives are emerging that aim to create leverage effects.⁵⁵ In this way, there is so far only little response to growing STI governance in Austrian regions and the need to coordinate e.g. priority setting and allocation of resources on multiple levels. The synchronization of national and regional strategies is very loose at present, i.e. case studies

⁵² http://ec.europa.eu/enterprise/policies/raw-materials/innovation-partnership/index_en.htm

⁵³ http://ec.europa.eu/agriculture/newsroom/119_en.htm

⁵⁴ Austria led the coordination and support action (CSA) “JPIs to Co-Work” in 2010, explicitly focusing on framework conditions for Joint Programming. First results (<http://www.jpis2cowork.eu/>) from the CSA suggest that: Implementation activities are mostly not yet fully explored, therefore funding modalities are not yet defined. For preparing JPI activities often national in-kind contributions are used. In general, alignment of funding sources and rules is still low. Similarly, JPIs did not succeed to convince most programme owners about the benefits of participation. This holds true for most participating Member States and, thus, also for Austria.

⁵⁵ Please also refer to section 2.7 for details on existing regional strategies and initiatives on national level in Austria.

by the OECD on Austria did not provide any evidence on this.⁵⁶ The need to coordinate priorities across governance levels will further increase once Austrian regional stakeholders deepen priority sets by identifying R&D niches in their portfolio (as they plan to do in the next years, e.g. Lower Austria).

Similarly, regional smart specialization strategies also can imply the development of new cross-border governance mechanisms beyond administrative borders. In Lower and Upper Austria, an attempt is being made to define specialization areas taking into account the cross-border dimension of specialization areas, but this still needs further refinement.⁵⁷

However, macro-regional coordination efforts in the Danube region may be a meaningful exception in this respect. Similar may hold for the long-planned macro-regional strategies among Alpine area regions. Here, the national strategy “Partnerschaftsvereinbarung Österreich 2014-2020: STRAT. AT 2020” (2013) developed by the Austrian Conference on Spatial Planning (ÖROK),⁵⁸ predefines national thematic goals and priorities for future EU cohesion policy and, thus, plays an essential role in the overall process. Additionally, Austria will have but one national operational programme for all ESIF (but with regional chapters) that will guide implementation of strategies.⁵⁹ It already foresees and discusses national potentials for efficient and expansive use of resources provided under the future European Structural and Investment Funds, in particular those in fields related to innovation and science.

4.5 International Scientific Cooperation

In general, Austria is well engaged in international R&D exercises and participates in international large-scale research programmes and infrastructures such as CERN, ESRF, EMBO, CISM, ILL, ELETTRA, IIASA, ISTC/STCU, WMO.⁶⁰ It has signed intergovernmental and bilateral S&T agreements with China, FYR of Macedonia, India, Korea (mainly in the EU project KORANET), Croatia and Ukraine. New or reinforced bilateral cooperation established in 2012 includes (among others) the following countries: Slovenia (in the context of Erasmus, Erasmus Mundus and CEEPUS), Slovakia, France, China, Saudi Arabia, Albania, Singapore, Montenegro and Indonesia. However, these agreements not only include bi-governmental action, but also cooperation at university or PRO levels, the national exchange services (OeAD) or Austria’s main funding agencies, e.g. the ÖAW and its Slovenian counterpart.

Additionally, a multilateral or macro-regional strategic communique was signed in 2012 by fourteen countries in the Danube region, addressing potential R&D synergies for Horizon 2020 and Structural Funds.⁶¹ The first progress report on the European Union Strategy for the Danube Region has been published in mid-2013. It details significant achievements in tackling problems from missing transport links, lack of competitiveness, to pollution and crime. However, it also calls on EU member states among Danube members to incorporate their

⁵⁶ Cf. OECD (2013).

⁵⁷ Cf. OECD (2013).

⁵⁸http://www.oerok.gv.at/fileadmin/Bilder/3.Reiter-Regionalpolitik/2.EU-Kohaesionspolitik_2014_/Nationale_Strategie_STRAT.AT2020/Stellungnahmen_2._Verfahren/STRAT.AT_2020_Rohbericht_11_06_2013_final.pdf.

⁵⁹http://www.oerok.gv.at/fileadmin/Bilder/3.Reiter-Regionalpolitik/2.EU-Kohaesionspolitik_2014_/EFRE/IWB_EFRE_AT_Draft_2.0_2014-02-05_inkl_Anhang.pdf

⁶⁰ For details on Austria’s involvement in ERA-Nets see section 5.3.

⁶¹ http://www.bmbf.de/pubRD/BMBF_Konferenz_Kommunique_Ulm_Draft_09_07_2012_EN_clean_final.pdf.

approach to Danube into the new generation of programmes for Regional Policy 2014-20. However, efficient and combined use of the funding sources is essential, namely, ESIF, Horizon 2020, COSME and the Connecting Europe Facility.

Austria's main area of international cooperation is support for the mobility of researchers, based on jointly defined projects. However, most of the existing internationalisation programmes are subcritical and rarely facilitate comprehensive research collaboration. To add critical momentum, Austria successfully participates in international INCO-NETs to establish and support the policy dialogue with third countries. It also participates in a number of international ERA-NETs to fund research activities with third country partners. However, to date, there is hardly any involvement of more applied and industry-oriented funding partners under these schemes.

In general, Austria is quite successful in attracting students from abroad, but less able to attract and retain (top) academic and inventors. According to recent data of the WIPO (2013), the share of patenting inventors with migrant background is roughly 12% for the last decade (2001-2010) and is comparable to the Netherlands or the UK. This also constitutes a significant increase compared to the period before 2000, i.e. a rate of 8%. However, outbound mobility flows of inventors in the last decade exceed these inventor inflows. As a destination country for higher education (i.e. obtain a PhD), Austria ranks well above EU average being a common destination among small and open economies (Luxembourg, Switzerland and Belgium).⁶²

⁶² Cf. MORE2 Higher Education Survey (2012).

5 NATIONAL PROGRESS TOWARDS REALISATION OF ERA

5.1 More effective national research systems

In general, public funds in Austria are more often distributed via institutional than project-based modes, roughly accounting for 2/3 and 1/3, respectively, of total funding. The share of the GUF in % of total university budget allocation in Austria still belongs to the highest ones in the EU, with up to 90% of core funding (for further details see section 2.2.1.1 ff).

GUF allocation, i.e. block funding, is mainly based on performance contracts (“global budgets” are determined every two years by Austrian government and HEIs). Currently, more than 20% of block funds to HEIs are allocated according to this performance-based institutional funding model. The latter model will be fully implemented until the performance contract period 2019-2021, for period 2016-2018 up to 60% of university funding will be based upon this model.

The emphasis on institutional rather than project-based funding in Austria has been and will be further strengthened by increases in institutional HEI funds in most recent and subsequent years (“HEA Structural Funds”). These increases, even though allocated based on performance (criteria), arguably, do not sufficiently consider criteria for scientific excellence.

Furthermore, Austria has comparatively high-quality standards with regard to allocation of public funds and awarding processes where suitable (in particular, in basic and excellent sciences). In this way, e.g. decisions on funding of applied research and innovation by the FFG are seldom based on international peer reviews, while applications to FWF funds and programmes are mostly processed via these standards and criteria.

Relatively little emphasis is put on impact evaluations of RTI interventions despite a well-developed RTI evaluation culture in Austria. Systematic evaluation of public research organisations is often missing or is only relatively “light”. Higher education institutions have to undergo external quality assurance (each 7 years), a requirement laid down in individual performance contracts of universities.

However, establishment of a new and single agency (Agency for Quality Assurance and Accreditation Austria) in 2012 responsible for external quality assurance in the HE sector and standard-setting activities of the Platform Research & Technology Policy Evaluation (FTEVAL) likely improve institutional assessments and general evaluation practice in Austria in medium-term and may, thus, further increase efficiency of public spending in STI policy.

5.2 Optimal transnational co-operation and competition

Cross-border RTI cooperation is well established in Austria at the level of researchers, research organisations from industry and academia, and research funding agencies. Consideration of grand and societal challenges as well as research infrastructures in Austrian RTI funding is still expandable.

Notwithstanding efforts by the task force implementing the national RTI strategy since 2011 (and its respective working groups) to address grand challenges, a horizontal (cross-ministerial) theme management is currently missing in RTI governance. However, with its 2020 perspective, the national strategy is explicitly embedded in Europe's 2020 growth strategy and contributes to the implementation of the Innovation Union.

More specifically, Austria is an active and important player in a variety of EU level initiatives including cross-border research cooperation and coordination such as ESF, EUROHORCS, ERA-Nets, Joint Undertakings and JPIs in particular those addressing grand challenges, but also with regard to the development of supranational or EU-wide standards for coordination of research (e.g. "JPIs to Co-Work").

However, according to ERAC (Final Report of the Expert Group, 2012) there is still room for improvement in specific activities: E.g. Austrian constraints for JPI participation were seldom based on the lack of coordination of national funding agencies towards JPIs or insufficient compatibility of national and European rules and procedures, but on budgetary restrictions, limited human resources and a limited match of national programmes with JPIs.

As regards the mutual recognition of reviewing standards (EU vs. national levels), evaluations within European initiatives such as ERA-Net and Art. 185 are usually accepted by the Austrian Research Promotion Agency (FFG). However, formal eligibility might be ensured by national authorities. Multilateral initiatives as regards recognition include e.g. the D-A-CH Agreement, a cooperation activity between research funding agencies in Germany, Switzerland and Austria already signed in 2003. The agreement follows the idea of a lead agency. Negotiations are ongoing to include similar funding agencies from other Member States such as the Netherlands' NWO or the UK's. However, to date, none of the participating agencies' contribution (or the agreement as a whole) have been evaluated. Hence, it is not possible to assess the specific contribution to ERA. However, the D-A-CH agreement can be regarded as innovative practice in the EU.⁶³

Austria has signed various new intergovernmental bilateral S&T agreements. This not only includes agreements on federal government level, but also cooperation across borders on the levels of universities or PROs and Austria's main funding agencies. Additionally, a macro-regional strategic communique has been signed in 2012 by eleven countries in the Danube region, in particular addressing potential R&D synergies for Horizon 2020 and Structural Funds. By the end of 2013, new scientific clusters have been launched in the strategy's context and the strategy has been positively evaluated: It recommends an even tighter alignment of signatory countries with European Structural and Investment Funds. Furthermore, the recent coalition agreement of the new government stresses the national importance of an additional macro-regional strategy for the Alpine region in the near future.

Only roughly 6.4% per annum of national investments were dedicated to research infrastructures in Austria (as share of GBAORD) according to the latest available data (2007). Most of the existing smaller or medium-scale infrastructure is hosted by the HEI sector and is mainly used by the hosting institutions, i.e. is frequently not open for national or international research cooperation. In turn, building world-class infrastructures in Austria does currently not rank very high on the policy agenda and is rather considered a topic and joint mission to be executed (and at least co-financed) on EU level. This view is again confirmed by the recent coalition agreement signed in late 2013; i.e. the agreement does not announce any new financial commitments in research infrastructures. Notable exceptions to this view are the Biobanking and Biomolecular

⁶³ Cf. http://www.fteval.at/upload/FWF_processes_and_governance.pdf.

Resources Research Infrastructure (BBMRI) inaugurated in September 2013 and a public consultation on research infrastructures executed in 2012.

5.3 An open labour market for researchers

Several support initiatives and laws enhance research mobility of Austrian and foreign scientists in order to pursue international science or industry careers in Austria and abroad. Austria's science and innovation system experienced a balanced net migration of mobile academics close to zero in the past 15 years, but at the same time a net loss of high-performing academic talent as regards scientific impact (citations).⁶⁴ Similarly, as regards diversity in industry innovation, there was a net loss of inventors (inventor inflows vs. outflows). Noteworthy, as a destination country for higher education, Austria ranks well above EU average being a common destination among small and open economies (Luxembourg, Switzerland and Belgium).⁶⁵

Since 2009, Austrian university laws require public research institutions to advertise for research positions internationally. Academic inbreeding in public research institutions is not frequently observed in Austria, however, language barriers for students as well as for employment of foreign university researchers persists.

Austria has implemented the Scientific Visa Directive 2005/71/EC and recommendations 2005/762/EC and 2005/761/EC. In this way, general immigration procedures for researchers from all over the world have been facilitated in 2008. However, migratory regimes will undergo further revision following an evaluation exercise (e.g. RWR visa card) and a coherent national migration strategy (including monitoring etc.) will be developed according to the recent coalition agreement of the new government.

The faster recognition ("Nostrifizierung") of foreign diploma and training qualifications, however, has been implemented in 2011 and has proven relatively successful so far (in the first half of 2011, 1,036 foreign diplomas were approved; for the same period in 2012, already 1,239 were approved). However, the recent grand coalition agreement (2013) plans to further simplify the overall approval of foreign qualifications/degrees, including an equivalence of academic ranks.

Austrian researchers are only allowed to move their publicly-funded grant to another ERA country to a fairly moderate extent as portability largely depends on the specific research funding organisation. In general, grant portability is frequently limited to individual grant merits rather than organisation associated grants. Additionally, scientist affiliation to a recognised institution is often more relevant than residency criteria with regard to individual grant portability. For example, grants allocated by the FWF (Austrian Science Funds) or the Austrian Academy of Sciences (ÖAW) are very flexible in this respect, while for instance the Vienna Science and Technology Fund (WWTF) is much more restrictive. Again, the DACH-agreement between the main (basic) science funds from Austria, Germany and Switzerland allows grant portability between these 3 countries to a very high extent (see section 5.2).

Austria participates in the EURAXESS initiative with a national portal, several contact points and two service centers. Evaluation of EURAXESS services by the EC published in mid-2013

⁶⁴ Cf. OECD (2013).

⁶⁵ Cf. MORE2 Higher Education Survey (2012).

did not highlight any recommendations specific to Austria but suggested an extension of services offered (e.g. mentoring, dual career) in addition to mobility related ones.

As regards doctoral training at HEIs, structured programmes have been launched (“Doktoratskolleg”) in 2011 as well as small-scale grant scheme for excellent post-docs. These initiatives complement existing (post-) doctoral fellowships mainly run by the Austrian Academy of the Sciences (ÖAW), as well as several GUF-financed doctoral programmes launched by individual universities (“Initiativkolleg”). Notwithstanding these initiatives, excellence orientation of funds for the Austrian science system is still comparatively low. This also holds true for funds dedicated to and quality of doctoral training in terms of “research excellence” and “attractive institutional environments”. E.g. the excellence cluster initiative is long-planned, but not implemented yet. In addition, existing career paths in science and organizational HEI structures are not fully internationally competitive and, thus, not very attractive to excellent young scientists. The expected reforms in this context outlined in the recent coalition agreement by the new government will not very likely change the overall situation for these scientists. With regard to “industry exposure” as well as “quality assurance” Austrian training in general meets principle standards.

Austria is among early adopters in the assignment of the European Charter for Researchers, partly because was part of the negotiations for performance agreements 2010-12 with universities. So far only four Austrian organizations have implemented the “Charter and Code” in their policies and practices via the HRS4R tool.

5.4 Gender equality and gender mainstreaming in research

Austria ranks only 19th in the global gender gap report 2013, notwithstanding that this unfavorable position has significantly improved since 2006 (27th). However, since the last decade gender monitoring and mainstreaming are a main concerns of general Austrian policy. In this way, several new measures and regulations aim to improve the general career prospects of women in the labour force and society, but also in science and innovation careers.

At the level of HEIs, the revision of the Universities Act in 2009 stipulated a women quota in university committees of 40%. Since 2009, the number of women in university committees increased in all committees besides the senate. In 2012, a training measure for members and chairpersons of university committees has been established by the BMWFW to support the universities. One result of this training measure was the establishment of the “club scientifica” (interdisciplinary network for female scientists). The same year the outcome oriented budgeting has been established at federal level and includes five principal aims, of which one is regarding equal treatment. The gender dimension is also outlined in university performance agreements. BMWF monitors progress with regard to the gender targets set in the performance agreements through gender monitoring indicators. These indicators measure the presence of women in different university positions and hierarchy levels; their promotion prospects (glass-ceiling index); the gender pay gap, gender-specific choice of fields of study and the presence of women in recruitment proceedings. Similarly, a number of support schemes have been launched and continuously expanded under the umbrella of the inter-ministerial action programme fForte (“Women in Research and Technology”) since 2002, to counteract the low rate of women in R&D activities. fForte includes, at the core, three branches: 1) an academic one (“Excellentia” expired in 2010) targeting the share of women full professors at Austrian HEIs; 2) an industry/applied research programme branch (“FEMtech”) seeking to increase female

participation in industry innovation and applied sciences at PROs; 3) a schooling branch, e.g. encouraging gender specific teaching schemes for STEM subjects.

As regards regulation at main funding bodies in Austria, e.g. FWF guidelines and reviewing criteria for applications account for women specific career tracks. The Austrian Promotion Agency (FFG) developed gender equality guidelines for all programmes. The Austrian Academy of Sciences (ÖAW) and the BMWF include gender equality provisions in the performance agreement. Fellowship programmes administered by the ÖAW allow women researchers to interrupt and extend their contract for a maximum of 12 months during maternity leave. OeAD grants do not include benefits for maternity leave. However, interruption is possible if the researcher wishes to finish the project after maternity leave.

In sum, legislative changes across all areas of policy and the fForte umbrella initiative may not only help reduce the “leaky pipeline” of women in academia, but also industry and PRO participation in Austria. However, so far, only some specific measures have been positively evaluated (e.g. the Laura Bassi Centres of Excellence). Systematic evaluation has not been conducted so far.

5.5 Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

Knowledge transfer (KT), knowledge sharing (KS) and open access (OA) as key ERA dimensions are well established in Austria. Most recent KT funding initiatives include the establishment of “knowledge transfer centers”.⁶⁶ However, most KT instruments are considered effective and have led to a high level of transfer activities. More specifically, some recently evaluated programmes and schemes (e.g. Josef Ressel and Laura Bassi Centres) still leave room for improvement or require strategic reorientation. Similarly, the Austrian KT funding portfolio is still focused on technological research and transfer, while only recently more emphasis has been directed towards non-technological innovations in manufacturing and in the service sector. E.g. the most recent coalition agreement in this context stresses the role of creative industries as well as ICT for innovation, value-creation and economic growth (without committing to a specific budget). Public sector innovation and social innovations are not tackled by the existing funding portfolio.

Additionally, increased provision of institutional funds for universities of applied sciences for student places and professorships in the last few and foreseen in next years may further improve transfer of knowledge and technology across sectors. However, it is too early for an assessment of (institutional) funding effects on KT activities.

In 2010, as noted before, a national contact point (NCP) aims to tackle the barriers associated with cross-border IP management and encourage KS. The NCP's tasks include the coordination of measures regarding knowledge transfer between public research organisations and the private sector, including tackling trans-national issues, in liaison with similar contact points in other Member States.

⁶⁶ Here, KT between universities, other research organizations and the private sector is promoted within three virtual regional Knowledge Transfer Centres and within a virtual thematic Knowledge Transfer Centre in the field of life sciences.

Regarding open access, all major Austrian research funders are signatories of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2007). National open access and preservation policies in Europe) and the HEIs' umbrella organisation Universities Austria (the Austrian Universities' Conference) ratified the European Universities Association's "Recommendations from the EUA Working Group on Open Access". In 2010, Universities Austria also published its recommendations for the enhancement of open access policies in Austria and the University of Vienna declared officially to implement a policy.

At the level of main funding bodies in Austria, e.g. the Austrian science fund (FWF) has developed an open access policy for all research programs they finance and it financially supports grantees to publish in an OA format. Similarly, the Austrian Academy of Sciences (ÖAW) has developed an open access policy and created a repository.

Most recently (2012), the "Open Access Network Austria" was established as a joint activity under the organizational umbrella of the Austrian Science Fund (FWF) and The Austrian Rectors' Conference (UNIKO). Additionally, the network comprises representatives of all public universities and many private universities, universities of applied sciences, non-university research institutions, and funding agencies. Its main tasks include the coordination of and recommendations for the Austrian OA-task/ activities of the research institutions, funding organizations and research policies (incl. taking into account international developments) as well as positioning towards the information providers (mainly publishing houses).

ANNEX 1. PERFORMANCE THE NATIONAL AND REGIONAL RESEARCH AND INNOVATION SYSTEM

Feature	Assessment	Latest developments
1. Importance of the research and innovation policy	<p>(+/-) due to merger of ministries, innovation policy as regards industrial policy components strengthened; similarly, independence of (basic) science policy likely reduced</p> <p>(+) highest GERD share in GDP, ranks Austria among top-EU/OECD as regards this indicator; also, high GOVERD per GERD share</p> <p>(-) policy continues funding a broad spectrum of technological fields and industries rather than concentrating resources on key priorities (grand challenges)</p>	<ul style="list-style-type: none"> all tasks and budgets of former Ministry of Science and Research (BMWF) now governed by the Ministry of Economy, Family and Youth (BMWFJ) Recent coalition agreement (2013) emphasizes the role of thematic funding for grand challenges, but does not specify budgets/identify institutions in charge.
2. Design and implementation of research and innovation policies	<p>(+) comparatively high-quality standards with regard to allocation of public funds and awarding processes where suitable (in particular, in basic and excellent sciences), all main funding bodies involved</p> <p>(+) some problems of horizontal and multilayer governance issues increasingly tackled</p> <p>(-) ambitious national RTI strategy with specific (transparent) targets in place, but no budgets specified</p> <p>(+) high AT involvement and leverage from EU level activities, but limited financial commitment to such activities</p>	<ul style="list-style-type: none"> establishment of quality assurance agency as regards HEIs' and PROs' institutional assessments increasing smart specialisation and macro-regional strategy activities as well as working groups established safeguarding the implementation of the national strategy
3. Innovation policy	(-) little evidence on demand-side innovation policies, notwithstanding pilot initiatives	<ul style="list-style-type: none"> again, cf. 1.
4. Intensity and predictability of the public investment in research and innovation	<p>(+) anti-cyclical public R&D expenditure, high share of GOVERD in GERD</p> <p>(+) multi-annual plans for HEI and PRO finance in place</p> <p>(-) R&D tax incentives in place, but little effect in generating additional private R&D and innovation in Austrian businesses according to latest available data (IUS, 2013; CIS 2010: decreasing shares of innovating SMEs and stagnating shares of overall innovators)</p> <p>(-) constantly decreasing share of finance from abroad since 2006</p>	<ul style="list-style-type: none"> performance-based contracting with HEI and PROs increasingly used relaunch of (R&D) headquarter initiative foreseen in coalition agreement (2013), notwithstanding negative evaluation of predecessor programme

5. Excellence as a key criterion for research and education policy	<p>(-) no explicit cluster initiatives for excellent science in place, notwithstanding initiatives with an excellence focus on applied sciences and tech transfer initiatives (e.g. COMET)</p> <p>(-) no significant improvement as regards (tenure) opportunities for excellent young scholars in the existing system; not competitive with US conditions</p> <p>(-) current emphasis on institutional rather than project-based funding will be further strengthened with HEI funding increases</p>	<ul style="list-style-type: none"> • ‘higher education plan’ reform includes e.g. incentives for third-party funding and private co-finance (e.g. sponsoring and donations) • small scale measures: • increases in HEI “structural” funding 2013-2016 • structural reform of the Austrian Academy of the Sciences (ÖAW)
6. Education and training systems	<p>(+/-) current initiatives address adverse early and social selection in primary schools and permeability in the overall education system, but too early for an assessment of recent reforms</p> <p>(+) efforts to raise quality of teacher education</p>	<ul style="list-style-type: none"> • reform of the new secondary school (“Neue Mittelschule”) replacing grammar school (“Hauptschule”) by 2019 • “Lehre mit Matura” programme, i.e. assistance for graduation examination of apprentices that gives university access • programmes such as “PädagogInnenbildung NEU”
7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level	<p>(+) majority of knowledge transfer (KT) measures considered effective, i.e. high level of transfer activities in innovation system</p> <p>(+) also, very comprehensive KT policy approach: provision of institutional funds for key organisations for KT as well as support to individual level (tacit) knowledge transfer activities, namely: see right column</p>	<ul style="list-style-type: none"> • overarching laws on the research system, obliging both research funders and public research organisations to play a full role in supporting national innovation and competitiveness (ERALAW 2011) • increased funding for universities of applied sciences (student places and professorships) and intersectoral mobility support (e.g. “Young Experts Programme”). • NCP established as regards cross-border IP management
8. Framework conditions promote business investment in R&D, entrepreneurship and innovation	<p>(+) The national government currently aims to improve financing conditions for innovation and support to newly founded businesses, in particular innovative SMEs and high-tech start-ups,</p> <p>(-) but most recent (2012) decrease of venture capital availability in Austrian capital markets</p>	<ul style="list-style-type: none"> • New public and semi-public venture capital funds established and supported • Also, coalition agreement foresees e.g. draft regulatory changes for crowdfunding activities, and enhance equity capital formation via the abolition of corporate income taxes by 2016.
9. Public support to research and	<p>(+) indirect support via tax incentives in place (no reviewing process needed, easy access for SMEs);</p>	<ul style="list-style-type: none"> • new coalition agreements foresees reduction of “red

innovation in businesses is simple, easy to access, and high quality	(+/-) variety of instruments, but mostly accessible in one-stop-environments (e.g. aws);	tape” for entrepreneurs and general innovating businesses as regards their policy support
10. The public sector itself is a driver of innovation	(+) systematic approach to thematic innovation procurement emerging, e.g. procurement laws adjusted and action plan implemented	<ul style="list-style-type: none"> • Recent initiatives on green procurement • E-government activities are expected to be strengthened according to recent coalition agreement

ANNEX 2. NATIONAL PROGRESS ON INNOVATION UNION COMMITMENTS

	IU Commitment	Main changes	Brief assessment of progress / achievements
1	Member State Strategies for Researchers' Training and Employment Conditions	<p>Charter & Code signed by 33 research institutions in Austria</p> <p>Recent activities (2013) under the roof of the DACH cross-border funding agreement</p> <p>Additional budget for FWF's structured doctoral programmes (2011)</p> <p>Excellence-in-teaching prizes (2013)</p>	<p>(+) C&C implementation at Austrian HEIs safeguarded by policy as explicit part of performance agreement negotiations</p> <p>(+) new jointly funding team established in 2013 in e.g. Advanced Computational Methods</p> <p>(+) Programs may attract highly qualified young scientists from abroad.</p> <p>(-) general excellence cluster initiative not implemented yet</p> <p>(+) Scheme incentivizes teaching excellence</p> <p>(-) small budget</p>
4	ERA Framework		
5	Priority European Research Infrastructures (RIs)	<p>Establishment of a database of RI in Austria (also included in EU-MERIL mapping exercise) and implementation of an "Open for Collaboration" tool on the same database</p> <p>Inauguration of BBMRI implemented under the European Research Infrastructure Consortium (2013)</p>	<p>(+/-) Draft National Infrastructure Roadmap 2014-2020 published in 2014, but no financial commitment outlined so far (partly because performance agreement negotiations still ongoing end of March 2014)</p>
7	SME Involvement	No changes	(-) Austrian SMEs lose innovation grip

			in the ultimate decade
11	Venture Capital Funds	€15m of (public) risk capital for a semi-public European Business Angel Fund Two purely public venture funds, total amount of €110m	(-) policy focus on VC access for start-ups high, but no significant improvement in total availability (2012) observable (-) good SME access to loans does not seem to translate into higher innovation involvement
13	Review of the State Aid Framework	No changes	-
14	EU Patent	Unified Patent ratified beginning of September (2013)	(+) First among all EU MS to ratify, no impact assessment at this stage available
15	Screening of Regulatory Framework	No changes	-
17	Public Procurement	Green procurement initiatives expanded (2013) Pilot on pre-commercial procurement in mobility (2011)	(+) pilot region collects experience on green innovation procurement implementation (+) Austria also engages in international learning exercise
20	Open Access	Open Access Network Austria founded (2012)	(+) stakeholder based initiative (+) publishing OA is supported by main funding body (FWF)
21	Knowledge Transfer	“Intelligente Produktion” initiative (2011): Industry and research cooperate in joint application oriented research projects.	(+) existing set of KT policies considered effective, only few new initiatives introduced (-) recently evaluated existing schemes (Josef Ressel Centres) still require modifications or strategic reorientation (un:invent and COMET).
22	European Knowledge Market for Patents and Licensing	Establishment of a national contact point (NCP) in 2010/11	(+) helps coordinate KT measures between academia and industry (-) main stakeholder in Austrian IPR,

			namely patent office underperforms according to 2013 evaluation
23	Safeguarding Intellectual Property Rights	No changes	-
24	Structural Funds and Smart Specialisation	Austria will have but one national operational programme (OP) for all ESIF but with regional chapters	(+) all regions will be eligible for ESIF funding
25	Post 2013 Structural Fund Programmes	Austrian Conference on Spatial Planning published national strategy (2013)	(+) financial leverage for macro-regional coordination is accounted for
26	European Social Innovation pilot	No changes	(+) a 2011 concept study discusses the potential of social innovation for existing policy instruments of the aws ⁶⁷
27	Public Sector Innovation	No changes	(+) 2010 data ⁶⁸ shows public services are (almost) 100% accessible online (+) high quality and efficiency of agencies (-) low level of innovative services
29	European Innovation Partnerships	Active member and commitments in EIPs on Active and Healthy Aging as well as Raw Materials	(+) also: active role in design of EU level instruments
30	Integrated Policies to Attract the Best Researchers	Student fees for non-EU students at Austrian HEIs (2011/2)	(+) overall high shares of mobile students and scientists from abroad (-) adverse effects of fees on non-EU talent likely, but coalition agreement foresees tax reimbursement for those staying
31	Scientific Cooperation with Third Countries	Recent ERA-Net activities (2013): Austria commits budget to ERAfrica	(+) joint calls may create long-term research collaboration at institutional/actor level (-) no overarching strategic approach

⁶⁷ https://www.zsi.at/object/project/2237/attach/0_Konzeptstudie_Soziale_Innovation.pdf

⁶⁸ Cf. Public Sector Innovation Scoreboard (2013).

		As far as applicable, current efforts (2013) with respect to EU's macro-regional Danube Strategy	<p>towards Third Country cooperation in place, no systematic evaluation</p> <p>(+) 6 scientific clusters launched in e.g. energy, sustainability research</p> <p>(-) evaluation delivers positive verdict on the existing strategies, but recommends tighter alignment to European Structural and Investment Funds</p>
32	Global Research Infrastructures	No recent changes	(-) no specification of RI strategy regarding infrastructures of pan-European interest.
33	National Reform Programmes	<p>"National Action Plan for Gender Equality" (2010-2013)</p> <p>youth and apprentice coaching, free-of-charge second-chance education and training guarantees</p>	<p>(+) the majority of measures is implemented</p> <p>(-) too little focus on family and career dimension</p> <p>(+) average school drop-out rates, also for pupils with migrant background reduced</p> <p>(-) policies do not fully prevent early streaming of migrant children to less demanding education streams</p>

ANNEX 3. NATIONAL PROGRESS TOWARDS REALISATION OF ERA

ERA Priority	ERA Action	Recent changes	Assessment of progress in delivering ERA
1. More effective national research systems	Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments	<ul style="list-style-type: none"> - Establishment of a single agency (AQAA) externally assuring institutional quality in the HE sector - standard-setting activities of FTEVAL consortia - strengthening of HEI funds in past and next years 	<p>(+) both likely improve institutional assessment and general evaluation practice among AT stakeholders</p> <p>(-) at present, relatively “light” and no systematic assessment of institutional funding in public sector, only partly performance-based allocation</p>
	Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review	<ul style="list-style-type: none"> - implementation of a priority and portfolio management in Austrian public funding administrations - No changes as regards international peer review 	(+) harmonizes rules for calls across programmes /administrations as regards an annual schedule for announcements
2. Optimal transnational co-operation and competition	Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas	<ul style="list-style-type: none"> - Climate Change Centre Austria (CCCA) established in 2011 - No specific changes as regards EU activities 	<p>(+) high involvement in EU level schemes</p> <p>(-) Effectiveness of current JPI participation limited because budgetary restrictions, limited human resources and a limited match of national programmes with JPIs</p>
	Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions	- D-A-CH Agreement, negotiations ongoing to include similar funding agencies such as the Netherlands’ NWO or the UK’s	(+) EU level best practice, even though not evaluated to date
	Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit joint financing of actions including cooperation with non-EU countries where relevant	<ul style="list-style-type: none"> - 6 scientific clusters have been launched in the macro-regional Danube strategy and the latter has been evaluated in 2013 - additional macro-regional strategy for the Alpine region in the near future foreseen in 	<p>(+) strategy links regions (cf. smart specialisation) as well as countries, implementation progresses</p> <p>(+) tightening of international strategic S&T partnerships underway</p>

		coalition agreement of new government - also, establishment of FTI-Attachés and additional Offices of Science and Technology Austria (OSTA) to be located in priority countries	
	Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest, particularly when developing national roadmaps and the next SF programmes	- Inauguration of BBMRI implemented under the European Research Infrastructure Consortium (ERIC) legal entity in 2013 Most financial commitment safeguarded in the triannual performance agreements of HEIs and PROs (host institutions), but negotiations on next contracting period still on-going	(-) research infrastructure in Austria has not ranked very high on the policy agenda in the last decade (+) draft National Infrastructure Roadmap 2014-2020 published in early 2014draft
	Action 5: Remove legal and other barriers to cross-border access to RIs	- Public consultation on research infrastructures and a repository commissioned by the Austrian Council for Research and Technology Development	(-) dito, cf. priority 2, action 4
ERA priority 3: An open labour market for researchers	Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers	- Following an amendment to the Universities Act (2009), Austrian universities must advertise research job vacancies (for scientific and research staff) internationally, at least EU wide. - coalition agreement plans to further simplify the overall approval of foreign qualification/degrees and development of coherent migration strategy - faster recognition ("Nostrifizierung") of foreign diploma and training qualifications introduced in 2011 - tuition fees for students from Third Countries introduced recently, but tax reimbursement for those staying in AT	(-) AT lost (top) academic talent and inventors in the past decade, (+) however, several initiatives have been implemented or are now underway which may develop impact

	Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants	- again, notably, the DACH-agreement (cf. priority 2, action 2)	
	Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network	- No specific measure taken recently, but number of academic jobs posted on EURAXESS Jobs increases.	(-) portal not a common website for job searches (MORE 2 Higher Edu. Survey); EC evaluation of services in 2013 suggests for all MS an extension of services offered (e.g. mentoring, dual career) in addition to mobility related ones.
	Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training.	- Funds for structured doctoral programmes (will) increase ("Doktoratskolleg")	(-) excellence orientation of doctoral training in terms of "research excellence" and "attractive institutional environments" limited, all other criteria met
	Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code	- broad implementation at Austrian universities as part of performance agreement with HEI/PRO	(+) Austria among early adopters, hrs4r framework implemented by only four organisations
ERA priority 4: Gender equality and gender mainstreaming in research	Action 1: Create a legal and policy environment and provide incentives	- inter-ministerial action programme fForte (with branch in academia) - women quota in university committees of 40% in 2009	(+) gender monitoring and mainstreaming are a main concerns of general Austrian policy; significantly improved system performance
	Action 2: Engage in partnerships with funding agencies, research organisations and universities to foster cultural and institutional change on gender	- again, inter-ministerial action programme fForte (with branches in education and industry)	(-) so far, only Laura Bassi Centres of Excellence, Hertha-Firnberg and Elise-Richter programmes have been evaluated. Systematic evaluation has not been conducted.
	Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating	- gender dimension is also implemented in funding governance via financial incentives outlined in university performance contracts	(+) stipulated by laws (Cf. priority 4, action 1)
ERA priority 5: Optimal circulation, access to and transfer of scientific knowledge including via digital ERA	Action 1: Define and coordinate their policies on access to and preservation of scientific information	- Open Access Network Austria" established as a joint activity of the Austrian Science Fund (FWF) and the Austrian Rectors' Conference (UNIKO).	(+) awareness of open access in Austrian autonomous institutions is small but growing fast

	Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies	<ul style="list-style-type: none"> - Among other measures, NCP established in 2010 for cross-border IP management - Initiatives on green procurement implemented 	(+) majority of knowledge transfer measures, considered effective i.e. high level of transfer activities in innovation system (+) systematic approach to thematic innovation procurement, e.g. procurement laws adjusted and action plan implemented
	Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures and for associated digital research services enabling consortia of different types of public and private partners	- Austrian academic institutions form part of the European National Research and Education Networks NREN Identify Federation and plans to form collaboration support services via AConet	
	Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services	- Austria's AConet signed the partnership for eduGAIN in May 2013.	

REFERENCES

Austrian Council for Research and Technology Development (2012): Report on Austria's Scientific and Technological Capability 2012, http://www.rat-fte.at/tl_files/uploads/Leistungsberichte/Leistungsbericht2012.pdf.

BMF (2012): Government budget report 2013, https://www.bmf.gv.at/Budget/Budgetsimberblick/Sonstiges/Budgetsimberblick/Budget2013/Budgetbericht_2013.pdf.

BMLFUW (2010): Austrian Actionplan for Sustainable Public Procurement, <http://www.uncsd2012.org/content/documents/520AUSTRIA%20nabe-action%20plan.pdf>.

BMWF, BMVIT and BMWFJ (2012): Austrian Research and Technology Report 2012, http://www.bmwf.gv.at/uploads/tx_contentbox/FTB_2013_en.pdf, Vienna.

BMWF, BMVIT and BMWFJ (2013): Austrian Research and Technology Report 2013, http://www.bmwf.gv.at/uploads/tx_contentbox/FTB_2013_en.pdf, Vienna.

Ederer, S. and Janger, J. (2010): Growth bottlenecks – Engpässe für Wachstum und Beschäftigung in Österreich im Rahmen der Strategie „Europa 2020“, May 2010.

EFI- Federal Commission of Experts on Science and Innovation (2014): Annual Report 2014, Berlin.

European Commission (2012): Assessment of the 2012 National Reform Programme and Stability Programme for Austria, Commission Staff Working Document, No. 306, Brussels.

Gönenç, R. et al. (2013): Responding to Key Well-being Challenges in Austria, OECD Economics Department Working Papers, No. 1080, OECD Publishing. <http://dx.doi.org/10.1787/5k42210gg9g5-en>.

Good, B., Radauer, A. (2013): Zwischenevaluierung der vom BMWF beauftragten Regionalen Kontaktstellen (RKS), Final report, Vienna, <http://www.era.gv.at/attach/RKSEvaluierungEndbericht.pdf> [in German].

Kaufmann, K. et al. (2012): Evaluation of the European Space Policy Institute (ESPI), Vienna, http://www.bmvit.gv.at/innovation/publikationen/raumfahrttechnologie/downloads/espi_evaluierung.pdf.

MORE2 Higher Education Survey (2012): Support for continued data collection and analysis concerning mobility patterns and career paths of researchers.

Oberholzner, T. et al. (2012): Evaluierung der Forschungsförderung in Österreich im Themenfeld Verkehr und Mobilität – Schwerpunkt Strategieprogramme IV2S und IV2Splus, Vienna,

http://www.bmvit.gv.at/innovation/publikationen/evaluierungen/downloads/iv2s_evaluierung.pdf [in German].

OECD (2011): OECD Family Database, OECD Publishing, Paris.

OECD (2012): Closing the gender gap, Paris.

OECD (2013): Synthesis Report on Innovation-Driven Growth in Regions: The Role of Smart Specialisation, Paris.

OECD (2013): Researcher on the Move, Paris.

Oxfirst (2013). Analyse des Österreichischen Patentamtes (ÖPA) im europäischen Vergleich, Vienna, http://www.ratfte.at/tl_files/uploads/Studien/Publikationen/112012_Oxfirst_Analyse%20Patentamt.pdf.

Peuckert, J.; Cuntz, A.; Harrap, N.; Ozbolat, N. (2012): Openness Determinants of National Research Funding Programmes in EU27: the Role of ERA-Net Inclusion.

Pfirmsmann, O. et al. (2012): Evaluierung des österreichischen Sicherheitsforschungsprogramms KIRAS, Interimsevaluation 2011/2012, Vienna, http://www.fteval.at/upload/Evaluierung_des_oesterreichischen_Sicherheitsforschungsprogramms_KIRAS.pdf [in German].

Pohn-Weidinger, S., Grasenick, K. (2011): Elita – Evaluierung der FWF Programme Elise Richter und Hertha Firnberg, Final Report, Vienna, <http://www.fwf.ac.at/de/downloads/pdf/elita.pdf> [in German] .

Schibany, A et al. (2013): Ex-post Evaluierung der Kompetenzzentrenprogramme Kplus und K_ind/K_net, Vienna, http://www.fteval.at/upload/Ex-post_Evaluierung_der_Kompetenzzentrenprogramme_Kplus.pdf [in German].

Schuch, K. (2011): ERAWATCH Country Report Austria 2010. European Commission.

Schuch, K. (2012): ERAWATCH Country Report Austria 2011. European Commission.

Statistik Austria (2012): Migration and Integration: Figures, Data, Indicators, Vienna, Austria.

Steen, J. (2012): Modes of Public Funding of Research and Development: Towards Internationally Comparable Indicators, OECD Science, Technology and Industry Working Papers, 2012/04, online <http://www.oecd-ilibrary.org/docserver/download/5k98ssns1gzs.pdf?expires=1356697098&id=id&accname=guest&checksum=6914B736B741F23A96C1B8F282A69C57>.

Technopolis (2011): Headquarters strategy programme evaluation; final report to the Federal Ministry for Transport, Innovation and Technology, Vienna.

Tyrolean Government (2013): Tiroler Forschungs- und Innovationsstrategie, <http://www.tirol.gv.at/fileadmin/www.tirol.gv.at/presse/downloads/Presse/forschungsstrategie.pdf> [in German].

Upper Austrian Government (2012): basic FTI strategic concept,
http://www.noe.gv.at/bilder/d71/FTI_Grundstrategie.pdf.

Warta, K., Good, B. (2012): Zwischenevaluierung der Dienstleistungsinitiative des BMWFJ, Final Report, Vienna.

World Economic Forum (2013): The Global Competitiveness Report 2012-2013.

LIST OF ABBREVIATIONS

ABA	Austrian Business Agency
ACR	Austrian Cooperative Research
AIT	Austrian Institute of Technology
AQA	Austrian Agency for Quality Assurance
AWS	Austria Business Service
BBMRI	Biobanking and Biomolecular Resources Research Infrastructure
BERD	Business Expenditure for Research and Development
BMBWK	Former Austrian Federal Ministry of Education, Science and Culture
BMLFUW	Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management
BMUKK	Austrian Federal Ministry for Education, Arts and Culture
BMVIT	Austrian Federal Ministry of Transport, Innovation and Technology
BMWF	Austrian Federal Ministry of Science and Research
BMWFJ	Austrian Federal Ministry of Economy, Family and Youth
CDG	Christian Doppler Research Society
CEE	Central and Eastern Europe
CERN	European Organisation for Nuclear Research
CESSDA	Council of European Social Science Data Archives
CIR-CE	Cooperation in Innovation and Research with Central and Eastern Europe Programme
CISM	Centre International des Sciences Mécaniques
CLARIN	Common Language Resources and Technology Infrastructure
COIN	Cooperation and Innovation Programme
COMET	Competence Centres for Excellent Technologies
COST	European Cooperation in Science and Technology
D-A-CH	Germany, Austria and Switzerland
DFG	German Research Foundation (“Deutsche Forschungsgemeinschaft”)
ECRIN	European Clinical Research Infrastructure Network
ELETTRA	International multidisciplinary laboratory specialised in synchrotron radiation
EMBO	European Molecular Biology Organisation
EMRP	European Metrology Research and Development Programme
ENIAC	European Nanoelectronics Initiative Advisory Council
ENIC	European Network of Information Centres
ENQA	European Association for Quality Assurance in Higher Education
EPO	European Patent Office
ERA	European Research Area
ERA-NET	European Research Area Network

ERDF	European Regional Development Fund
ERP Fund	European Recovery Programme Fund
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum on Research Infrastructures
ESRF	European Synchrotron Radiation Facility
EU	European Union
EU	European Union
EU-27	European Union including 27 Member States
EU-27	European Union including the 27 member states
EUROCORES	European Collaborative Research Programmes
FAFB	Food, Agriculture, Fisheries and Biotechnology
FAIR	Facility for Antiproton and Ion Research
FDI	Foreign Direct Investments
FEMTECH / FFORTE	Women in Research and Technology Programme
FFG	Austrian Research Promotion Agency
FP	European Framework Programme for Research and Technology Development
FP	Framework Programme
FP7	7th Framework Programme
FTE	Full-time Equivalent
FWF	Austrian Science Fund
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GUF	General University Funds
HEI	Higher Education Institutions
HERD	Higher Education Expenditure on R&D
HES	Higher Education Sector
HRST	Human Resources in Science and Technology
ICT	Information and Communication Technologies
IHS	Institute of Advanced Studies
IIASA	Institute for Applied Systems Analysis
ILL	Institut Laue-Langevin
INQAAHE	International Network for Quality Assurance in Agencies
IP	Intellectual Property
IPR	Intellectual Property Rights
ISCED	International Standard Classification of Education
ISTA	Institute of Science and Technology Austria
ISTC	International Science and Technology Centre
IUS	Innovation Union Scoreboard
JITU	Young, Innovation and Technology Oriented Companies Programme

JTI	Joint Technology Initiative
KORANET	Korean Scientific Cooperation with the European Research Area
MINT	Mathematics, Informatics, Natural Sciences and Technology (initiative to promote the enrolment of students in these subjects)
MORE	Mobility of Researchers
NARIC	National Academic Recognition Information Centres
NMP	Nanosciences, Nanotechnologies, Materials and New Production Technologies
NOW	Netherlands Organisation for Scientific Research
ÖAW	Austrian Academy of Sciences
OeAD	Austrian Agency for International Cooperation in Education and Research
OECD	Organisation for Economic Co-operation and Development
ÖH	Austrian student representatives (“Österreichische HochschülerInnenschaft ”)
PhD	philosophiae doctor
PISA	Programme for International Student Assessment
PPP	Public-private Partnership
PRACE	Partnership for Advance Computing in Europe
PRO	Public Research Organisations
R&D	Research and Development
RI	Research Infrastructures
RTI	Research, Technology and Innovation
S&E	Science and Engineering
S&T	Science and Technology
SF	Structural Funds
SHARE	Survey of Health, Ageing and Retirement in Europe
SME	Small and Medium Sized Enterprise
SNF	Swiss National Science Foundation
STCU	Science and Technology Centre Ukraine
STE	Science, Technology and Engineering
TC	TrendChart
UNIKO	Assembly of Universities (“Universitätenkonferenz”)
VC	Venture Capital
VCI	Venture Capital Investment
VTÖ	Austrian Association of Technology Centres
WIFO	Austrian Institute of Economic Research
WMO	World Meteorological Organisation
ZSI	Centre for Social Innovation

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