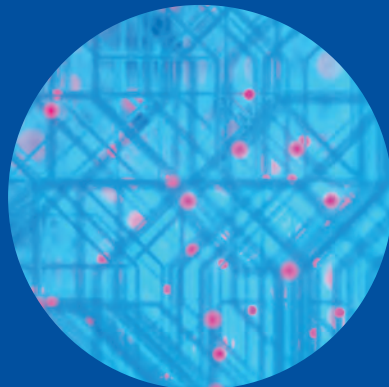
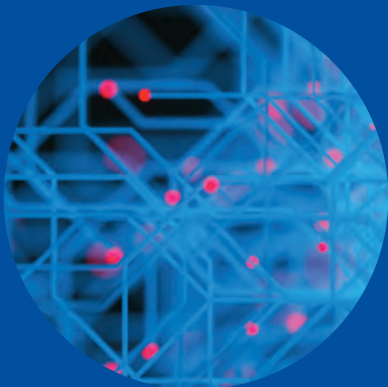
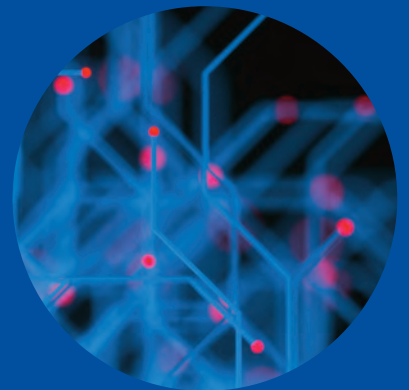
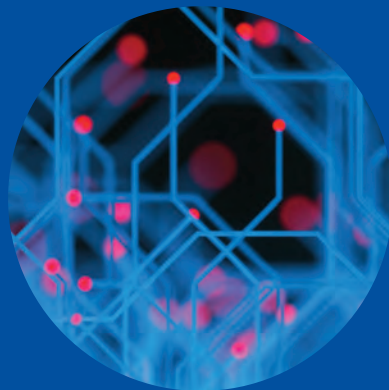
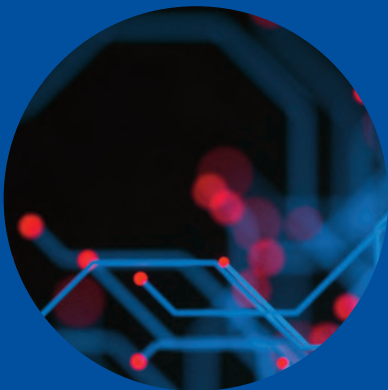
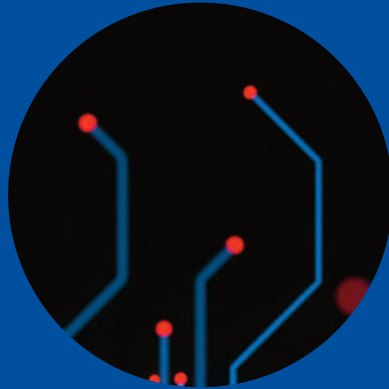






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contents

4 **foreword**

5 **editorial**

7 **outlook**

13 **the austrian council recommends**

Recommendations 2018 _____ 14

Statements 2018 _____ 59

63 **creating knowledge**

Work areas, Reports and Studies 2018 _____ 64

International Activities _____ 84

87 **events**

91 **the austrian council**

Review 2018, Outlook 2019 _____ 92

Geschäftsstelle Robotikrat _____ 93

Members of the Austrian Council _____ 94

Secretariat _____ 95

96 **contact**

foreword

2018 was the year of Austria's EU Council Presidency. Negotiations were especially intensive in the research, technology and innovation area. Top priority with the Austrian Presidency were the Horizon Europe negotiations, the 9th EU framework programme for research and innovation 2021 to 2027, for which basic consensus on the content alignment was reached, and which is expected to be awarded approximately EUR 100 billion.

With its "Future initiative for research, technology and innovation" presented to the Cabinet on 22 August 2018, the Austrian Government further specified the "Innovation and digitization" priority formulated in its government programme by presenting five measures: Development of an RTI Strategy 2030, an excellence initiative, a research funding act, the consolidation of the Research Council, Science Council and the ERA Council Forum, and a research funding database.

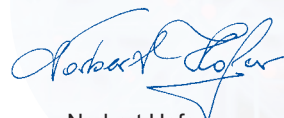
The "OECD Review of Innovation Policy –

Austria 2018" presented on conclusion of the EU Presidency in December 2018, which on the whole gave our country a good grade but calls for further steps to improve output, underscores the importance of these measures. The rapid increase in the R&D rate, where Austria already performs above the EU target, and strong points such as quantum physics or the life sciences area, were emphasised as especially positive. Nevertheless, Austria should not rest on the laurels of previous successes, but rather must also strive in the future to further develop as a research location and remain internationally competitive. It will be important here to make those interfaces in particular at which research and economy intertwine even more efficient.

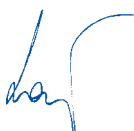
The Austrian Council has always accompanied the Government as a committed and reliable adviser for the RTI area. With this in mind we would like to express our gratitude for its valuable expertise and look forward to continued fruitful cooperation.



Dr. Heinz Faßmann
Federal Minister for
Education, Science, Research



Norbert Hofer
Federal Minister for
Transport, Innovation and Technology



Hartwig Löger
Federal Minister of
Finance



Dr. Margarete Schramböck
Federal Minister for
Digital and Economic Affairs

“Set Innovation Free” wrote the Economist some years ago. The urgency of this appeal has not diminished – quite the contrary! Why? Because only with the aid of education, science, research and innovation will we truly be able to meet the challenges of the future. The goal of taking Austria into the top league of European research and innovation is therefore not an end in itself, but rather a necessity for our country, so we can also secure our prosperity and welfare for future generations.

However: Global competition in science and research is getting stronger and even tougher all the time. The development trends of recent years and a comparison of the United States, Europe and China based on such illustrate China’s unbridled race to catch up – with the result that it has now caught up with and even surpassed Europe and the USA in some research statistics and indicators. The budgets of China’s elite universities, such as Tsinghua University or Beijing University, for example, have consequently already caught up and more with those in the USA, be it Michigan Institute of Technology or Yale University. And even if the speed in the growth of the university budgets and the output of Chinese universities has since dropped off a little, the number of scientific publications and patents or the amount of graduates clearly show how the scientific capacities accumulating in China present an increasingly greater challenge. In the USA, and perhaps even more so in Europe, immense efforts will be required to remain represented among the world’s research elite.

For Austria this signifies that in the EU it will have to continue focusing on the top research countries, the innovation leaders, so as not to lose international ground. All are called upon here – scientists, researchers, universities and research institutions, funding agencies, companies and of course the body politic, who will have to provide the appropriate framework conditions. With its Research, Technology and Innovation Strategy (RTI Strategy) adopted in 2011, the

Austrian Government recognised this in good time and set itself the overriding goal of positioning Austria among the group of leading innovation nations. The 2020 time horizon planned for this will soon be reached, and in summarising we can and must say that the Strategy has had an entirely positive impact in some areas and has also triggered new dynamics. On the whole, however, it has not been possible and will not be possible to move forward into the group of innovation leaders by 2020, despite above-average R&D investments. The current QS World University Ranking, for example, once again shows a deterioration with some Austrian universities. Most concerning, however, is the fact that, apart from the University of Music in Vienna and its first place in the area of the performing arts, only five other universities appear among the top fifty in at least one of forty-eight subjects. It is therefore very much the order of the day to intensify the measures taken to date, correct where required and also introduce new steps to make Austria a leading innovation nation.

In recent years the Austrian Council has systematically analysed the implementation of the RTI Strategy as part of its annual scientific and technological capability report. It already pointed out early on that the existing efficiency barriers and serious imbalances in the distribution of funds in particular generate an unbalanced input-output ratio and therefore obstruct the utilisation of our innovation potential. In most international RTI rankings Austria currently occupies positions in the forward mid-field and therefore is still at the same point it was at approximately ten years ago when the RTI Strategy was being worked out. This shows how Austrian performance is stagnating compared to the innovation nations Denmark, Germany, Finland, the UK, the Netherlands, Sweden and Switzerland in particular.

editorial



Hannes Androsch
Chairman
of the Austrian Council



Markus Hengstschläger
Deputy Chairman
of the Austrian Council

editorial

The Austrian Government already announced the preparation of a new Research, Technology and Innovation Strategy (RTI Strategy 2030) in the presentation it made to the Cabinet on 16 August 2018. The Austrian Council believes, with this new RTI Strategy, those existing efficiency barriers that it illustrated numerous times in its monitoring activities and its analysis of Austria's innovation performance must in particular be removed. The Council Board therefore already submitted an input paper in January this year, which formulates the existing challenges in this context in the shape of fifty issues in six future areas. These range from "Economy and society" to "People", "Universities" and "Companies" through to "Innovative structures and financing" and "Europe and internationalisation".

Securing the respective measures with appropriate financial provisions will therefore also be of critical importance for the success of the future RTI Strategy. The Austrian Council believes the Research Funding Act also announced in the presentation to the Cabinet is therefore a welcome step towards securing long-term plannability, as, for example, was already achieved with the foundation and expansion of IST Austria.

In view of these pending tasks, the Austrian Council will continue to contribute its share to supporting the responsible institutions with its recommendations and promoting the required understanding and awareness as best it can.

We also wish the ministers responsible for science, research and innovation a successful research year in 2019 and hope that with a new strategy a successful research decade also lies ahead.



The Austrian Council,
from left to right standing:

Hermann Hauser

Markus Hengstschläger

Klara Sekanina

Hannes Androsch

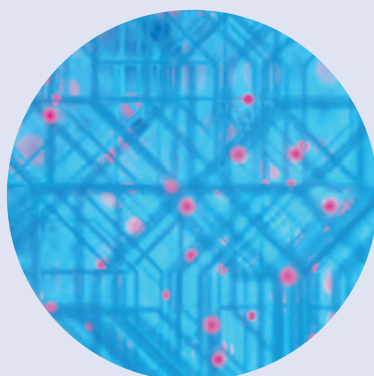
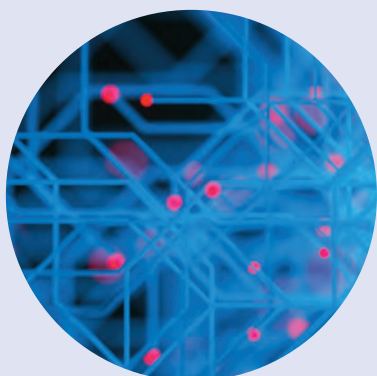
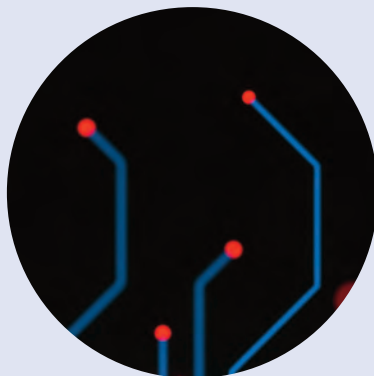
Jakob Edler

Left to right sitting:

Sabine Herlitschka

Helga Nowotny

Sylvia Schwaag-Serger



Re:thinking Europe – Publication by the Austrian Council on Europe's future

Background

Making good use of Austria's EU Presidency in the second half of 2018, the Austrian Council published its book entitled "Re:thinking Europe. Positions on shaping an idea". (points on shaping an idea). The book is a contribution by the Austrian Council to the discussion on the realignment of the European project and therefore collects ideas and proposals of prominent authors for the EU's social, economic and ecological renewal. It focuses on the basic question of what role education, science, research and innovation (can) play here.

The Austrian Council decided to go ahead with this publication project with the working title "Europa 2050" in its advisory session in December 2016. Similar to the predecessor project, "Austria 2050", the Austrian Council's intention was to show the paths and strategies with which a European knowledge society can be established, in which innovation acts as a motor of economic growth, while social cohesion and environmental protection are also intensified. Parallel with the "Re:thinking Europe" book, an extensive discussion process on relevant issues concerning Europe's future was therefore also established. Entitled RTI – GAME CHANGER CONTEST, the accompanying website went online on 12 September 2018 with the book presentation.

Goal

The intention and goal behind publishing "Re:thinking Europe" was the argumentative underpinning of the Austrian Council's view of where, in the face of the global grand challenges and recent geopolitical changes, an intensification of European integration is required – as opposed to a relapse into nation-state operating. Europe, as the Council Board believes, requires new strategic thinking, a new vision fo-

cusing on a knowledge-based society and economy. Correspondingly, "Re:thinking Europe" illustrates different paths and strategies to establish a European knowledge society and delivers ideas for the EU's social, economic and ecological renewal.

Rethinking Europe

For quite some time now there has been no conceptual discussion on the further development of the European Union. This strategic deficit has manoeuvred Europe into a cul-de-sac. The consequences include, for example, the Brexit vote and the rising nationalistic movements in quite a few European countries. In contrast to these backward-looking divisive trends, openness, creativity, innovation and the ability to reinvent oneself holistically and overcome one's own boundaries in particular represent a constituting moment for Europe here. During the course of its history Europe has often demonstrated its ability to produce innovative new starts. And in view of the major global challenges and geopolitical upheavals, such a new start is now required today more than ever. The individual European nation states are practically powerless in the face of these global challenges – from climate change and resource scarcity through to geopolitical developments. With the USA and China, but also India and Russia, jostling for world supremacy, the situation is even more exacerbated for Europe. From a global perspective the European nation states are threatened with a return to insignificance in the face of these trends. In the nascent multipolar world disorder, Europe can only assert itself as the unity of the respective European states. One might argue that Europe mustn't necessarily participate in the USA, China, Russia and India's geopolitical wrangling for the new world order. This would be an extremely

short-sighted view to take, because the consequences of geopolitical transformation processes are already emerging quite clearly, with Europe immediately affected, in particular by conflicts in Ukraine, the Balkans, the Caucasus, in the Middle and Far East or in Africa, resulting from the erosion of the western world order. Only a united and strong Europe can react appropriately to these developments, by, for example, reaching a reasonable arrangement with Russia or establishing a strategic approach with the respective African countries.

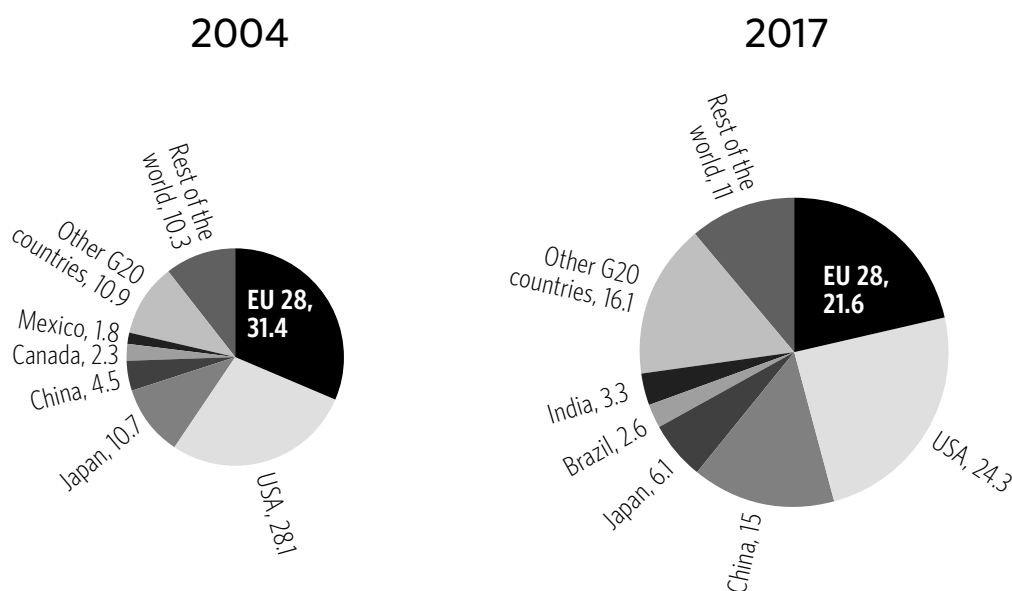
The return to what Friedrich Nietzsche called the “comedy of particularism”, so often demanded today, will in any case never contribute to providing effective answers to Europe’s 21st century challenges. Because even Europe’s most

powerful countries really are not that significant on a global level. A sober look at the figures is enough to confirm this, with shares in global output, population trends or the development of R&D expenditures or patent applications, for example, which are all documented by Eurostat in its global comparison and published in the online publication, “The EU in the world”. This statistical comparison shows how the EU as a whole is (for the moment that is) the world’s second greatest economic power (see figure 1).

This is an ideal example of how the European Union as one unit is in such an entirely different weight class than even the biggest member states could ever be on their own. In view of the

outlook

Figure 1: Global output shares of selected countries and regions, 2004 and 2017



Source: Eurostat (2018). The EU in the world – A statistical portrait. Luxembourg, p. 79.

* Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/The_EU_in_the_world



outlook

multitude and complexity of the challenges facing Europe and the world, it's quite clear the EU can only be successful when its members move forward and act in unison. Because only then – in the federation of European states – can Europe continue to act on the stage of global players. With its population, its gross domestic product, its scientific and innovative potential and its infrastructure conditions for digitization, the EU, on paper at least, meets all the requirements to be one of the most powerful players, if not the most powerful, in the international arena. Alone its inability to act collectively currently hinders the European Union from pursuing the interests of its citizens and equipping itself for the challenges of a globalized world. Consequentially, in the future it will require additional efforts, hard work and persuasion to realise the European idea and build Europe even further. Creativity knows no bounds with the actual embodiment of the European concept. When some 400 million vote-carrying citizens of the European Union's member states are called upon in 2019 to elect a new European Parliament it can be assumed that, "these active voters in some way have the European concept in mind."^{***} But what is this idea of Europe today? What concepts are there for the future of the European project? And how can or should, indeed must the EU further develop to be able to meet

the diverse challenges of the 21st century world effectively and efficiently – and not just in view of the recent geopolitical upheavals?^{****} Little of any significance, so the cry from all and everywhere, is currently being done in this respect. Apart from a few exceptions, there is currently no comprehensive conceptual discourse on the strategic further development of the European Union. This strategic deficit, "Europe's Achilles' heel"^{****}, has taken the EU into a cul-de-sac, from which it would appear there is no way out.

The Austrian Council therefore invited a large number of renowned individuals from different European countries and the most diverse areas of science, research, politics, art and culture to contemplate the idea of Europe and the future of the Union. A considerable number of experts accepted this invitation. The book includes twenty-four articles by thirty authors from ten EU member states: Belgium, Germany, Estonia, Finland, the UK, Italy, Austria, Portugal, Spain and Hungary. The articles reflect a wide range of positions, that do not necessarily represent the opinion of the Austrian Council. Taken together however, they do provide important food for thought and can therefore be taken as a starting point for the overdue debate with respect to a redefinition of the European concept in the 21st century and the required further development of the European Union.

^{**} Schmale, Wolfgang (2016): "Die Idee Europa." In: Schmale, Wolfgang: Mein Europa (blog), wolfgangschmale.eu/idee-europa, December 5th, 2016, section 8.

^{***} For this see inter alia, Androsch, Hannes / Gadner, Johannes (2018): Aus den Fugen: Die Zukunft der Welt(un)ordnung. In: Androsch, Hannes / Pelinka, Peter (eds.): Zukunft: Erkennen/Gestalten. Perspektiven einer neuen Welt. Vienna: Brandstätter, p. 14–48.

^{****} Weidenfeld, Werner (2014): Europe: A Strategy. Munich: Kösel, p. 109.

The book

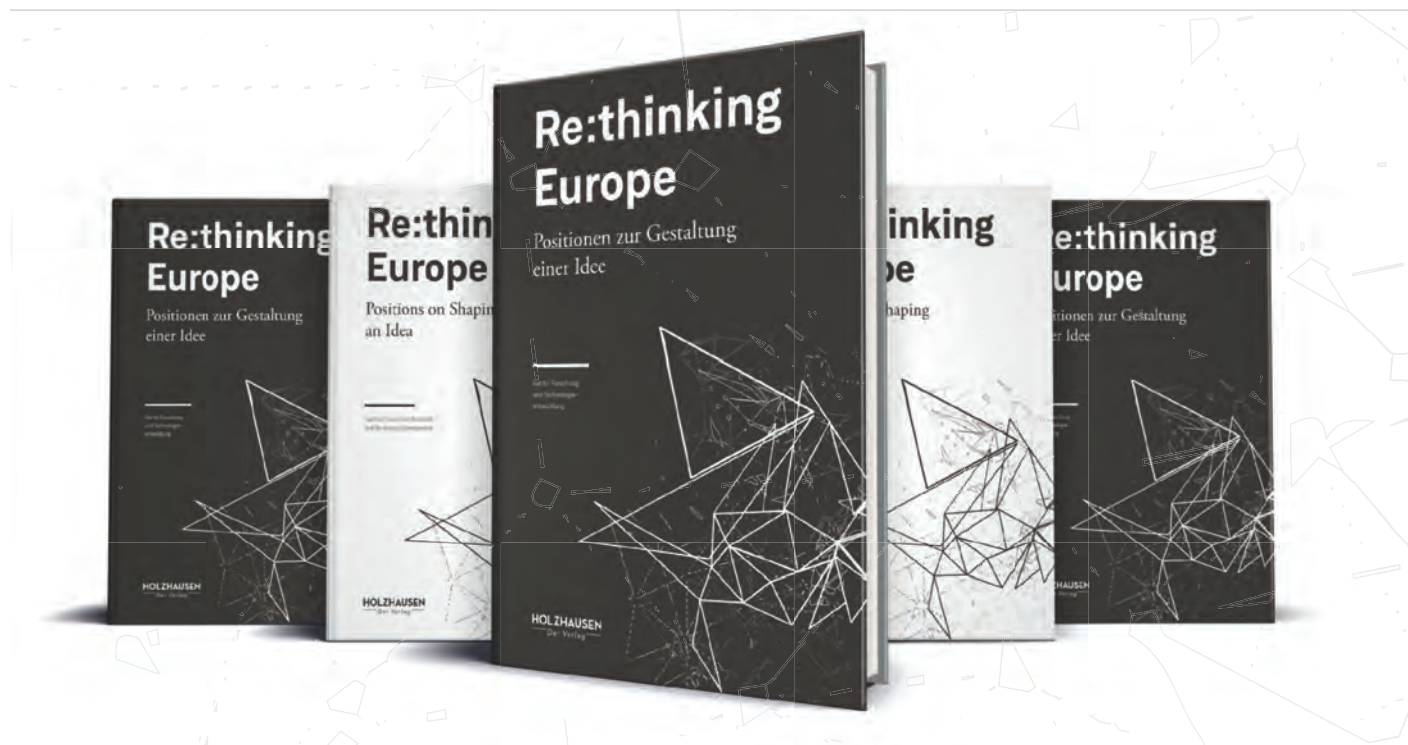
The book is divided into three parts. The articles in part one deal with Europe's beginnings from global historical perspectives, European expansiveness and the resulting consequences for the course of historical developments, and not just in Europe. The emergence of modern sciences and their influence on the vision of the Europe are tropicalized here, as is the issue of the continuities of historical processes in the present and possibly also the future. History is therefore always also understood in these historically-oriented articles as bridge-building into the future.

Articles are gathered together in the second part to present the positions on the specific embodiment of the idea of Europe and the political further development of the European Union. The spectrum ranges here from proposals for the

further consolidation of the EU to the development of a grand strategy, through to surmounting the mind-set of the nation states and the creation of a kind of "United States of Europe" or a European Republic. Jointly these approaches firstly produce the realisation that in view of the global upheavals there can no longer be an effective policy of isolated European nation states, and secondly awareness of the strengths resulting from the community of the European member states, which is required to meet the challenges facing the world in the 21st century.

And finally part three of the anthology deals with the necessary prerequisites to maintain or achieve global leadership in the future areas of research, innovation and digitization and therefore to also further succeed in global competi-

outlook



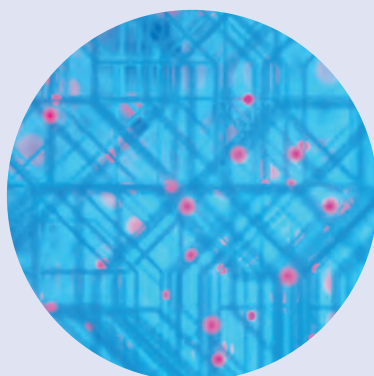
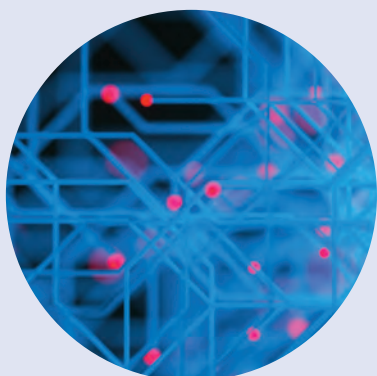
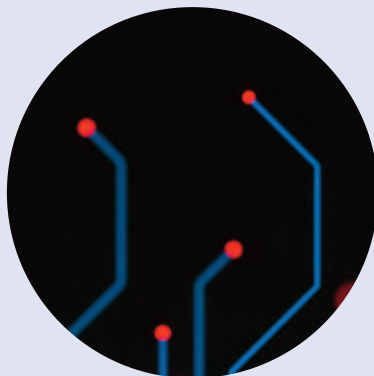


outlook

tion. On one hand topics that originally emerged in Europe (the sciences in particular), and once made the continent a global leader are front and centre here, and on the other hand, the authors believe, promise the most success in meeting the global grand challenges and increasing the competitiveness of the European economy. The topics of digitization, artificial intelligence, robotics, sustainability and ecologization are therefore also addressed. These exhibit the potential to make Europe a global leader in the future (again). The EU must therefore define its role even more precisely here than it has been, to also be able to truly leverage the existing potential.

With the USA's renunciation of its global policy responsibility, a global vacuum forms, which to date China in particular has endeavoured to fill. The EU has so far done little to counter

this. With its tradition of humanistic values and principles for a future-oriented society – human rights, democracy, rule of law, equality, freedom, tolerance, rationality, freedom of science, environmental protection, and so on, as stipulated in the Treaty of Lisbon or the EU's Charter of Fundamental Rights – Europe more than any should assume the mantle of responsibility for our global civilisation more than has previously been the case. This, however, would require a courageous vision and clear strategic objectives, which would first have to be formulated and negotiated. Europe must be rethought today, as it has been countless times in the past. Because even if it is claimed time and again, Europe is far from anywhere close to being “over”. On the contrary: The European concept is more alive than it has ever been. “Re:thinking Europe” will contribute to ensuring it also remains so in the future.



Recommendations 2018

Recommendation on the dual budget 2018/2019 –

Recommendation of 26 January 2018

After the beginning of the legislative period, the drafting of the 2018/2019 dual budget is the first and most important agenda setting for implementing the government programme. The achievement of essential education and research policy goals depends directly on the priorities set in this budget. In the research area this affects the expiring Strategy 2020, which still has many open points, and the compilation of a new RTI Strategy, whose implementability depends on its financing.

Should the budget not enable these implementations at this point in time, achievement of these goals will become improbable in the legislative period that has just begun.

On 30 November 2017 the Austrian Council published the content recommendations for “the way to the forefront of innovation”. With the points specified herein the Austrian Council underscores the need to invest in future topics such as education, basic research and applied research and recommends that

- prioritisation of the education and research policy goals be visualised in the 2018/2019 dual budget and reflected in a significant increase in the corresponding budget approaches.

The Austrian Council also recommends,

- on the basis of its recommendations for the way to the forefront of innovation of 30 November 2017, more funds be provided for the future areas of
 - **Kindergartens**
 - **Schools**
 - **Universities**
 - **Basic research**
 - **Applied research**

and linked with measures for increasing efficiency, including that of the research funding system. The RTI reform agenda named in point

2) of the recommendations of 30 November 2017 can perform an important function in this context.

- In addition to the expansion of supervision positions across and beyond the urban centres, in the **kindergarten area** it is especially about up-scaling the kindergarten teachers working here. In a modern meritocracy in which the value of a professional group is expressed and measured via its rewarding, it is urgently recommended that the salary scheme of kindergarten teachers be adjusted accordingly to the value of their work – supervising and educating children. In addition to motivation and quality, this also increases the quantitative offering of educators. If we want, as called for in the Austrian Government’s government programme, to define higher standards for the training and further training of staff in elementary level teaching institutions, then this must always be accompanied by a corresponding upgrading of pay and salaries.
- In the **area of school training** the budgetary increases must be linked with a reform of the education system according to modern, up-to-date standards. This must include international success examples, such as those in Scandinavia for example. Corresponding reform proposals already exist, but still await implementation. A reform of this kind must be based on modern teaching content and both pedagogic and didactic innovations, and not in the discussion of purely chronological parameters (all-day schools, interwoven or non-interwoven activities, hourly structured teaching responsibilities, and so on) or different school types. This not only bypasses the actual issues, but rather also causes lasting damage to the reputation of the education system.

● **In the higher education area**

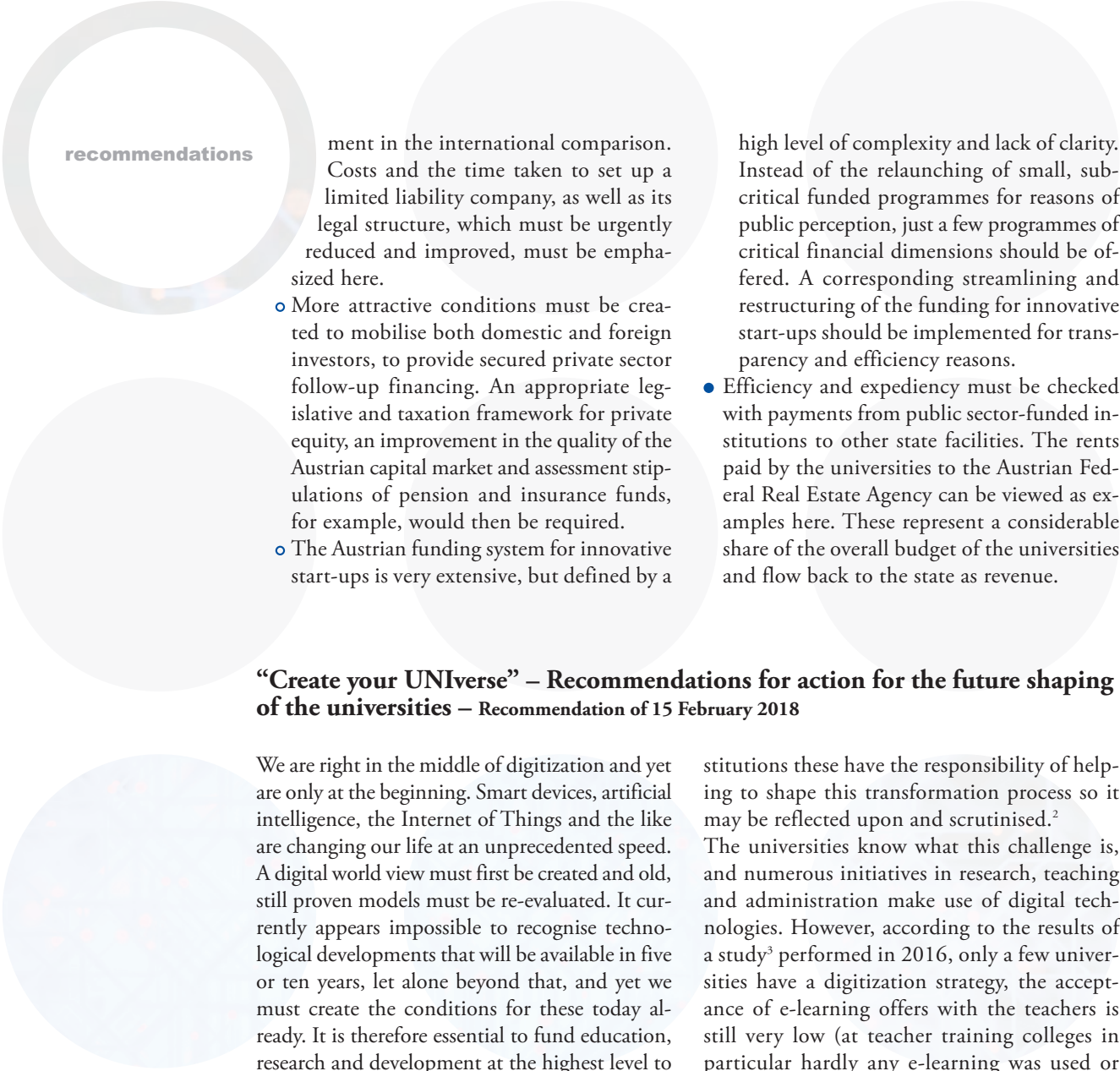
- the universities' resources must be extended for improved input-output effect. Bad supervisor-student ratios, drop-out rates, brain drain and long study periods define the current situation. Career planning in the scientific environment must be significantly improved with job opportunities and tenure track systems, and the required resources must be adjusted to international standards. The financial uncertainty in career planning must not obstruct the targeted academic goal in the future. The Austrian Council has repeatedly highlighted the measures required to increase the output.
- Expansion of the technical college sector must be strategically coordinated for the long term. Factors for creating required resources in infrastructure, human capital and study place management must be reflected here in the budgeting for the long term.
- More funds for expanding competitive **basic research**. This is a must for the sustainable securing and enhancing of scientific excellence. Only when we succeed in creating excellent research conditions can successful competition for the best minds take place. Leading countries such as Switzerland, Denmark, the Netherlands and Germany invest two to four times more in basic research and consequently produce attractive locations for excellent researchers. This is one of the most important requirements for the frequently and rightly called for improvement in the Austrian input-output ratio.
- The funding on offer in **applied research** must be streamlined and consolidated. The heavy fragmentation of the funding land-

scape in patchwork and often overlapping structures of subcritical dimensions is a special problem in times of tight budgets in particular. Every budgeted euro must therefore be provided to the respective target groups as efficiently and effectively as possible, with a view to optimal achievement of the goals of the overall system. In this context the agencification of the agencies in the interests of increased autonomy of the research funding bodies called for in both the government programme and the Austrian Council's white paper¹ must also be driven forward seriously and expeditiously as part of the respective departments' strategic guidelines. A focus on socio-politically relevant topic areas in the interests of a mission orientation of research funding as named in the government programme appears beneficial. In this context, however, it is urgently recommended that existing topic areas be critically scrutinised, and not simply continued in a new RTI Strategy without being checked.

- **Start-up activity** must be given special consideration to ensure optimum transfer of the knowledge generated within the aforementioned recommendations. Despite the increased importance of start-ups in political awareness, the start-up dynamic in Austria is still behind the targets. This is especially due to the insufficient availability of private financing forms and the adverse framework conditions for start-up entrepreneurs in Austria.
- With regard to the bureaucratic, regulatory and taxation framework in particular Austria has considerable catch-up require-

recommendations

¹ White paper on controlling research, technology and innovation in Austria, Austrian Council, Vienna, September 2013.



recommendations

ment in the international comparison. Costs and the time taken to set up a limited liability company, as well as its legal structure, which must be urgently reduced and improved, must be emphasized here.

- More attractive conditions must be created to mobilise both domestic and foreign investors, to provide secured private sector follow-up financing. An appropriate legislative and taxation framework for private equity, an improvement in the quality of the Austrian capital market and assessment stipulations of pension and insurance funds, for example, would then be required.
- The Austrian funding system for innovative start-ups is very extensive, but defined by a

high level of complexity and lack of clarity. Instead of the relaunching of small, sub-critical funded programmes for reasons of public perception, just a few programmes of critical financial dimensions should be offered. A corresponding streamlining and restructuring of the funding for innovative start-ups should be implemented for transparency and efficiency reasons.

- Efficiency and expediency must be checked with payments from public sector-funded institutions to other state facilities. The rents paid by the universities to the Austrian Federal Real Estate Agency can be viewed as examples here. These represent a considerable share of the overall budget of the universities and flow back to the state as revenue.

“Create your UNiverse” – Recommendations for action for the future shaping of the universities – Recommendation of 15 February 2018

We are right in the middle of digitization and yet are only at the beginning. Smart devices, artificial intelligence, the Internet of Things and the like are changing our life at an unprecedented speed. A digital world view must first be created and old, still proven models must be re-evaluated. It currently appears impossible to recognise technological developments that will be available in five or ten years, let alone beyond that, and yet we must create the conditions for these today already. It is therefore essential to fund education, research and development at the highest level to meet the challenges to benefit society.

The challenges for the education system are enormous, therefore special focus is afforded to the third level education institutions, and the universities in particular. As lead social in-

stitutions these have the responsibility of helping to shape this transformation process so it may be reflected upon and scrutinised.²

The universities know what this challenge is, and numerous initiatives in research, teaching and administration make use of digital technologies. However, according to the results of a study³ performed in 2016, only a few universities have a digitization strategy, the acceptance of e-learning offers with the teachers is still very low (at teacher training colleges in particular hardly any e-learning was used or taught up to this point), the cooperation between the universities is also very low, and last but not least, the shifts in the university budget required for a digital change are not yet sufficiently recognised.

2 bmwfw, GUEP 2019–2024 p. 40.

3 Bratengeyer, E., et al.: “Die österreichische Hochschul-E-Learning-Landschaft”. Forum neue Medien in der Lehre – Austria, (fnn), February 2016.

Based on these findings, it must also be concluded that the majority of management bodies and committees at the universities to date have not considered the promotion of digital transformation processes at leading education institutions to be a priority of their management assignment.

The “Create your UNiVerse” – Students’ expectations for the universities of the future” study brought the specific view of the students into the university policy debate for the first time. The analysis of the study results produces three topical areas, which from the students’ point of view critically define the developments of the future at the universities.

- Virtual and real learning have inseparably fused with one another at the university of the future. The combination of digital and physical teaching and learning tools enables the development

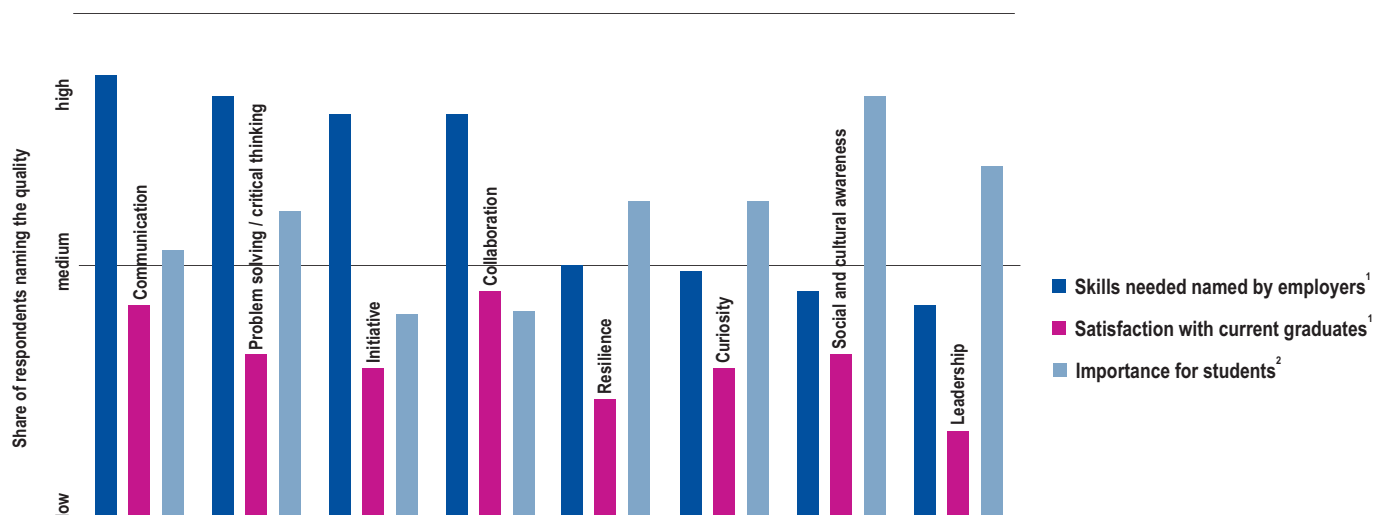
of new didactic possibilities. Different expectations and requirements of the students can be dealt with individually.

- The university of the future invests in the individual development and orientation of the students and
- actively develops students’ cooperation and problem-solving skills and puts them at the centre of focus.

Students’ expectations typically overlap in these results with those of companies (see figure 1). Students in particular believe the teaching of skills for social and cultural competence, problem solving/critical thinking and leadership is of huge importance to them for their training. Further very important competencies include communication and cooperation, which companies will demand far more in the future than is currently the case.

recommendations

Figure 1: “Skills that graduates need most for the digital age” (Ist nummer “1”, richtig?)



Source: To compile this graphic the data of the Global University Employability Ranking 2017 (Times Higher Education) – figure “Wish list: skills that graduates need most for the digital age” – was compared with the results of the Create your UNiVerse study – figure “Prioritisation of the expectation categories”. Austrian Council 2017.

recommendations

The results of the “Create your Universe” study and discussions based on them with experts from the universities, university research and the political sphere produced different areas of action.

Together with the various stakeholders, the Austrian Council has formulated recommendations for action from this, which are directed at the body politic and the universities.

Recommendations for action for the future shaping of the universities

- **Expansion of digital infrastructures and implementation of digital technologies at universities:** Digital technologies have the potential to fundamentally change science, teaching and learning. The requirements necessary for this are a modern digital infrastructure and teachers with experience in using digital tools in knowledge transfer, but these must first be extensively put in place and trained. The measures presented in the GUEP 2019–2024 (all-Austrian university development plan) for the “digital transformation” must be seen as an unequivocal mandate to the universities’ management. But the “wheel” does not have to be reinvented here. Experiences that are already made and lived in other countries in the university area with specific technology trends (Massive Open Online Course [MOOC], Bring Your Own Device [BYOD], Flipped Classroom, game-based learning [“Gaming”], Learning Analytics, Makerspaces, Affective Computing, Robotics, for example) and with specific key technologies (such as cloud computing, machine learning in use for “learning and predictive analytics”, “augmented reality and virtual reality”, digital collaboration tools), can be used for optimised and swift use of these tools.
- **Utilising the potential of digitization for the strategic further development of the university:** Universities are called upon to evaluate the current teaching opportunities and to then develop specific modern virtual and/or physical, in any case stronger interactive educa-

tional transfer formats, to meet students’ expectations for modern learning environments, and however, to also create new resource-related room for manoeuvre.

- **Incentivizing teaching – competitions provide visibility:** The reputation of teaching for careers at universities is negligently low; research projects and publications are what counts. The competitive awarding of funds for innovative concepts in teaching and the rewarding of excellent performances in teaching increase visibility and public presence and result in the cooperative further development of concepts (Ars-docendi state award, Teaching Award, and so on).
- **Further development of the role of the teacher at universities – from pure knowledge transfer to teaching coach and mentor:** Universities must herewith intensively further develop their staff didactically, so teachers can utilise these new skills in the transfer of knowledge and increase openness and knowledge with regard to the use of innovative teaching and learning formats and technologies with training activities. A diversification of the job description in university teaching is recommended to cover the requirements of increasing digital competencies.
- **Development of structures at universities that enable lifelong learning and networking:** The target groups at the universities in the future will increasingly be in different life phases. The study and teaching opportunities should therefore support this positive trend of a lifelong learning culture. Universities should also create structures and framework conditions that essentially support the specific networking of students, alumni, teachers and companies, NGOs and the public sector and promote the knowledge transfer between science and society.
- **Setting up and anchoring open experimentation spaces in teaching:** Universities should intensively promote the direct exchange between peers with one another and between

peers and teachers, to intensify the personal and professional further development of the students. This will require interactive formats in the curricula, experimental settings in courses and physical areas that are open to all students.

- **Expansion and further development of national and international cooperation between universities (setting up a digital forum at universities' level):** Intensive national and international cooperation and exchange of experiences between the universities are extremely important in meeting today's challenges of a

digital and globalized society. Learning through the inclusion of other national and international education providers must be promoted.

- **Intensify research for digitization and evaluation of digital teaching (e-learning):** The developments and effects or success or failure of the use of digital tools has only been insufficiently examined in scientific terms with research and evaluation. The exchange of experiences of international education providers on digital teaching materials should accelerate reciprocal learning here.

recommendations

Priorities for awarding the funds of the RTD National Foundation 2019 –

Recommendation of 23 February 2018

The RTD National Foundation plays a very important role in the Austrian RTI system as an additional financing source for long-term strategic measures.

The Austrian Council therefore welcomes the Foundation's allocation of EUR 100 million per annum for the three years from 2018 to 2020 provided for in the RTD National Foundation Act. The Austrian Council assumes that these funds provided will also actually be available, so that the required planning security for

the National Foundation is a given. This is already aggravated by the fact that the financing beyond 2020 is entirely open.

We therefore wish to make clear once again that a sufficient and sustainable allocation of funds is necessary for the National Foundation to perform its functions. The Austrian Council believes it is absolutely key that the targeted level of EUR 100 million per annum be maintained.

The orientation here follows the principle of the

Following in-depth discussion, based on the priorities set in the government programme 2017–2022 and the Report on Austria's Scientific and Technological Capability, the Austrian Council recommends the following content orientation for awarding funds in 2019 in descending priority:

(Austrian Council recommendation in March 2018)

- Reinforcing the research infrastructure with initiatives with appropriate critical variables and risk potential
- Coordination and harmonisation of regional and federal RTI activities
- Activities that have a broader innovation focus (open innovation, social innovations)
- Reinforcing of the national human potential basis
- Reinforcing competitive funding in basic and applied research
- Risk capital reinforcement



recommendations

National Foundation's long-term planning ability and continuity. The Austrian Council would also point

out that the simultaneous addressing of several key points is positively reflected in the evaluation of an application made to the National Foundation.

Excellence programme to promote science as key for increased cooperation and competition in basic and top-quality research — Recommendation of 22 March 2018

Research funding – Excellence in science

Successful nations invest sustainably in education, science, research and development. Countries with high standards of living and technology in particular must also endeavour to go beyond the limits of technological possibilities and move on to the forefront of innovation. To also secure competitiveness in the future it is essential that Austria increase investments in top quality research and therefore also create a successful science location, which is attractive for researchers and research-intensive companies from all over the world. Top-quality research and innovation are the key to securing prosperity in Austria, staying ahead in economic terms and meeting the societal challenges of tomorrow. Education and research for scientific, technological and social progress must therefore be considered priorities in the budget. Stagnation or even a reduction in research expenditures would cause lasting damage to science and business location Austria.

Recommendations

The Austrian Council recommends the urgently required fresh funds of EUR one billion to finance an excellence programme be provided as guaranteed over a defined period of eight years, so the required expansion of competitively awarded funds for basic research is also guaranteed and an attractive science location for the best minds is created.

The Austrian Council also recommends the Science Fund (FWF), where required in cooperation with further institutions and experts of the

Austrian science and business system, be commissioned with the compilation of an excellence programme and the necessary programme development to support top quality research in a process with other partners and to anchor an excellence programme as a crucial pillar of a new RTI Strategy for the coming decade. Excellent science and a strong economy for the implementation and subsequent use of new findings for society are required to sustainably secure the location's excellence.

In an iterative process to create a strategy for the excellence programme, different stakeholders of the RTI ecosystem – from science to business – must be involved to strengthen the network and build bridges between the individual university, non-university and corporate players.

Goals of an Austrian excellence programme

The general goal of an excellence programme is the promotion of top quality, freer, findings-based basic research as a guarantor for the recognition and anticipation of urgent issues and societal challenges. As a cornerstone in this respect, free and independent research provides an enlightened democracy knowledge-based answers and solutions and secures the ability to react to future challenges, which cannot be foreseen as such from where we stand today.

As key factors an excellence programme for science and research in Austria should therefore address:

● **Promotion of the best scientific young talent**

Excellent young scientists should be supported and kept here with improved career prospects.

Against the backdrop of the increasingly stronger global competition for the “best and most creative minds” the attractiveness of Austria as a science location must be sustainably increased. Excellent talented young researchers will be won for the long run with long-term career prospects. A dynamic profiling at the research centres and locations is supported by opening up new research fields and methods.

The Austrian Council recommends the promotion of 200 career posts and that a total funding amount of EUR 300 million be reserved for this over a period of eight years.

● **Development of more innovative models for the knowledge transfer system**

Improved framework conditions for research, innovation and corporate funding should be activated and strategically strengthened across the entire innovation chain, from basic research through to market maturity.

Successful basic research develops itself in a bottom-up process. However to exploit the potential of scientific findings, the knowledge transfer between basic research, development and application must also be intensified. It is therefore essential to create cooperation and feedback mechanisms between basic research, applied research and (more entrepreneurial and more social) innovation. The changes in society and economy caused in particular by technological upheavals are challenges for which basic research can deliver possible solutions. These must not be implemented purely via economic applications, but rather must be addressed holistically in

society and must function beyond thematic, geographic and institutional boundaries. An Austrian excellence programme should therefore pursue an integrative approach across and beyond merely excellence promotion, by promoting excellent basic research at both individual and institutional level and by making its utilisation – for society and business – part of the funding strategy. Helpful here, among other factors, is focus on the mission orientation, also with a view to the ability to connect with developments at EU level. Good coordination between the funding organisations is obligatory in this respect.

The Austrian Council recommends suitable mechanisms for funding excellent lab structures and to set up open research networks and for improving the interaction between basic research, applied research, companies and social players be funded with EUR 400 million over a period of eight years, and with it an “ecosystem” for top quality research and knowledge and technology transfer be developed.

● **Expansion of infrastructure funding**

Important infrastructures that can be accessed across the institutions will have to be established to boost the profiling at research locations. This not only supports sustainable profiling in research, but rather also strengthens the regions via local and international collaborations.

The importance of research infrastructures for successful and excellent research at national and international level has been referred to and emphasised many times in recent years⁴. A current overview is provided by the research infrastructure database of the BMBWF with 1,100 research infrastructures at 68 research facilities⁵.

recommendations

⁴ Austrian research infrastructure action plan 2014–2020. The Austrian Government’s RTI Task Force Work Group (2014); Austrian research infrastructure survey. The Austrian Government’s RTI Task Force Work Group as commissioned by the Austrian Council (2009).

⁵ <https://forschungsinfrastruktur.bmbwf.gv.at/de>



recommendations

For the funding of the research infrastructures the Austrian Council recommends the already tried and tested model of matching funds between federal and regional authorities be transferred as a prime example and an investment framework of EUR 300 million be reserved.

Based on the recommendations, together with further experts of the Austrian science system, suitable programme tools will be developed, which can massively support a horizontal and vertical differentiation of the research landscape. In “An excellence programme for Austria – statements and recommendations”, the Austrian Science Council recently presented elements for shaping an excellence programme for Austria.⁶ A further intensification and an international appraisal of the excellence programme to be created will also guarantee that this programme acts formatively at national level and exemplary at international level.

The Austrian Council herewith supports the excellence orientation in the scientific institutions to expand Austria’s international attractiveness as an academic location, which was announced in the “Future and society” government programme.

For Austria an excellence initiative with programme elements should therefore be established and strategically anchored, which fits in with the Austrian science and research funding system and specifically focuses on and coordinates the key competencies for successful development with the situation in Austria.

Background

With its RTI Strategy Austria began in 2011 on its journey to join and stay among the group of innovation leaders and therefore the globally most successful countries. With the goal of investing 3.76 percent of GDP in R&D by 2020 a strong signal was sent out and a committed RTI policy was introduced, and this in the shadow of the financial crisis that began in 2008/2009.

The entire innovative RTI ecosystem must be strengthened to achieve these goals. In the Federal Government’s RTI Strategy the different elements and links along the entire innovation chain are therefore addressed, and the strengthening of both science and the economy are defined as necessary measures for the respective goal achievement. The cooperation of the stakeholders in the RTI ecosystem must therefore be intensified beyond the established dimensions. Chapter three of the RTI Strategy, “Create knowledge, accelerate excellence” formulates the goals for the universities and basic research, non-university research and research infrastructure. Together with the higher education area closely connected with it, the development of these areas is a critical factor for the country’s future sustainability. Chapter 4, “Leverage knowledge, add value” illustrates the importance of funding R&D activities in cooperation with companies to be able to move up in global competition into market leader positions and thereby to create economic growth and jobs.

Some key points of this chapter are:

- Increase in investments in basic research by 2020 to the level of the leading research nations (tar-

⁶ An excellence programme for Austria. Statements and recommendations. Austrian Science Council, Vienna, March 2018.

get for basic research is 0.94 percent of GDP)

- Basic research boosting with further structural reforms of the higher education system
- More competition in university funding
- Improved framework conditions for researchers at universities
- Boosting of university research funding via third party funds of the Science Fund (FWF) acquired in competition
- Boosting of the strategically oriented cooperation between science and business

Subsequent government programmes underscore these goals and measures. The 2017–2022 government programme “Future and society” formulates “(...) a competitive research and innovation system as the basis for success in the age of digitization and the knowledge society”. Moving Austria up into the group of innovation leaders and therefore making it one of Europe’s most innovative country’s remains a clear goal of the Austrian Government.

To implement and achieve these goals, the following measures, among others, were formulated once again:

- Annual, continuous increase in the Government’s research expenditures to achieve a research quota of 3.76 percent. The additional funds must, where systematically possible, preferably be awarded in competition.
- Research Funding Act – agreement on research and development: long-term RTI funding for more planning security, fewer bureaucratic hurdles
- Excellence initiative to increase competitive basic research (promotion of excellent talent-

ed young scientists, competitive incentives for research excellence for universities and non-university institutions)

- Utilise EU research framework programme for Austria and build on existing strengths
- Optimally use structural funds for sustainable further development of R&D location Austria
- More joint innovativeness – strengthen bridges and knowledge transfer (centres) between basic research, applied research and business to accelerate innovation processes; expand existing competence centres and co-operative research centres to research clusters.
- Planning security for university buildings and research infrastructure

Development of the universities and basic research

The Austrian Council’s monitoring for the implementation of the RTI Strategy goals illustrates the developments, among other things, in this respect since the Strategy began. A clearly positive change in the relevant indicators⁷ for the development at the universities and in basic research was not achieved because of several hindrances.

Basic research in Austria runs the risk of losing its connection with international top rate research and squandering the successes of the past. Strong basic research and excellent graduates at universities and research institutes are the basis

recommendations

⁷ See, Report on Austria’s Scientific and Technological Capability 2017, p. p. 45–50, and appendix 1, Indicator set, p. 82 ff.



recommendations

for developing new technologies and co-shaping rapidly changing companies and markets. The comparison with the leading innovation countries – here in the specific indicators for “competitive research funding” and “doctoral candidates with employment contracts” as a gauge for available career positions at universities – shows a significant deficit since the monitoring started, as to date it has not been possible to catch up (and not even partially), due to insufficient young talent support and insufficient funding to set up positions for young scientists. The best brains follow the best research conditions and the return of successful Austrian scientists from abroad is also unattractive due to partially encrusted human resource structures at domestic universities.

Different dynamics in science and research in the interaction with business development requires a dynamic controlling for the right balance between basic research, applied research and development.

This should not trigger any kind of separate discussion on funding the various types of research, but rather should imply a joint consideration in which the different types of research complement one another. With a basic research rate of 0.54 percent of GDP, Austria is stable within a group of research-intensive nations, on a par, for example, with Denmark, France, the Netherlands or Japan. Relative to the total expenditures for R&D the share for basic research in 2015 in Austria fell, however, to 17.6 percent; applied research (approximately 34.5 percent) and experimental development (46.2

percent) on the other hand increased⁸. The expenditures for the research premium increased especially sharply – with about five times the volume since 2005. This development boosts research-active companies and industries and supports a successful location policy. In the international comparison Austria is therefore at the head of state business funding.

In Austria the corporate sector funds approximately 64 percent of research. 49.7 percent of this comes from domestic companies and 14.1 percent from companies based outside Austria (mainly subsidiaries in Austria with international parent companies). 32.6 percent is funded by the state, the rest is spread over the university sector and the private non-profit sector.⁹ It is provided with 63.5 percent of the total expenditure for R&D in the business sector, 7.9 percent in the cooperative area (AIT, IST-A and competence centres), 23.5 percent in the university sector and 4.6 percent in the state sector¹⁰. The share of corporate research in Austria is therefore at that of the innovation leaders¹¹ and number 3 within the EU.

As a significant amount of the funding of basic research generally comes from the public sector (will have to) – in Austria approximately 70 percent of basic research at universities –, the current funding structure makes it increasingly more difficult to provide sufficient funds for competitive basic research.

Switzerland pursues a different strategy in the funding of research and development with somewhat different conditions, in the taxation area as well. More than 60 percent of the research in Switzerland is funded by companies

8 Research and experimental development (R&D) 2015 in the international comparison. Table 6. Quick report 8.1. Statistik Austria, 2018.

9 Ibid., table 4.

10 Ibid.

11 Group of innovation leaders: Denmark, Germany, Finland, the Netherlands, Sweden, UK.



and with a share of approximately 30 percent (from public sector financed funds in particular), basic research has a significantly higher share in research funding. The excellent basic research at the Swiss Federal Institutes of Technology and cantonal universities is of huge importance here for the research-intensive industry and companies in Switzerland. Both sides benefit from the efficient and direct technology transfer and strong research cooperation between companies and universities. With this innovation climate Switzerland has been very successful in securing its top places with many international rankings in research and innovation for many years now.

The competitive awarding of research funds for basic research in Austria is severely under-funded compared to the innovation leaders.

These findings are not new and the Austrian Government is aware of them. Measures called for by the Austrian Council and others have also been accepted into and announced repeatedly in the government programme of previous legislative periods, as was also the case in the current 2017–2022 government programme. Specific funding of competitive corporate research and an increase in competitive basic research through excellence initiatives will make business location Austria more attractive. The international start signal, which will be sent with such an initiative in the science community, could increase the attractiveness of science location Austria massively.

Excellent research requires excellent funding. How urgently these additional funds are required is illustrated by the comparison of the

available budgets for the competitive awarding of funds for basic research of the research funding organizations of the leading research nations. Compared to the innovation leaders (standardised as per population), and also other research-oriented countries, Austria continues to fall back with competitive research expenditure of EUR 22 per inhabitant. Between 2010 and 2018 in all countries of the top group the funds were significantly increased by an average of 33.8 percent. However, there were practically no increases in Austria. The investments in the Netherlands, the UK, Sweden and Finland are about three times as high; Denmark and Switzerland surpass Austria in competitive funding of basic research with a continuous increase in funds over recent years by almost five times.

A development that is extremely alarming and which brings poor conditions for science and research location Austria with it. Because researchers' prospects of success in applying for project funds, via the ERC for example, also largely depend on excellent framework conditions at national level.

An excellence programme for boosting competitive top quality research could generate sustainable successes at international top quality level. The restricted availability of national funds for basic research, coupled with sluggish reforms and an increase in the number of career posts at the universities, would not, by contrast, contribute to bringing talent to Austria and keeping excellent researchers at domestic universities.

recommendations

Recommendation to set up a nationwide database to illustrate research inputs and outputs — Empfehlung vom 22. März 2018

Background

In its report on research funding in Austria published on 24 June 2016, the Court of Auditors also criticised the complexity of research funding.¹² According to the Court of Auditors the Federal Government and the states had a total of EUR 3.1 billion at their disposal for research funding in 2014. However, there is still no full overview of the actual cash flows.¹³ There is also a multitude of heterogeneous research funding databases of the Federal Government, the states, funding institutions and research organisations, which make a complete overview rather difficult. The Court of Auditors therefore suggested setting up a standardised database to ensure recording of research funding across Austria.¹⁴ In reference to the Court of Auditors report, the Federal Ministry of Transport, Innovation and Technology (BMVIT) and the Federal Ministry of Education, Research and Science (BMBWF, previously BMWF) approached the Austrian Council and requested a feasibility study on setting up a research funding database, including the respective cost-benefits analysis. The Austrian Council accepted this opportunity to anchor a corresponding project in its work programme and to commission a study to establish the required foundations. In coordination with the BMVIT and the BMBWF, the Swiss consortium Rütter Soceco,

Senarclens, Leu & Partner and Quantum Analytics were commissioned with performing an appropriate feasibility study. The goal of the study was to examine the required framework conditions for setting up a research funding database across all government departments. As part of the study heuristic, technical, legal and financial principles were outlined, relevant stakeholders in the Austrian RTI system were identified and necessary implementation steps were proposed. The study was completed in November 2017 and published on the Austrian Council's homepage.¹⁵

Recommendation

On the basis of the feasibility study and the existing national best practice examples¹⁶ the Austrian Council recommended an all-Austria research funding database.¹⁷ The Austrian Council believes such a database has a multitude of benefit factors for the Austrian RTI system: The foremost purpose is to guarantee, as proposed by the Court of Auditors, extensive and transparently comprehensible documentation of all research funding at federal and state levels in a standardised, public accessible database. Politicians, administration, the research institutions, researchers and the general public are therewith enabled transparent access to the results and information of public sector-funded

12 Rechnungshof (2016): Forschungsfinanzierung in Österreich. Reihe Bund 2016/4.

13 The Court of Auditors did substantial preparation work in this respect in its report (figure 8).

14 The CREST Report in 2008 and the system evaluation in 2009 already made reference to this requirement.

The adjustment of legal framework conditions for the use of existing databases is also addressed in the RTI Strategy.

15 Rütter Soceco, Senarclens, Leu & Partner and Quantum Analytics (2017): Feasibility study on setting up a nationwide research funding database. Study commissioned by the Austrian Council. Zurich, 11 Nov. 2017.

16 See Rütter Soceco et al. (2017): Feasibility study p. 11, p. 37 ff.

17 The Austrian Council already adopted an appropriate recommendation in 2011: Austrian Council recommendation on setting up an all-Austria public sector research funding database of 24 Nov. 2011.



research in Austria¹⁸, which results – in addition to meeting the requirement of public accountability to the tax payer – in diverse benefit factors with respect to RTI policy governance or scientific analyses (see appendix I).¹⁹

To this end the Austrian Council recommended setting up a database structure that meets the requirements for the objectives and functionalities of an all-Austria research funding database. The Austrian council believes two of the options proposed in the feasibility study are possible for this – setting up a new and independent “schema-free” database solution or expanding the existing transparency database (see appendix II). As part of the work of a project team to be established, the framework conditions for technical implementation must be defined on the basis of clear targets.

Regardless of the actually selected technical solution, in a first expansion stage it must draw on the data already available anyway at federal level (FWF, FFG, AWS, B_f.dat).²⁰ Interfaces to the underlying systems must be established for this and a higher-level database architecture and data model must be developed. Subsequently the databases of the states can then also be integrated step-by-step into the system. Suitable and effective measures must be developed to guarantee the integration of the data provided by the states.

For structuring the content and application options of the research funding database the Austrian Council recommends the specific formula-

tion of a core dataset as part of a participative process, which includes the relevant information on realising the corresponding benefit aspects. An effective framework concept to be used must be developed here in close coordination with the ministries and the relevant institutions of the RTI system (intermediaries, universities, research institutions, and so on). Within it the content and technical details of the core dataset must be defined and legal data protection aspects must also be considered, as must already existing standards and approvals of the federal research intermediaries. The Austrian Council recommends the core dataset proposed in the feasibility study as a basis for discussion (see appendix III).²¹

For the specification and implementation of its recommendation the Austrian Council proposes the use of a broadly based project team, with the participation of the responsible ministries and departments, in particular the BMVIT, BMBWF and BMF, the funding agencies, Statistik Austria, the states, the Court of Auditors and the Austrian Council. As part of this project team's work, specific proposals for the elements of a core dataset, the technical implementation of the database and a decision-making basis (including a costs plan for required human and financial resources) must be worked out for the ministries.²² Ultimately the respective departments are responsible for the specific arrangement of the database, the core dataset to be used and the actual institutional positioning.

¹⁸ Since the target groups are different, the public view with regard to data protection should be checked and, if required, two different detailed views of the data should be developed.

¹⁹ See Rütter Soceco et al. (2017): Feasibility study, pp. 15 ff.

²⁰ This can be justified because a large part of the public sector funds for research funding is awarded at federal level and here in turn via the big research funding bodies. For this, see Rütter Soceco et al. (2017): Feasibility study, p. 9.

²¹ Rütter Soceco et al. (2017): Feasibility study, p. 19.

²² In this context, possible adjustments to the legal framework should also be checked. International examples in any case show that it is basically possible and in many countries also standard practice to publish the outlined elements of the core dataset within the framework of appropriate databases.

For this, see Rütter Soceco et al. (2017): Feasibility study, pp. 20 ff.

Appendix I: Benefit aspects of a research funding database of the Federal Government and the States

An essential benefit aspect of an Austrian research funding database for the policy controlling of the RTI system is the ability, on the basis of a holistic overview²³ of the financing flows, to guarantee a regular check and evaluation of the overall system's effectiveness and efficiency. Building on this, evidence-based required adjustments of individual funding mechanisms can also be made, and systematic further developments of the funding portfolio can be initiated. Data-supported impact analyses can also act as an essential decision-making basis for RTI policy pointers.

An additional benefit aspect is the making available of a secured data stock for interested players with an increase in the available data quality and quantity. The research funding database can serve, for example, as the basis for complying with special legal reporting obligations and evaluations

(for example, the Report on Austria's Scientific and Technological Capability, Research, facts documentation, reporting obligations within the framework of "Europa 2020", and so on). Appropriate data is already recorded today by the respective funding institutions as part of their standardised data collection with all funding cases. National and international analyses of the Austrian RTI system are made considerably easier with a continuously updated and constantly available holistic database.

In a further expansion stage, the database can

generate an additional benefit with regard to all-Austria research documentation, which, in addition to the research input (third party funds, grants, etc.) also illustrates the research output (publications, patents, and so on). Already existing and collected information from documentation and databases of the research institutions, funding bodies and ministries can also be accessed here. This data, which is available anyway, can be consolidated and integrated into the research funding database via appropriate interfaces.²⁴

Appendix II: Options for setting up the database

The feasibility study proposes several options for the technical implementation of the research funding database. The Austrian Council believes two of these require closer examination as part of the project team's work to analyse their suitability in detail. One option is to set up a new and independent "schema-free" database solution. The other option is to extend and adjust the existing transparency database.

The "schema-free" database solution gets by without any interventions in existing data structures or potential added burden on existing databases, can be flexibly used with incremental integrations of data from the most diverse sources, can be extended in any way and enables efficient polling for complex, interconnected issues.²⁵ Basically graph or network databases are primarily conceivable for this, as, however, are other solutions (relational databases, for example) with a minimum of structural conditions, which allow an analysis of more complex struc-

²³ It must be pointed out here that any database solution is only as complete as the connected collection systems. Neither B_f.dat (data gaps) nor the Government's funding agencies (e.g. non-disclosure agreements) publish all funded projects completely.

²⁴ This applies to all existing or in preparation systems for illustrating the output, such as FFG-Infonetz or ÖPA-PatStat, for example.

²⁵ See Rütter Soceco et al. (2017): Feasibility study, p. 27.



tures and networking patterns via easily formulated polling. Essential here in any case is the fact that the selected solution should operate “schema-free” and be based on a local “read-only” database. The autonomous storage of the data stock proposed in the feasibility study offers substantially enhanced analysis options.

The Austrian Council believes the greatest advantage of the “schema-free” variant is the fact that it would use a technical solution that functions independently of the respective content, structures, standards and processes of existing research funding databases and research documentation of the most diverse institutions of the Federal Government and the States. This makes the adjustment requirements very low, apart from setting up the required interfaces. As the data is only used for “reading purposes” and the database is not used as a primary recording system, its development basically entails very little expense. The Austrian Council believes the biggest disadvantage of this solution is the fact that a new structure would be established in the system.

In the context of the simplifications and efficiency increases of the funding system²⁶ provided for in the government programme, to set up a research funding database the project team should therefore also discuss the expansion of the transparency database with the aspect of research funding, also proposed in the feasibility study. Despite the criticism recently expressed by the Court of Auditors²⁷, the plans to adapt the given framework conditions anchored in the government programme nevertheless appear suitable to enable a restart of the trans-

parency database, even along with an extension of a research funding database.

The feasibility study estimates the required changes of existing structures and processes of the transparency database or even a revision of the entire database architecture in all probability would actually be even more expensive and resource-intensive than the development of a new solution set up from scratch especially for this specific purpose, which would be comparably more cost-effective to complete.²⁸ However this is opposed on one hand by the appraisal of the BMF, according to which, with an extension scarcely any significantly higher costs can be expected than with setting up a new, independent technical solution. On the other hand with the extension of the existing system of the transparency database, synergy effects can also be used in the areas of hosting, maintenance and training. This solution would also counteract the intransparency and fragmentation of the information on the most diverse databases at federal and state level, which has been criticised many times by the Court of Auditors, as no additional structures would have to be established.

The project team should therefore check whether or not the expansion of the transparency database would possibly be more beneficial and resource-friendly than a (happening anyway, because anchored in the government programme) further development of the transparency database in addition to the implementation of an independent research funding database.

recommendations

26 Bundesregierung (2017): Zusammen. Für unser Österreich. Government programme 2017-2022, p. 14.

27 For this, see Court of Auditors (2017): Transparency database – costs and benefits, goals and goal achievement. Reihe Bund 2017/45. It should be noted in this context that the deficiencies within the framework of the adjustment process of the transparency database criticised by the Court of Auditors would have to be removed. Suitable measures in particular must, however, be determined to increase the input discipline in particular of the states and the municipalities and to guarantee an appropriate and transparent form of evaluation.

28 See Rütter Soceco et al. (2017): Feasibility study, p. 36.

recommendations

Appendix III: Proposal for the elements of a core dataset

With the recommendation of a “schema-free” database solution, only minimal standardisations in the area of existing databases would have to be made.²⁹

The proposed elements of a core dataset will already be recorded anyway as part of the standard data collection of the respective funding bodies with all funding cases. To maximise the benefits of an all-Austria research funding database, the Austrian Council believes the core dataset should include the following elements:³⁰

People

- Name
- Personal contact information (e-mail, telephone numbers, etc.)
- Unambiguous personal identification number (ORCID, for example)

Institutions (funding provider/recipient)

- Name of the institution
- Address/contact information
- Type of institution
- Specialist area/department of the institution

Research project

- Project name
- Project link
- Unambiguous personal identification number
- Project manager
- Project co-workers

- Project time aspects
- Project status
- Project content information
- Further project information

Financing

- Total project budget
 - Approved funding amount:
 - Public institutions/programmes
 - Funding purpose (project, career, infrastructure, scientific commissions, etc.)
 - Private institutions (foundations, private companies, etc.)
- Other financing resources/sources

Scientific output

Publication

- Type of publication
 - Further information
 - Title of the work
- Author(s)
- Publication time

Other output

Spin-offs

- Name of the company
- Further information on the company (contact information, date founded, etc.)

Patents/out-licensed patents

- Name of the patent
- Further information on the patent/out-licensing

Other types of transfer services

²⁹ A harmonisation of the funding landscape with regard to standardised project names and the possibility of comparing projects via funding agencies, for example, would therefore be required.

³⁰ Rütter Soceco et al. (2017): Feasibility study, p. 19.

Recommendation for improving the framework conditions for starting innovative companies in Austria – Recommendation of 22 March 2018

recommendations

Introduction

Due to their positive macroeconomic effects, start-ups contribute, for example, to the creation of jobs, increased international competitiveness or the knowledge diffusion that is essential for the dynamics of national economies. The Austrian Council has therefore already underscored the importance of active start-up promotion in the past and in December 2008 provided a corresponding recommendation on the optimisation of start-up activity in the knowledge and technology-intensive area.

In the “Global Startup Ecosystem Ranking 2017”, however, in which internationally important start-up regions are compared, Austrian cities have so far made absolutely no appearance. Reasons for Austria’s low significance in the global start-up ecosystem can in particular be attributed to bureaucratic hindrances, the lack of funding options and cultural factors, such as the scarcely defined corporate culture and risk appetite among the Austrian population. While the lack of private equity capital, venture capital and alternative funding forms in particular, and the undernourished spirit of entrepreneurship in Austria also represent key obstacles in start-up activity, within the scope of the following recommendation the focus should be on the administration-related difficulties in the actual company start-up process. The Aus-

trian Council reserves the right to address the two other impact directions – financing and start-up mentality – at the given time with their own separate recommendations.

With regard to the bureaucratic and financial aspects of the start-up process, numerous studies, among others the GEM Austria Report 2016, consequently refer to the unfavourable framework conditions for starting an innovative company that still prevail in Austria.³¹ With regard to the time and costs required for a company start-up in the international comparison the information varies depending on the data accessed. In the “Starting a Business” sub-index of the World Bank’s “Ease of Doing Business” index Austria is 111th among 190 nations. According to the index, starting a limited company in Austria takes 21 days, whereby the company founders must run through eight formal steps³². In the group of OECD countries with high incomes, the average required is about eight days and five formal steps (World Bank 2017). According to the “Small Business Act for Europe” published by the European Commission, a start-up in Austria takes eight days on average (compared with about three days in the EU-wide average) whereby eight procedures are required (EU average: five) and an average of EUR 244 in costs are incurred for these procedures³³ (EU

31 Kiendl/Schmalzer/Wenzel/Penz/Kirschner, Global Entrepreneurship Monitor 2016: Report on the entrepreneurship situation in Austria.

32 For an illustration of the index indicators see World Bank: Doing Business 2017. Equal Opportunity for All. Economy Profile 2017 Austria (2017) 17. Particular attention should be given to the rather unrealistic assumption that a full day is estimated to complete every step and that only one formal step can be completed per day.

33 These costs do not, however, include the required share capital when starting an LLC, or the costs of legal advice, subsequent improvement work and notary costs.

recommendations

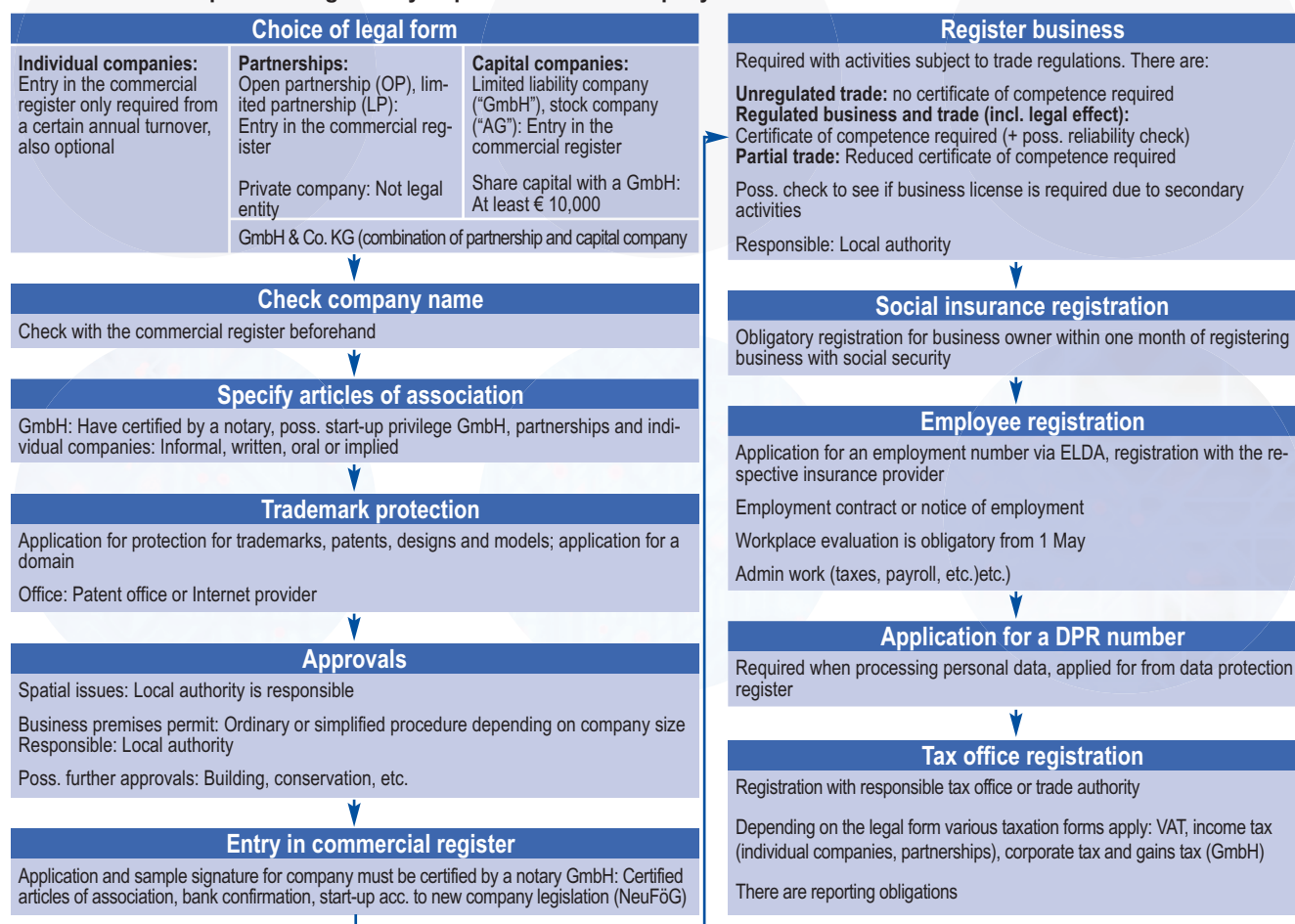
average: approximately EUR 360³⁴. The report in particular shows that with regard to the administrative framework conditions for start-ups, since 2008 Austria has not improved to any significant degree, despite numerous policy reform initiatives in the country comparison. The Global Innovation Index 2017 also emphasises the “Ease of Starting a Business” category in Austria

as a particular weak point.³⁵ This data indicates how Austria continues to lose its connection with other countries in the international context with regard to the administrative framework conditions for innovative start-ups.

Starting situation

As the studies mentioned above show, the start-up process in Austria in the international com-

Overview of the steps that are generally required to start a company in Austria



Source: SME Research, RPCK Rastegar | Panchal

³⁴ European Commission, 2017 SBA Fact Sheet Austria (2018).

³⁵ Cornell University, INSEAD, WIPO, The Global Innovation Index 2017.

parison is defined by strict bureaucracy and is a significant time and financial burden for the company founders.

The following graphic provides an overview of the steps generally required in Austria when starting a company.

This mapping of typical sequences alone clearly illustrates the complexity and slowness that are connected with the formation of a new company in Austria. The more unusual and less easy it is to standardise the business purpose, as is the case with innovative, research-based companies, the more complicated and more difficult it is to predict the procedure.

To provide a deeper insight into the hindrances and obstacles essentially connected with the bureaucratic and regulatory arrangement of the start-up process, the Research Council commissioned SME Research Austria, with the inclusion of the legal expertise of RPCK | Rastegar Panchal, with an analysis of the respective framework conditions³⁶. The objective was to analyse the situation with start-ups for young, innovative entrepreneurs in Austria in more detail, and based on this to work out recommendations for action to create more entrepreneur-friendly framework conditions.

According to this analysis the three biggest hurdles in the start-up process are:

- The generally required by law appointment of a notary as a formal requirement.
- The process to be entered in the commercial register.
- Generally the inflexibility of the legal form of a limited liability company, especially with regard to the formation of share classes.

These three obstacles are made additionally difficult depending on the business purpose by further regulations (trade regulations, for example), which necessitate interaction

with various interested parties (chambers of commerce, for example). Added to this is the fact that the simplification of the administration steps required for the company start-up in the international comparison is still insufficiently supported by the use of modern digital technologies (e-start-up).

A first step towards an e-start-up was made with the Deregulation Act 2017 with individual companies and one-person limited liability companies. The time-limited and strictly restricted area of action of this simplified limited company start-up (one shareholder-managing director with minimum staff³⁷), however, is hardly ever applied to innovative start-ups, where the focus is on the start-up team and innovativeness. The expansion of such digitization is essentially welcome, whereby analogue bureaucracies should not be replaced or concealed by digital ones.

In the start-up process and in the later growth phase the legally stipulated involvement of notaries in limited liability company law, the time and financial expense of which appears to be excessive to the experts and company founders surveyed, must in particular be emphasised as a financial and time hindrance and obstacle. To reduce the time required and the financial costs, but also to improve the comprehensibility of the processes and the perception of a start-up as a complicated process, the require-

recommendations

³⁶ "Analyse der Rahmenbedingungen, Hemmnisse und Hindernisse für innovative Unternehmensgründungen in Österreich". SME Research Austria and RPCK | Rastegar Panchal commissioned by the Austrian Council, November 2017.

³⁷ § 9a GmbH-Gesetz idgF, according to which the declaration of starting a company is limited to minimum content, appointment of the managing director, reimbursement of start-up costs, start-up privilege and distribution of net profit, if it reserves a special annual decision-making process.



recommendations

ments of the mandatory notarial act and the notarial certification must be removed from company law or at least heavily restricted.³⁸

On the whole it would appear appropriate to accelerate, simplify and make the respective procedures more transparent. In the area of trade regulations a step has already been taken here in the right direction.

The inspection obligation of the register court should be limited and (feasible) completion periods should also be provided for. The inspection should be limited to the correct publication of the required information and should no longer include a complete content check of every subject to publication entrepreneurial step. Furthermore, clear, company-friendly deadlines should be defined, within which the court must perform the respective process, including more effective sanctions with non-compliance with the deadline.

For the consistency and predictability of practising the administration of justice connected with this, helpful formal instructions should be published in advance as authoritative, as well as sample applications, whose approval is certain. English should also be provided as a matter of course with the commercial register and English-language information and instructions on the processes should be provided.

Finally, the fundamental consideration as to whether or not the commercial register is correctly in place at a court (commercial) is recommended, as the client orientation and the "service concept" must be front and centre with such a register. The underlying rethinking of the "sovereign authority" into a "service facility" is

appropriate and required in the near-term in any case.

On the whole, as part of a start-up process entrepreneurs must deal with a series of issues, all of which are not necessarily relevant for the success of their product or service. Some of these hindrances actually have an indirect effect, causing company founders to deal more intensively with the business idea and prepare the start-up more intensively. Essentially, however, it must be said that the reciprocal interaction of notary and register court in particular stresses the time and financial resources of the company founder, without any economic added value. Company founders are consequently deflected from their actual goal of implementing business projects. The delays this causes can in particular mean the end of the innovative company's market success, as the competitive edge at the right time is a key success factor here more than ever.

Also problematic is the inflexibility of the limited liability company (as the preferred choice of company form with innovative start-ups), with regard to the possibility of creating different share classes. As a single class company the limited liability company is hardly suitable for meeting the different requirements of founders, investors and employees. In the interests of improving the framework conditions, freedom to create share classes for employee participations and investors would be especially suitable to increase the attractiveness of the Austrian limited liability company. Different participation options in the company would make jobs in start-ups more attractive.

³⁸ Nor is it to be feared that founders will leave the comprehensive consultancy offering of notaries, solicitors, tax advisers, start-up centres, start-up service of the chambers, start-up service of the banks and the like unused, nor are the protective aspects of the notarial act tenable (e.g. as protection of the founder against precipitance or default liability), where partnerships and companies unobjectionably form civil rights with limited liability for the founder. Prevention of abuse by a small few (by falsifying signatures, for example) does not justify a high extent of bureaucracy towards all others either.

Recommendation

On the basis of the outlined initial problems in the start-up process, focusing on the three impact directions

1. Reduction in formal requirements
 2. Restriction of the inspection obligation of the register court
 3. Liberalisation of the share classes with limited liability companies
- appears expedient (see graphic on right).

The main advantage of the measures outlined here is that, in contrast to the measures of direct or indirect funding of innovative start-ups, they do not present any budgetary burden, and in fact appear as neutral in financial terms. The improvement in the existing framework conditions in the start-up process using exclusively legal changes also favours all start-up founders equally, and in contrast to direct subsidies, tax breaks and similar measures, not only prevent additional administration costs, but rather also promise a direct effect in the system.

The Austrian Council recommends in detail, **removing the mandatory notarial act and the notarial certification with limited liability companies in the following cases:**

- The articles of association and their amendment (§§ 4 para. 3, 49 para. 1, 44 para. 2 GmbHG – LLC law)
- Limited liability company shares acquisition and acceptance (§§ 76 para. 2, 52 para. 4, 60 para. 1, § 6 GmbHG)
- Certification of signatures (managing director – all except for the first sample signature: §§ 51 para. 1, 53 para. 1 GmbHG, § 11 UGB, § 11 FBG; shareholder: §§ 9 para. 2, 17 para. 1, 49 para. 1, 84 para. 1 Z 2, 98, 99 para. 6 GmbHG)

Restricting the inspection obligation of the register court and increasing company-friendliness with:

- Restriction of the register court's right to inspect with start-ups to § 11 GmbHG minimum content (for example, share capital, location and business address, name and date

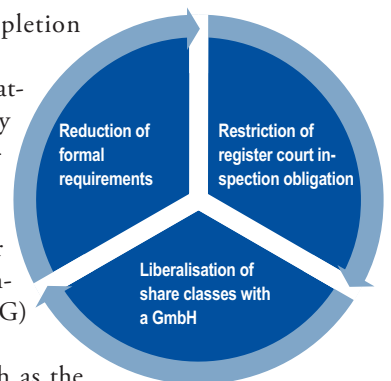
of birth, shareholders, etc.)

- Handling of all commercial register registrations as “simplified” registration in accordance with § 11 FBG
- Standardised and electronically structured commercial register applications (similar to structured land register applications, see cadaster amendment 2012)
- The introduction of feasible completion deadlines:
 - With inactivity for 14 days automatic registration (while technically available – established and is entitled to registration) similar to §§ 12f VerG.
 - With all other commercial register registrations (after start-up): Completion by a judge (§ 9 para. 1 RPfG) obligatory after expiry of 14 days.
- Effective means of legal redress such as the reintroduction of a judge deciding on lodging an appeal (§ 11 para. 3 and para. 4 RPfG idF before BudgetBglG 2011) and the approval of submission of the case to a judge (§ 12 RPfG) with register court issues, with simultaneous completion deadline of 14 days.
- Publication of formal instructions and sample applications, which reflect consistent administration of justice.
- The possibility of standard start-up (“off the shelf”), subsequently via “Unternehmensserviceportal (USP) – company service portal”.
- Acceptance of English in dealing with the register court and provision of available information in English.
- Cultural shift away from “sovereign court” and towards a “service point”.

Simplifying employee participations and investments with limited liability companies with

- the possibility of creating different share classes in limited liability company law (“liberalisation of share classes”) for employees and investors, with more flexible arrangement of rights, such as:

recommendations



recommendations

- Exclusion of voting rights
- Exclusion of controlling rights, such as inspection of all books/documents (§ 22 GmbH – LLC law)
- Creation of better positions (preferences) with profit distribution and liquidation (“liquidation preferences”)
- Removal of the notary obligation and simplified register court registration with transfer, to enable vesting.

Recommendation on the negotiations of the European Multiannual Financial Framework (MFF) and the 9th EU research framework programme –

Recommendation of 23 April

Background

● European Multiannual Financial Framework (MFF)

The annual highest amounts (“upper limits”) that the EU may issue in the individual policy areas during a period of at least five years are defined in the Multiannual Financial Framework (MFF). The most important categories from the research and development point of view are provided under 1a – “Competitiveness, to boost growth and employment” and 1b – “Economic, social and territorial cohesion”. 1a includes, among others, research and innovation (especially the research framework programme), education and training, trans-European energy, transport and telecommunication networks, social policy, corporate development, and so on. Under 1b you’ll find regional policy mechanisms, designed to increase the competitiveness of all regions and promote cooperation between them.

● The EU research framework programme

With almost EUR 80 billion for 2014–2020, the currently running 8th EU research framework programme, “Horizon 2020”, is the world’s biggest transnational cooperative programme for research and innovation. The EU research framework programme is an essential instrument in strengthening European knowledge-based competitiveness and expanding European innovation networks, by promoting cooperative R&D projects with

the participating countries and thus realising high leverage effects. Furthermore, the EU research framework programme also contributes to achieving the goal of an EU research rate of 3 percent of GDP (in 2016 the research rate of the EU 28 was 2.03 percent). The strategic relevance of the EU research framework programme has grown massively in Austria, as it covers important R&D priorities, and through its focus on cooperative R&D projects it allows expertise to be bundled within the EU and ideas in Europe to be picked up on, developed and taken through to market maturity. EU R&D projects are especially valuable in strong export-oriented supplier countries like Austria, in order to drive forward knowledge-based innovation in Europe together.

● The future EU research framework programme

The proposal for the coming 9th EU research framework programme was presented to the European Commission in the first half of 2018. The subsequent negotiations by the European Parliament and the European Council therefore essentially took place during the Austrian EU Council Presidency in the second half of 2018.

An inter-ministerial agreed paper with key points for the Austrian negotiations on the 9th EU research framework programme was presented to the RTI Strategy Task Force in September 2017. The importance of the EU



research framework programme is illustrated by the success in the current “Horizon 2020”. Austria has a very good return rate from the programme and with regard to participations in the countries ranking is at third place (as at end of 2017). Domestic companies in particular have retrieved an above-average high share of the applied for funds and therewith generate an important network for the innovation location with European players from science and research.

Recommendations

In view of the global challenges, the planned retention of the structure and the proportional distribution of funds in the European financial framework are no longer up-to-date. The Austrian Council therefore recommends clearly aligning structure and distribution within the policy areas of the future EU budget with future topics. Even if the European Commission has suggested a modernisation³⁹ of the EU’s budget on the revenue side in particular, a basic, courageous modification of the categories appears unrealistic for the structure on the expenditure side. The Austrian Council therefore recommends the distribution of the total budget be boosted in favour of the research-relevant and future-oriented categories (1a and 1b). Furthermore, content room to manoeuvre in the other categories of the budget must be used and expanded explicitly for innovative and future-oriented topics. The interfaces to areas such as agriculture and social issues, for example, have high potential and this must in any case be utilised for innovative projects. Away from the dedicated research programmes, fixed allocation of funds for future topics also creates

networking and establishes innovations in all areas and promotes an up-to-date, progressive budget alignment for the high expenditures and spending of a knowledge-based Europe. Fixed earmarking also systematically complies with the spirit of mission orientation (see below) and can make a positive contribution to the goal achievements of other policy areas.

The Austrian Council recommends significantly increasing the allocation of funds to the future framework programme and where possible concentrating all R&D-relevant instruments and topics in the framework programme. A requirement for this is that the budgets belonging to the instruments also flow into the framework programme. To meet the requirements from the different administration areas of the EU a suitable governance structure must be created for this.

The three pillars of the programme not only finance important areas - some of which will in future be structured in ‘missions’ - but also generally ensure uniform financing arrangements. With various necessary verifications and audit processes, with the guidelines oriented on R&D, the framework programme is a practical procedure that also guarantees a high level of legal certainty for researchers.

The Austrian Council therefore recommends supporting the EU Commission's scenario proposal for doubling the budget and enabling the creation of up to 650,000 jobs⁴⁰ with a framework programme budget of 160 billion euros. Important here is that the increase be provided with additional, fresh funds and budgets as cash values.

In the future EU research framework pro-

recommendations

³⁹ The proposals primarily focus on the revenue side: https://ec.europa.eu/commission/sites/beta-political/files/modernising-revenue-sources-eu-budget_de.pdf.

⁴⁰ COM(2018) 98: A new, modern Multiannual Financial Framework for a European Union that delivers efficiently on its priorities post-2020: <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A52018DC0098&from=EN>



recommendations

programme attractive funding amounts in the form of subsidies for all participating players and all company sizes will also have to be secured. Generally speaking, loan models are only suitable as supplements for market-related investment activities. R&D activities must be funded with subsidies.

The Austrian Council recommends the key points for the Austrian negotiations⁴¹ (presented in 2017) be considered and special attention be paid to strategic objectives in harmony with optimum financial coverage. The Austrian Council supports the request for simplification of the instruments and also believes the expansion of such to partnership instruments is very important. To counteract the prevailing underfunding and to increase efficiency, special attention must be paid to critical programme variables of successful programmes, and the respective measures must be arranged transparently and comprehensibly.

The Austrian Council recommends the national structures and instruments be adjusted to possibly changed framework conditions and the content of a future research strategy be worked out with regard to European instruments and objectives.

The Austrian Council recommends focusing on strategically important missions for Europe, topical areas and key technologies with the arrangement of the 9th EU research framework programme. Just like the first pillar, successful and strategically important programmes of the current second and third pillars must therefore also be strengthened. In a possible new structure of the 9th framework programme, the proportional budgets of this programme must be secured and increased to also promote new key technologies and meet Europe's future global

challenges. The Austrian Council therefore believes the previously mentioned increase in the framework programme budget is of essential importance to be able to strengthen all pillars equally.

The Austrian Council recommends cooperative formats continue to be given priority, covering the entire innovation chain – from basic research to applied research and development, through to market transition. An increase in European innovativeness and value creation will only be realised if new or improved products and services and process innovations are implemented successfully in Europe. A high level of participation by companies of all sizes must therefore be ensured, particularly in the field of European strengths.

Special strategic partnerships as “joint technology initiatives” and “contractual public private partnerships” have proven their value in establishing long-term R&D collaborations and functioning R&D networks between science and business and therefore in leveraging high R&D and innovation project implementation capacity. These instruments must therefore also be secured, further developed and equipped with ambitious budgets. In this context, too, the Austrian Council reiterates its call for an increase in the Framework Programme budget in order to systematically expand the diversity of European research funding instruments from ERCs and missions to economic cooperation. To achieve the goals to support the planned European Innovation Council (EIC) the Austrian Council recommends excellent, groundbreaking innovations of European frontrunners as well as young and medium-sized enterprises and encouraging the cooperation between established and new companies to promote corporate growth be accelerated.

⁴¹ <https://era.gv.at/object/document/3542>

The Austrian Council recommends realistic goals be set with the currently planned missions in the 9th framework programme and – where possible and beneficial – technology neutrality for goal achievement be enabled. These must be formulated in such a way that sufficient points of reference for R&D-strong European players are at hand. The missions and their

arrangement must also be defined in an open, transparent process and coordinated closely with the relevant specific areas of policy. Close coordination with the European R&D stakeholders from science, business and society must be ensured to guarantee this, while also considering appropriate governance structures.

recommendations

Recommendation on setting up the new EU research framework programme and the national framework conditions for participation in EU mechanisms –

Recommendation of 29 June 2018

Background

Reference to the preceding recommendations of the Austrian Council

In its recommendation of 23 April 2018 the Austrian Council referred to the importance of prioritisation for research and development with the budgetary distribution of the coming EU budget. The Austrian Council believes an increase herein of the research framework programme budget is extremely important. The European Commission's proposal for the 2021–2027 Multiannual Financial Framework, which was presented on 2 May 2018, clearly shows the deviations from the Austrian Council's recommendations. In the meantime the European Commission's proposal on the new EU research framework programme was also published on 7 June 2018.

The European Commission's proposal distributes funds within the individual budget categories to the detriment of future topics and continues to strongly favour the agricultural sector and cohesion polic⁴². In the coming EU

budget, the opportunity will therefore not be utilised to substantially restructure financial funding for Europe's future in line with important priorities in research, technological development and innovation.

From an Austrian perspective the second half of 2018 is entirely defined by its EU Council Presidency and the planning for the coming funding period, and for 2019 with the EU elections and conclusion of important negotiations, important changes and turning points are also on the horizon.

This recommendation reflects current developments in the planning for the coming framework programme and provides the reference point for the required national measures.

The European Commission's proposal for the new EU research framework programme:

The essential three-pillar structure of the research framework programme was also retained for the next "Horizon Europe" framework programme. However, in terms of content, key

⁴² Overall budget: EUR 1,279.408 billion

Research and innovation: EUR 102.57 billion, of which EUR 97.6 billion for Horizon Europe

Regional development and cohesion: EUR 273.24 billion, of which EUR 226.3 billion for EFRE

Agriculture and marine policy: EUR 372.264 billion

Source: COM (2018) 321 final.



recommendations

changes are planned with five thematic clusters and the mission orientation terms with the creation of the European Innovation Council (EIC).

Pillar 1 “Open science”

In the first “Open science” pillar, together with “Marie Skłodowska-Curie Actions” and “Research Infrastructures”, the European Research Council (ERC) will continue the previous science excellence programme line.

The ERC has performed very well and turned into a European success story. It is funded with EUR 13.56 billion within the scope of Horizon 2020 and in the European Commission’s proposal a further significant increase by 27 percent to EUR 16.6 billion is also recommended. For researchers ERC grants are an undisputed confirmation of excellent research work. In the context of an excellence initiative, successful ERC grants are therefore an important indicator for the current situation of basic research in comparison to other countries. Overall, Austria has a satisfactory position in the European ranking, but on closer examination a concentration on IST Austria becomes evident. If we evaluate only the universities without IST Austria, we see a significantly worse situation in the ranking. The now proposed further substantial increase in ERC, combined with its attractive remuneration is an extremely interesting opportunity for Austrian applicants, which must be utilised.

Furthermore, the share of incoming ERC grants at Austrian universities must also be increased significantly.

Pillar 2 “Global challenges and industrial competitiveness”

The second pillar presents the content consolidation of the previous second and third pillars (leading role of industry and societal challenges). To date Austria has been very successful in this area; a large part of the returns were achieved with projects from this pillar. The ICT and Transport focus points currently generate significantly more than EUR 100 million in returns to Austria.

Future measures for societal challenges are addressed with EUR 52.7 billion. With the inclusion of the stakeholders, strategic programme developing is planned in the future in the “top-down” method. The thematic subdivision comes in five clusters, which are in turn subdivided into “intervention areas”. The mission orientation is a new element and will illustrate topics with higher social relevance.

The partnerships also planned in this pillar, which include “Joint Technology Initiatives (JTI)” and “Joint Programming Initiatives (JPI)”, will be made more efficient and more effective with numerical reduction.

Pillar 3 “Open Innovation”

This pillar is new in this form in the framework programme and will enable a seamless promotion of research and innovation with clear market orientation. The European Innovation Council (EIC) is the central point of contact here to support these goals with mixed funding (subsidiaries/loans/equity capital). Of the planned EUR 13.5 billion, EUR 10 billion are planned for the EIC, and EUR 3 billion flow into the continuation and strengthening of the European Institute of Innovation and Technology (EIT). With EUR 0.5 billion the European innovation ecosystem will also be boosted with the co-financing of national initiatives.

National framework conditions for continuing Austria’s success course

The success of the domestic research community with European project participations was highly satisfactory in the past and in the currently running funding period, which on one hand is reflected in numerous successful research and innovation projects, and on the other hand has also resulted in a very good return rate to Austria.

On the whole more than EUR 871 million was acquired by Austrian R&D-active science and business players. If this success course can be continued, it appears the self-set ambitious goal of realising 1.5 billion in EU returns by the end of the programme can be achieved.

The successfully acquired ERC grants are an important quality indicator for researchers and increase the international visibility of science coming from Austria. At the same time the R&D-intensive companies in particular make an enormous contribution to progress and innovation in the country. They increased their participation compared to the previous EU research framework programme by ten percent and in the comparison of countries with more than 37 percent of the successfully acquired funds are now significantly above the EU average.

Austria scores successfully above-average here in the areas of ICT, key technologies, energy, climate and transport in particular.

The EU research framework programme on the whole has grown massively in strategic importance for internationalisation and Austria as an export-oriented country. With the complementary effect on national activities it forms an essential cornerstone for strengthening R&D and innovation in Austria and consequently in Europe.

The FFG as the national contact point has a clear key function here with its advisory service.

The international networking and research oriented on modern technologies, however, necessitate other requirements in the future, in order to remain competitive. The digitization of many specialist areas requires a stable and efficient infrastructure with high penetration rates. However, to meet the requirements of technology-supported jobs and research positions, as well as for private life situations, constant further training and upgrading of knowledge across the entire population would also have to be ensured. The development and implementation of forward-looking concepts and procedures – from automated driving to Industry 4.0 through to virtual classrooms – build on a sufficiently good supply of broadband in all parts of the country. Comparisons with other European countries show how Austria is significantly behind with

the penetration rate of broadband Internet and how rural regions in particular are neglected. The technical base infrastructure and access to digital networks are indispensable for a competitive research location. In addition to specialist expertise, these rank among the absolutely necessary requirements to guarantee the connectivity and maintenance of correspondingly higher return rates from the EU programmes.

Recommendations

The Austrian Council therefore recommends that, during the course of the Council Presidency, Austria enables the swift conclusion of the negotiations, and especially those on the multiannual financial framework. It cannot be assumed that a newly elected EU Parliament will reach a quick result after being installed. A “fast track to budget” process would therefore create an important perspective and planning basis even before the EU 2019 elections. In this context the distribution of funds in the individual categories must also be explained in content terms in good time. The Austrian Council believes many questions and objectives in the agricultural sector are better taken care of in regional and national responsibilities. Important food security issues, which are currently included in the agricultural sector’s budget, could, however, also be mapped in research and could therefore also bring synergies with them for dealing with the global challenges.

The Austrian Council recommends the allocation in content terms of budgetary funds of the research framework programme and structural funds categories be considered holistically. The highest possible effect of structural funds when creating research project families should therefore be achieved and existing problems with the financing of bigger projects from different budgetary areas should be dealt with. The Austrian Council specifically recommends a share of at least 40 percent of the structural funds be used for research, innovation and education.

recommendations



recommendations

The Austrian Council recommends the funding of the future framework programme be significantly increased and the EU budget be aligned future-oriented. The Austrian Council therefore believes the doubling of the budget to EUR 160 billion called for by experts⁴³ is an important signal for a future-oriented Europe. The Austrian Council believes the approximately EUR 100 billion proposed by the European Commission is not sufficient. Austria must contribute significantly to effective measures being implemented in Europe to be able to successfully stay abreast in the race with Asia and the USA for competition-critical future areas and key technologies.

The Austrian Council believes the ERC grants are an important instrument in establishing excellent research and increasing international visibility, and therefore welcomes the proposed significant increase by 27 percent to EUR 16.6 billion in the future. The Austrian Council therefore recommends the planned significant boosting of ERC research funding for Austria be used, and the universities in particular be motivated at national level to successfully participate in ERC with competitive projects. The Austrian Council suggests scientific institutions and universities be encouraged with appropriate anchoring in the performance agreements to increase their ERC applications and to use these for excellence and to increase their global competitiveness.

The Austrian Council recommends special attention be paid to Austrian areas of strength, in particular for the correct configuration in Horizon Europe so Austria can compete with the best in the international competitive pressure for top rate technological expertise. This in par-

ticular includes the cluster topics, “Climate, Energy and Mobility” and “Digital and Industry”, which must be strengthened in budgetary terms to also ensure successful Austrian participation in the future. A budget increase is still not planned for these topics in particular, although new key technologies will be added.

If greater focus is not made on these in the future framework programme and they are not equipped with more additional budgets, for important initiatives such as artificial intelligence or digital security and connectivity, Austria’s successful position will be endangered. It is also essential that implementation-intensive mechanisms, especially strategic partnerships such as JTIIs or cPPPs be secured and accelerated. Utilising the synergies of other EU programmes, such as “Digital Europe” will also be important.

The Austrian Council believes the mission-oriented approach is an important further development in the framework programme and recommends, wherever beneficial, application throughout the entire innovation chain. The missions can be seen here as a part of pillar two, and also generate added value in the framework programme, in structural programmes and in agriculture. Appropriate governance for practical implementation is an indispensable requirement here.

The Austrian Council believes successful participation in EU programmes can only be achieved with appropriate national framework conditions.

In applied R&D funding it is therefore extremely important to continue in Austria on the successfully followed path – consisting of a complementary mix of topic-open and thematic priority programmes – and to further

⁴³ For example, Pascal Lamy, former WTO Director General: https://ec.europa.eu/research/evaluations/pdf/speech_pascal-lamy_03072017.pdf

strengthen it, to optimally address existing and new added EU research areas and key technologies, and therefore to be able to consolidate value creation chains in Austria.

These also include important technical requirements, such as access to broadband Internet infrastructures. The expansion of this technology must be swift, to enable competitive activities in both urban and rural areas. With regard to coming technologies the appropriate structural measures must already be introduced in preparation, so a rapid roll-out can be made after the legal and financial aspects (licensing in particular) are clarified.

The Austrian Council believes the expansion of digital infrastructures is an important element for various structural challenges facing Austria, which, in addition to the need for research activity, also have massive impacts on education, social effects such as rural exodus and the ageing society, as well as location attractiveness. The Austrian Council therefore recommends a significant increase in the funds for expanding digital infrastructures, and in this context also calls for a swift implementation of the respective measures.

recommendations

Recommendation on increasing excellence in science and research –

Recommendation of 16 August 2018

Starting point: RTI Strategy of the Austrian Government 2011

The right goals and measures were already named with the RTI Strategy, “The Path to Becoming an Innovation Leader”, in 2011. Increasing excellence in science and business must continue to be the goal. The “Universities and basic research” chapter includes the following goals, among others:

- “We want to increase investments in basic research by 2020 to the level of the leading research nations.”
- “University research funding via third party funds of the Science Fund (FWF) acquired in competition must be boosted and equipped with appropriate costs coverage.”
- “The university funding model will be reformed. Research financing will be more competitive and project-related.”
- “Expansion of third party funding of university research via projects of the FWF Science Fund evaluated in competition with lump sum coverage of overheads to the amount of 20 percent.”

- “Implementation of an Austrian excellence initiative with up to ten excellence clusters by 2020.”

Excellent research and development is performed by scientific institutions – universities, technical colleges and non-university research institutions – and by companies, which contribute approximately 65 percent of overall research investments in Austria. R&D-intensive companies in particular excel with high networking with science – non-university and university – and the business world. They have positive spillover effects on their surroundings. It is important here that the entire innovation chain and R&D networks and therefore innovation location Austria be strengthened as a whole.

In the reports on Austria’s scientific and technological capability the Austrian Council persistently points out that the implementation of these goals and measures, especially for the further development of the higher education sector, has to date only been driven forward at an

recommendations

intensity that is far too low. The reform of university funding actually goes in the right direction and the investments in basic research enable a position in the midfield of the research-intensive countries. The considerable obstacles that impede an improvement in the performance and international competitiveness of the universities, however, remain where they are. The most relevant here are, for example:

- The limited availability of funds awarded in competition for funding basic research, (i) at research funding level, as the FWF – as essential funds for science –, compared to partner organisations in the leading countries has a significantly lower budget and (ii) at institution/university level, the defined research priorities and excellence areas can only be formed and funded out of the overall budget with low funds due to the notorious underfunding of research (and teaching). Positive here is the fact that an increase in the overall budget by 2021 by approximately EUR 1.3 billion has been decided. These funds must be used strategically and future-oriented, to set clear priorities and create attractive framework conditions. To be internationally attractive Austria's universities must also profile themselves more intensively as research universities. This also includes a to-date only partially completed professionalization of the PhD courses.
- A low number of career posts, the absence of a standardised and quality-driven tenure track model as well as a supervision ratio requiring much improvement compared to research-intensive countries

- have both an adverse and limiting effect on funds for the procurement and operation of research infrastructures, which are awarded transparently and performance-related.

The Austrian Council recommends

increasing the share of competitive funding for basic research to the level of research-strong nations. For the creation of framework and location conditions for excellent research the Austrian Council recommends providing additional funds of EUR 300 million annually.

The Austrian Council in particular recommends

- **increasing the competitively awarded, project-based public sector funding for basic research.** The competitive component as key for excellence in science and research has to date not been strengthened. In contrast to the international trend the share of competitively awarded research funding even fell. The comparison with European funding organisations shows that Austria falls back continuously both in relation to the innovation leaders and compared to other research-strong nations.⁴⁴ With the FWF budget EUR 22 per inhabitant are currently invested in basic research – the same as in 2008. As a result the approval rates of programmes fall due to the increasing application amounts. While 37.8 percent of the funds applied for in 2008 were funded, in 2017 it was only 24.8 percent (see appendix). Numerous positively appraised projects therefore have to be suspended. This development must be vigorously countered to prevent an increasing exodus of superbly qualified researchers. Well-furnished FWF funding in the international comparison is al-

⁴⁴ See Report on Austria's Scientific and Technological Capability 2018, p. 50. Austrian Council.

so an essential factor in bringing the “best brains” to Austria.

The increase in the funds for the FWF by EUR 110 million in total for 2018–2021 is therefore far too low, if the same conditions for excellent research as those in the Netherlands, Sweden, Finland or Switzerland are to be created.

As a short-term goal the Austrian Council recommends an increase in the approval amounts of the FWF by a further EUR 80 to 90 million per annum, to guarantee excellent basic research and excellent researchers are successfully funded and to be able to implement new attractive funding programmes (the “Research Groups” or “Austria Research Chairs” programmes, for example). In the medium term, the increased annual budget of the FWF should be doubled, in order to fund excellent research at the level of the leading innovation countries. Strong national research funding is also an essential support factor for the future success at European level (Horizon Europe) and an effective basis to be able to successfully acquire ERC grants.

- **Compensating indirect costs (overheads)**

Overheads are an additional incentive for the universities to increase the acquisition of competitively awarded research funds.

From 2011 an overhead amounting to 20 percent of the direct project costs was only introduced (reintroduced) for certain funding programmes of the FWF. Since 2016 overheads are no longer compensated directly by the FWF, but rather within the scope of the higher level education infrastructure funds on the basis of the “Knowledge transfer” in-

dicator. Due to the low coverage of indirect costs for universities (and other research centres), with a high share in third party-funded research there is only little incentive to acquire more third party funds via the FWF.

Comparable promotion funds, such as the German funding body, the Deutsche Forschungsgemeinschaft (DFG) or the Swiss National Fund (SNF), provide a lump sum indirect cost reimbursement amounting to 20 or 22 percent. For Horizon 2020 projects a lump sum of 25 percent is reimbursed for indirect costs.

To increase the incentive for universities to boost the acquisition of excellent research projects via the FWF, the Austrian Council recommends a lump sum costs reimbursement of 20 percent in addition to the respective funding amount. With a recommended increase in the approved amount to EUR 300 million, an additional EUR 60 million must be provided for this.

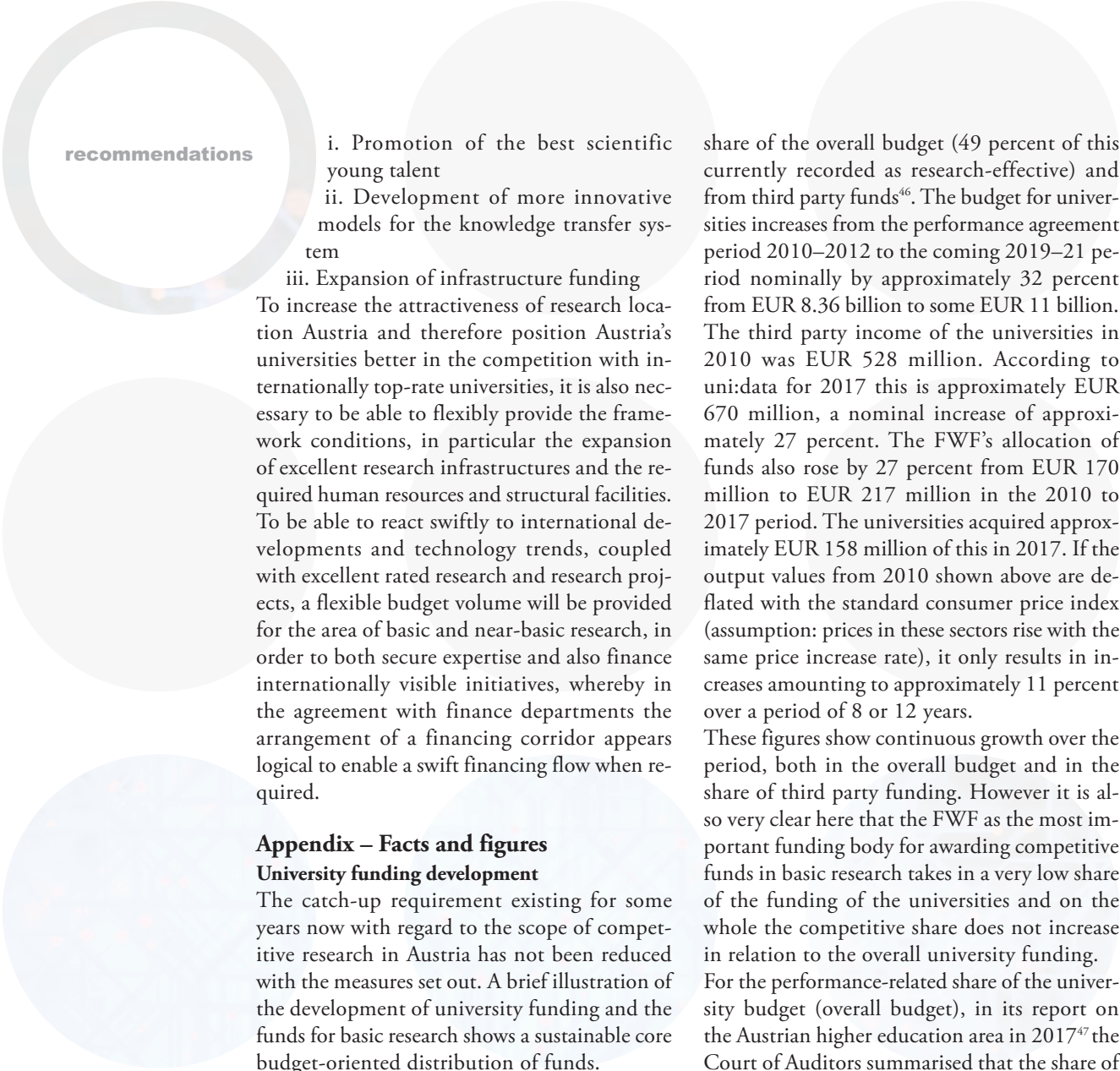
- **Creation of framework and location conditions for excellent research**

Excellence in science and research at a high international level can only be achieved if a “research culture” is created, in which research and the appreciation of research excellence are front and centre.

With the recommendation for an excellence programme⁴⁵ in March 2018, the Austrian Council emphasised the need to make Austrian universities internationally competitive. The Austrian Council recommended three key pillars for funding top quality, freer, findings-based basic research here:

recommendations

⁴⁵ Recommendation for promotion of science as key for more cooperation and competition in basic and top-quality research. Austrian Council, 22 March 2018.



recommendations

- i. Promotion of the best scientific young talent
- ii. Development of more innovative models for the knowledge transfer system
- iii. Expansion of infrastructure funding

To increase the attractiveness of research location Austria and therefore position Austria's universities better in the competition with internationally top-rate universities, it is also necessary to be able to flexibly provide the framework conditions, in particular the expansion of excellent research infrastructures and the required human resources and structural facilities. To be able to react swiftly to international developments and technology trends, coupled with excellent rated research and research projects, a flexible budget volume will be provided for the area of basic and near-basic research, in order to both secure expertise and also finance internationally visible initiatives, whereby in the agreement with finance departments the arrangement of a financing corridor appears logical to enable a swift financing flow when required.

Appendix – Facts and figures

University funding development

The catch-up requirement existing for some years now with regard to the scope of competitive research in Austria has not been reduced with the measures set out. A brief illustration of the development of university funding and the funds for basic research shows a sustainable core budget-oriented distribution of funds.

The funding of research and development at universities is essentially provided both from a

share of the overall budget (49 percent of this currently recorded as research-effective) and from third party funds⁴⁶. The budget for universities increases from the performance agreement period 2010–2012 to the coming 2019–21 period nominally by approximately 32 percent from EUR 8.36 billion to some EUR 11 billion. The third party income of the universities in 2010 was EUR 528 million. According to uni:data for 2017 this is approximately EUR 670 million, a nominal increase of approximately 27 percent. The FWF's allocation of funds also rose by 27 percent from EUR 170 million to EUR 217 million in the 2010 to 2017 period. The universities acquired approximately EUR 158 million of this in 2017. If the output values from 2010 shown above are deflated with the standard consumer price index (assumption: prices in these sectors rise with the same price increase rate), it only results in increases amounting to approximately 11 percent over a period of 8 or 12 years.

These figures show continuous growth over the period, both in the overall budget and in the share of third party funding. However it is also very clear here that the FWF as the most important funding body for awarding competitive funds in basic research takes in a very low share of the funding of the universities and on the whole the competitive share does not increase in relation to the overall university funding.

For the performance-related share of the university budget (overall budget), in its report on the Austrian higher education area in 2017⁴⁷ the Court of Auditors summarised that the share of indicator-related funds (formula budget up to 2012 and higher education area structural funds

⁴⁶ On the whole with its expenditures for R&D – Higher education expenditure on R&D (HERD) – Austria ranks number 4 among the OECD countries. BMF, R&D supplement. Overview acc. to § 43 para. 4 BHG 2013, March 2018.

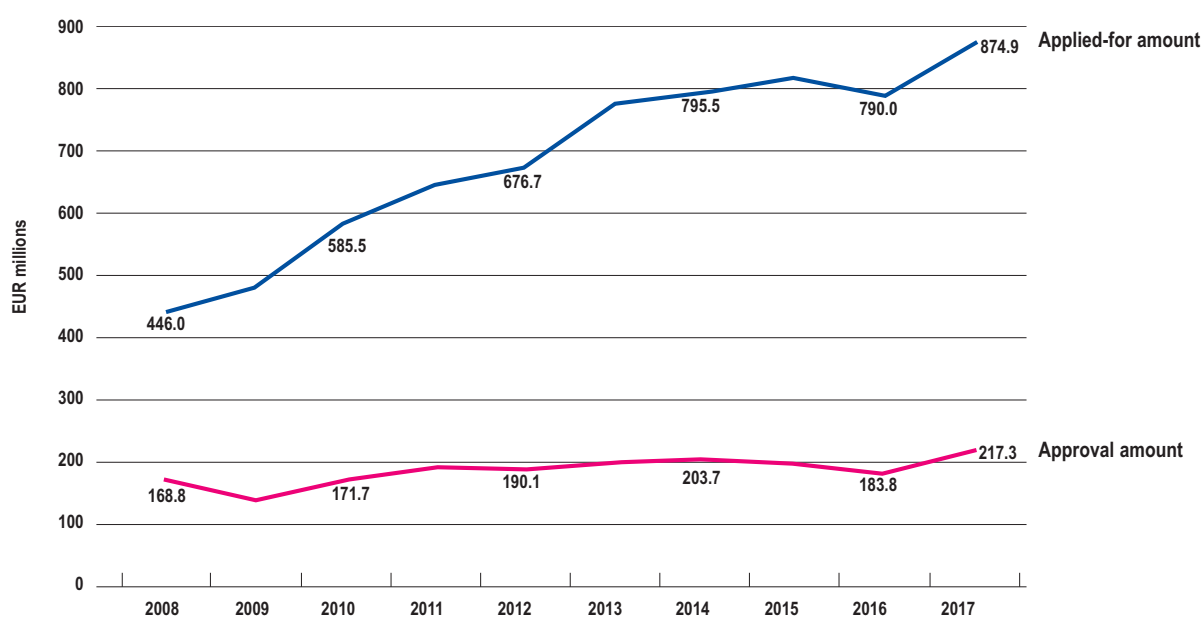
⁴⁷ Report by the Court of Auditors: Austrian higher education area; Reihe Bund 2017/54.

from 2013) in the university budget (total amount) fell from 16.2 percent in the performance agreement period 2007–2009 to 7.7 percent in the performance agreement period 2016–2018.⁴⁸ With the university funding from performance agreement period 2019–2021, with the introduction of basic indicators and competition indicators in teaching and research

there is now a clearly performance-oriented funding system. However, with a share of four percent in teaching and approximately nine percent for the research budget, the competition indicators also only include a low share of the total budget of the universities.⁴⁹

recommendations

Figure 2: Development of FWF approval amounts and applied-for amounts from 2008 to 2017
(mit hochgestellter Zahl "50")



Source: "Run" on competitive FWF funds, FWF Science Fund

⁴⁸ Ibid., p. 38.

⁴⁹ See Statement of the Austrian Council on regulations for the implementation of capacity-oriented, student-relevant university financing (UniFinV) of 22 June 2018.

⁵⁰ Q: Press conference on the status of research in Austria, BMBWF/FWF, 24 April 2018. FWF facts-figures-2017-2, p. 7.

Relevance and potential of frugal innovations for Austria –

Recommendation of 13 September 2018

On the importance of frugal innovations for Austria

Austria's existing (strong) position on the world market, which is based largely on top quality products and services with a high R&D share⁵¹, increasingly faces competition from emerging economies such as China and India, and those in Africa. In the global innovation competition new challenges emerge with shifts in the international distribution of labour and the emergence of new lead markets for innovation in emerging economies.⁵² Complex and far-reaching changes that this entails mean Austrian companies are faced with the task of rethinking and redefining established innovation models, in order to maintain and strengthen a leading role in global research and industry structures for the long term. This must also be considered with the main goal formulated in the RTI Strategy of joining the innovation leaders by 2020.

In addition to highly complex (and therefore expensive) products, the increasing demand in emerging economies such as China and India and those in Africa also increasingly requires affordable robust solutions, which are optimally adjusted to the local framework conditions. According to a study compiled by the Austrian Council⁵³, with its high-tech strategy in the emerging markets, "Europe is in no way simply met with open arms, but actually more and more comes up against domestic competition". Such "good enough" products, that is, technology solutions at a significantly lower price level with sufficiently good quality, define the concept of frugal innovations.

Experts believe European companies cannot only position themselves in emerging economies with frugal products, but rather can possibly also apply them well with the changing framework conditions in industrial countries. These assumptions are derived from trends such as demographic shifts, rising costs for medical care and the eroding middle class in European countries. At the same time global environmental policy pressure and with it also the economic pressure to shape innovation and production processes resource-friendly and energy-efficient are also increasing.

On this basis increasing market orientation, understanding of local requirements and adjustment to new and sustainable forms of innovation are what are required instead of the actual adverse increasing complexity and performance of products that continues. Frugal innovations open up a new forward-looking perspective here. Insufficient resources and capital should not be understood here as innovation-inhibiting, but rather far more as drivers for demand-driven and therefore marketable technological solutions. Key technologies such as digitization, biotechnology or nanotechnology can contribute here to radical new solutions (products and services) being developed for global societal challenges, which at the same time are also affordable and ensure pioneer benefits for the respective companies on unsaturated growth markets. For said reasons, the assumption that tackling the relevance of frugal innovations for Austria would make an impor-

51 With a research rate of 3.09 % in 2016 Austria was number two in the EU comparison, behind Sweden, and ahead of Germany, Finland and Denmark. In the OECD comparison Austria is ranked number 4 (OECD Main Science and Technology Indicators).

52 Cf. Tiwari & Herstatt (2014).

53 Cf. Ax et al. (2015: 20).

tant contribution to the further development and implementation of successful innovation strategies in Austrian companies in the context of global competition appears plausible.

Despite this detectable interest by companies and other players, to date there has been no systematic examination of the potential importance and relevance of frugal innovations for Austria. The existing need for action is illustrated by the fact that both the European Commission and Germany have already commissioned and funded similar studies.

Recommendations

The Austrian Council recommends measures to create awareness by informing about frugal innovations with:

- Information events for companies and industry associations in particular (disseminators)
- Setting up competence centres on the topic of frugal innovation
- Coordinating activities and providing an online overview of existing offers
- Analysis of positive and negative examples and best practices

The Austrian Council recommends **capacity building in the area of frugal innovation** in particular with:

- Training courses for frugal product and business model development
- Advise on frugal product and business model development (with external experts, among others)

Even if there already are similar offers⁵⁴, the Austrian Council recommends significantly intensifying the **cooperation with emerging economies**, in particular by:

- Learning about lead markets for frugal innovations by integrating economic development agencies, among other activities

- Financial and institutional promotion of cooperations with international partners (companies/research institutions, among others)

The Austrian Council recommends **establishing frugal innovations in innovation policy** by:

- Reinforcing the innovation concept: “From technology to innovation strategy”
- Establishing frugal innovations in research and teaching
- Establishing the state as promoter and demander of frugal products and services
- Scrutinising existing standards with regard to specific application areas

The Austrian Council also recommends:

- Specifying the requirement for information and training with industry associations and their members
- Sector-specific examinations of the relevance of frugal innovations with extensive surveys
- Increasing the relevance of frugal innovations in the service area
- Detailed determination of customer acceptance of frugal innovations

Background

The advancing globalisation has not only resulted in a spatial shift of the innovation centres, but rather also effectuated a qualitative change in innovation processes. Emerging economies such China, India and those in Africa are establishing themselves as new lead markets. Their rapid economic growth favours the formation of a middle class, which not only sparks growth and innovation stimuli in comparable markets in other developing countries, but rather is increasingly doing the same at global level. The phenomena of frugal innovations therefore emerged on this basis. Frugal innovations are at-

recommendations

⁵⁴ For this, see the economic partnerships of the Austrian Development Agency: <https://www.entwicklung.at/akteure/unternehmen/wirtschaftspartnerschaften/>

recommendations

tractive products and services for certain customer target groups, which concentrate on core functionalities and are especially affordable. We also talk about affordable excellence in this context.

Frugal innovations, which primarily target an improvement in the living conditions of people in emerging and developing countries, also have positive sustainability effects, by enabling customers with small budgets to have access to high quality products and services, and often with ecological benefits too.

Since frugal innovations ideally minimise the use of materials and financial resources across the entire value creation chain, they significantly reduce usage and/or ownership costs. At the same time they also meet specified quality standards to optimise the functionality and service life of products. It is increasingly reported that

frugal innovations are also in demand in industrial countries.

With regard to the relevance of the topic for Austria, research at TU Hamburg found that there was actually tangible increasing interest in this topic in the economy, science and society areas. However, to date very little has been done. This shows an explicit need for action in this area.

The increased relevance of this topic is rather obvious: Companies from emerging economies increase their commitment in Austria and other EU states (Germany, for example), from where they could supply price-sensitive Austrian customers. For this reason the development of innovative frugal solutions and consequently the ability to offer such products is also a beneficial and necessary part of an innovation strategy.

On the use of RTD National Foundation funds for 2019 and the Austria Fund's funding for 2018 – Recommendation of 13 September 2018

Preamble

Based on the Foundation Council's decision of 12 June 2018 with respect to awarding funds for 2018, on 18 June 2018 the Austrian Council was invited in accordance with § 11 para. 1 item 1 of the RTD National Foundation Act to issue a recommendation on the use of the Austria Fund's funding for 2018 and the National Foundation's for 2019. This was to be made on the basis of the applications submitted. According to the current estimate for awarding funds from the Austria Fund and the RTD National Fund for 2018/2019 on the whole some EUR 140 million are available (of this EUR 33.7 from the Austria Fund).

The total sum applied for in 2018/2019 is EUR 315,110,000.

The basis for the decision on awarding funds are the strategic importance and socio-political relevance of the projects submitted and their classi-

fication in the overall context of Austrian research funding.

RTD National Fund

The Austrian Council also defined the following priorities for awarding funds from the RTD National Foundation for 2019 in descending priority:

1. Reinforcing the research infrastructure with initiatives with appropriate critical variables and risk potential
2. Coordination and harmonisation of regional and federal RTI activities
3. Activities that have a broader innovation focus (open innovation, social innovations)
4. Reinforcing of the national human potential basis
5. Reinforcing competitive funding in basic and applied research
6. Risk capital reinforcement

Austria Fund

In accordance with § 3 paragraph 2 of the RTD National Foundation Act the funds from the Austria Fund for 2018 are used for funding in the area of basic research and for funding applied research and the development of technology and innovation.

The specific priorities according to the explanatory comments on the Tax Reform Act 2015/2016 (Article 13) here are:

- Funding young talent researchers in basic research
- Increased knowledge transfer
- Cooperation between science and business

- Increased Industry 4.0
- Increased Life Sciences
- Industrial technologies (from the areas of productivity, mobility, energy, ICT, Industry 4.0)
- Promoting young talent
- Promoting frontrunner companies

Recommendation

On this basis the Austria Council issues the following recommendation on awarding the EUR 106.3 million to be expected from the National Fund for 2019 and the EUR 33.7 from the Austria Fund for 2018.

recommendations

Recipient	Programme	Applied for (millions)	Recommended (millions)
National Foundation for Science, Technology and Development 2019			
FFG	Ideen Lab 4.0	6.00	2.00
FFG	F&E Infrastrukturförderung	25.00	0.00
FFG	Innovationswerkstätten	3.30	2.00
FFG	BRIDGE	15.00	10.00
FFG	Impact Innovation	10.00	3.00
FFG	China Austria Cooperation Research Initiative	3.50	0.00
FFG	Complexity Science	5.00	5.00
FFG	Digitalisierung der Arbeitswelt	2.00	0.00
FFG	Early Stage	10.00	6.00
FFG/FWF	Quantenforschung und Quantentechnologie	11.50	5.00
FWF	doc.funds Programm	10.00	7.00
FWF	Forschungsgruppen	20.00	10.00
FWF	Matching Funds Initiative	8.36	5.00
FWF	SFB und DKs	25.00	12.00
aws/FFG	Ausbau des Global Incubator Networks (GIN)	6.00	4.00
aws	Venture Capital Initiative (VCI)	21.40	3.00
aws	aws Digital Innovation Initiative (aws DI2)	7.00	3.00
aws	Digital World	5.00	0.00
CDG	CDL Digitalisierung	9.76	9.00
CDG	CDL Krebs	5.82	2.00
LBG	Clinic2Research	7.00	4.00
LBG	Co-Creating Careers	5.00	4.00
LBG	Transforming Health Systems	7.00	6.00
ÖAW	APART-GSK	11.00	4.00
Austria Fund 2018			
FFG	Frontrunner	15.00	9.00
FFG	Forschungspartnerschaften – Industrienahe Dissertationen	3.00	3.00
FFG	Laura Bassi Centres 4.0 – Frauen gestalten die Digitalisierung	7.00	2.00
aws	Impulsprogramm für den Wissens- und Technologietransfer in die Wirtschaft	18.00	6.00
aws	Industrie 4.0	10.00	5.00
aws	aws IÖB Toolbox	6.05	2.00
FWF/ÖAW	Young Independent Researcher Groups	10.00	4.00
CDG	CDL Life Sciences	6.42	3.00
Total		315.11	140.00

Distribution of funds 2018/2019

recommendations

Reason

National Foundation for Research, Technology and Development 2018

● Ideas Lab 4.0

This is an innovative cross-industry/sector approach focussing on digitization. Innovative selection procedures, not found in the current funding landscape, will enable entry into the system for new target groups and funding recipients. The Austrian Council therefore recommends the project be funded with EUR 2 million.

● R&D infrastructure funding

As already determined by the Austrian Council, the funding of research infrastructures in Austria with the existing funding mechanisms is only conditionally possible, especially when it is about setting up research infrastructures of critical dimensions. The current project does actually address this lacuna. Based on the funding volumes in it the Austrian Council believes the applied for budget of EUR 25 million is only conditionally adequate to leverage appropriate infrastructures. This would require far greater amounts, which would go far beyond the scope of any funding from the Foundation or the Fund.

However, as suitable research infrastructures are indisputably a key requirement for good science and research and systematic failure is rooted herein, the Austrian Council recommends long-term appropriate funding be ensured for the research infrastructure area. This could be provided on the current basis of the framework of the Research Funding Act. Certain criteria can be included for the implementation, such as the cooperation of several institutions, for example. A further option is to provide an appropriate amount for the infrastructure area from the consecutive budget of the National Foundation.

● Innovation workshops

The programme offers funding recipients access to top quality technology for pilot applications and prototypes, while the require-

ment in the community is specified as high. The idea of the critical mass and coordination of lab offers is well implemented in the new tender. The Austrian Council therefore recommends funding of more than EUR 2 million.

● BRIDGE

Bridge is a long-established programme. The cooperation between science and economy is an attractive option. An allocation of funding as high as possible to the tune of EUR 10 million is recommended according to the resources available.

● Impact Innovation

This is a relatively new format, which was well received in the pilot phase. User integration is still under-developed with many companies, a system failure, which is afforded too little consideration. The continuation after the pilot phase appears to be basically beneficial, however the absorption capacity and the administrative implementation are also rated in the applied for amount as too ambitious. Experiences with a reduced approval amount of EUR 3 million should be evaluated.

● China Austria Cooperation Research Initiative

The very specific preferential treatment of the cooperations with China does not appear to be highly prioritised in the context of National Foundation funds. Furthermore, the funding conditions and obstacles for Chinese participants are only conditionally gathered from the application, as the illustrated topical areas are not consistent. It also remains unclear whether or not more business development or promotion of scientific cooperation is ultimately addressed here. The risks of the uneven partnership are not examined either. In view of the required prioritisation this application is therefore not recommended for funding.

● Complexity Science

The Complexity Science area has established itself rapidly in recent years and addresses

important current issues with new solution methods. These must be funded in the interests of continuous development work and establishing of previous measures in the full scope of EUR 5 million.

- **digitization of the working world**

The issue of digitization is an all-encompassing one, however the applied for funding only covers a sub-area here. As a subcritical and narrowband programme could emerge, the funding was declined.

- **Early Stage**

Early stage funding is an important mechanism. The applied for amount is, however, determined as far too high for the current target group. The Austrian Council therefore recommends the project be funded with EUR 6 million.

- **Quantum research and quantum technology**

Austria already has a good international reputation in the field of quantum technology. The programme will in particular serve the preparation for the EU FET Flagship 2018. This requires the building up of human resources in the area of quantum physics in Austria, which will be boosted by this programme. The planned close cooperation with FFG and FWF as part of the initiative must be positively emphasised here. The Austrian Council recommends the measures be funded with EUR 5 million, whereby EUR 1 million must be provided for the FWF and EUR 4 million for the FFG.

- **doc.funds**

The doc.funds programme promotes an expansion of excellent running doctoral programmes and therefore supports top quality training programmes oriented on the highest possible international standards. With the funding by the National Foundation and the Austria Fund 2019 amounting to EUR 7 million, some 30 to 40 further highly qualified scientists can participate in a highly competitive environment within the scope of structured doctoral programmes.

- **Research Groups**

This programme format provides an excellent basis for smaller, young scientific teams to address research topics in a highly competitive environment, and offers a basis for high-risk research aspects with high potential. With funding amounting to EUR 10 million it is possible to select 6 to 8 research groups per year in competitive processes and fund accordingly over a period of up to five years.

- **FWF Matching Funds Initiative**

With the FWF Matching Funds Initiative, since 2013 the National Foundation has been promoting an extremely successful concept that contributes sustainably to the coordination and quality assurance of missions and priorities set at state level. The Austrian Council recommends the Foundation provide EUR 5 million.

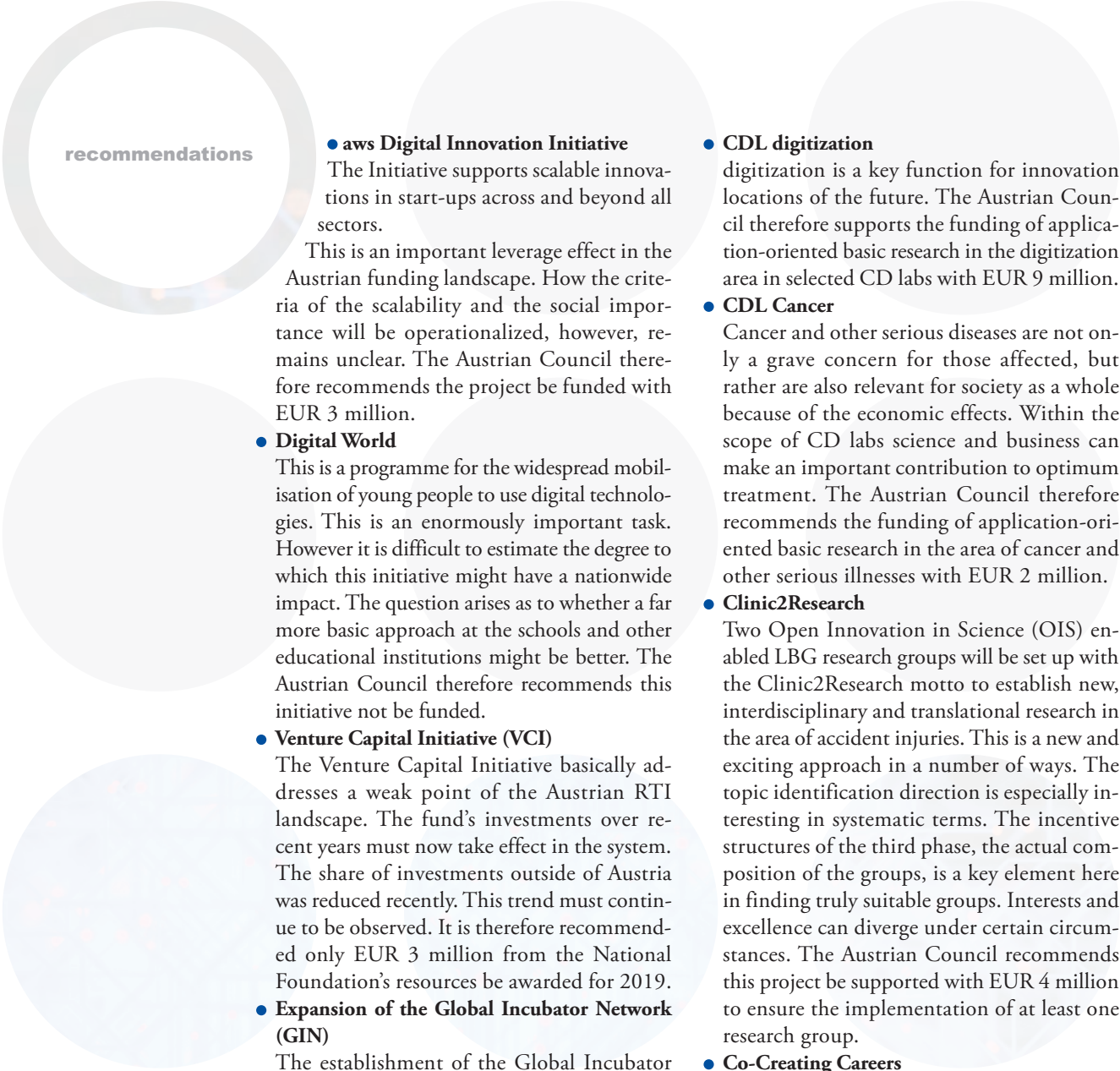
- **FWF Special Research Area and Doctoral Colleges**

The special research areas (German abbreviation: "SFB") are a superb funding concept with very high quality and maximum requirement for research and teaching. SFB financing is an essential factor of top-quality interdisciplinary research in Austria.

The PhD programme (German abbreviation: "DK") received a very positive evaluation in 2014 with a view to its value for training highly qualified scientists. Although the PhD courses are among the core tasks of the universities, the additional and complementary financing of the structured PhD programme by the FWF seems essential for the universities until further notice.

SFB represents medium-sized scientific consortia at the highest quality level. In combination with the doctoral colleges they present optimum complementary excellence funding. The special research areas and doctoral colleges can continue their work with funding of EUR 12 million from the Foundation.

recommendations



recommendations

● **aws Digital Innovation Initiative**

The Initiative supports scalable innovations in start-ups across and beyond all sectors.

This is an important leverage effect in the Austrian funding landscape. How the criteria of the scalability and the social importance will be operationalized, however, remains unclear. The Austrian Council therefore recommends the project be funded with EUR 3 million.

● **Digital World**

This is a programme for the widespread mobilisation of young people to use digital technologies. This is an enormously important task. However it is difficult to estimate the degree to which this initiative might have a nationwide impact. The question arises as to whether a far more basic approach at the schools and other educational institutions might be better. The Austrian Council therefore recommends this initiative not be funded.

● **Venture Capital Initiative (VCI)**

The Venture Capital Initiative basically addresses a weak point of the Austrian RTI landscape. The fund's investments over recent years must now take effect in the system. The share of investments outside of Austria was reduced recently. This trend must continue to be observed. It is therefore recommended only EUR 3 million from the National Foundation's resources be awarded for 2019.

● **Expansion of the Global Incubator Network (GIN)**

The establishment of the Global Incubator Network (GIN) was recommended for funding during the special tranche of the National Foundation 2015. Before this concept is further expanded the Austrian Council believes the sustainability of the initiative's effect should first be observed. Appropriate verification has now been provided. The Austrian Council therefore recommends this initiative be funded with EUR 4 million from the National Foundation's financial resources.

● **CDL digitization**

digitization is a key function for innovation locations of the future. The Austrian Council therefore supports the funding of application-oriented basic research in the digitization area in selected CD labs with EUR 9 million.

● **CDL Cancer**

Cancer and other serious diseases are not only a grave concern for those affected, but rather are also relevant for society as a whole because of the economic effects. Within the scope of CD labs science and business can make an important contribution to optimum treatment. The Austrian Council therefore recommends the funding of application-oriented basic research in the area of cancer and other serious illnesses with EUR 2 million.

● **Clinic2Research**

Two Open Innovation in Science (OIS) enabled LBG research groups will be set up with the Clinic2Research motto to establish new, interdisciplinary and translational research in the area of accident injuries. This is a new and exciting approach in a number of ways. The topic identification direction is especially interesting in systematic terms. The incentive structures of the third phase, the actual composition of the groups, is a key element here in finding truly suitable groups. Interests and excellence can diverge under certain circumstances. The Austrian Council recommends this project be supported with EUR 4 million to ensure the implementation of at least one research group.

● **Co-Creating Careers**

Wide-ranging career consulting and soft skills teaching for young scientists are a key factor for building scientific competence and for solidifying such in Austria. The current project provides for important measures here. However it is still unclear how much LBG will succeed in generating system-wide acceptance and demand, in order to establish itself as a centre of excellence for this kind of consulting. In any case it is a welcome ap-

proach, which the Austrian Council recommends be funded with EUR 4 million.

- **Transforming Health Systems**

To strengthen the research infrastructure and contribute to achieving a required critical dimension in the area of e-health research in Austria, LBG sets up a research platform in the area of e-health, quality assurance of healthcare services and patient safety. The project will make an important contribution to the digitization of the Austrian healthcare system. The Austrian Council therefore recommends it be funded with EUR 6 million.

- **APART-GSK**

Basically post-doc funding in the GSK area is an approach worth pursuing. However, the Austrian Council believes the possibility exists of also funding individual people in other ongoing funding programmes with tenders with no thematic restrictions. It is therefore recommended the project be funded with EUR 4 million.

Austria Fund 2019

- **Frontrunner**

The long-term maintenance of research departments for big companies in Austria is considered beneficial and important as part of a sustainable location policy. Funding is therefore expedient and in view of the different measures in the programme should be set at EUR 9 million.

- **Research Partnerships**

The programme is a response to the Austrian Council recommendation formulated in the Strategy 2020 to set up a dissertation programme, to then strengthen the structured cooperation between industry and science, and funding with EUR 3 million is therefore recommended.

- **Laura Bassi Centres 4.0 – women shaping digitalisation**

The Laura Bassi Centres are a good complementary programme for further developing expertise in Austria. Similar programmes for

promoting the work of women, excellence and cooperation with companies are available in sub-areas with FWF and FFG, at the least. The Austrian Council therefore recommends funding with EUR 2 million, whereby EUR 1.7 million will be provided from the Austria Fund and EUR 0.3 million from the RTD National Foundation.

- **Impulse programme for knowledge transfer**

This modularly set up new project is based on the experiences of the previous implementation of the “Knowledge Transfer Centres and IPR Utilisation” programme and the findings of the interim evaluation. The goal is to further strengthen the strategic cooperation of universities, non-university research institutions and companies and in particular to address the STEM area as an important basis for technology transfer, as well as qualified specialists. In the interests of sustainable use of existing structures, the Austrian Council therefore recommends funding the “Impulse” programme, and in particular modules A and C, with EUR 6 million.

- **Industry 4.0**

The diffusion of digital technologies determines the sustainability of industry. A system failure can also be seen in Austria, and not in the innovation development phase alone. The Austrian Council therefore recommends the programme be funded with EUR 5 million.

- **aws IÖB Toolbox**

The programme essentially fills a lacuna and is well suited for the Government’s procurement strategy. The demand subsidy, however, appears somewhat random. The introduction of a percentage share with the highest possible limit would be more expedient here. A key element is certainly the actual support and the learning structure of procuring organisations. Module 1 should, however, be reduced. Participation in procurement processes is an immanent activity of SMEs. The Austrian Council therefore recommends this

recommendations

recommendations

measure be funded with EUR 2 million.

- **CDL Life Sciences**

The CD labs are a proven mechanism in promoting the cooperation between science and business and for promoting knowledge transfer, and especially in the life sciences area. The Austrian Council therefore recommends the application for funding CD labs in life sciences be awarded EUR 3 million.

- **Young Independent Researcher Groups (Zukunftskollegs – colleges of the future)**

The Young Independent Researcher Groups project is an excellent cooperation between the Austrian Academy of Sciences (ÖAW) and the Austrian Science Fund (FWF). The focus, to promote especially interdisciplinary projects of excellent young talented scientists (post-docs), is funded by the National Foundation/Austria Fund with a total of EUR 4 million in a highly competitive environment.

Recommendation on funding the research infrastructure and shaping sustainable funding certainty — Recommendation of 15 November 2018

Recommendation

The Austrian Council recommends

- the financing of the procurement and expansion of modern, top quality research infrastructures for basic research and application-oriented research be anchored in the implementation of the new Research Funding Act. Funds of EUR 1 billion must be reserved for this over a period of ten years.
- The budgeted billion must be awarded over two pillars. On one hand within the scope of an annual tender process – similar to the tried and tested funding programme for research infrastructure implemented via the National Foundation and the FFG – and on the other hand a part of the funds will be provided for long-term planned and to be planned extensive research infrastructures.

The funding will firstly enable investments in setting up and operating excellent research infrastructures in universities, non-university re-

search institutions and in companies from a lower limit of EUR 500,000. And secondly investments will therefore also be provided in national and international scientific infrastructures with Austrian participation and therefore increase the international visibility of research location Austria.

The funds awarded in competition according to transparent, quality-oriented guidelines will in particular include cooperation – both between research institutions (universities and non-university institutions) and research institutions and companies.

A strategic planning and national overall strategy for major research infrastructure projects forms the framework in many countries for structured modernisation and the expansion of research infrastructures, as well as their sustainable secured financing plan⁵⁵. In Austria the research infrastructure action plan 2014–2020⁵⁶

⁵⁵ See national roadmaps and strategy documents: <http://www.esfri.eu/national-roadmaps>.

⁵⁶ Austrian research infrastructure action plan 2014–2020, compiled by the RTI Task Force Work Group 4, Research Infrastructure.

specifies measures at national and European level (ESFRI)⁵⁷ for the areas of basic research and application-oriented research. A transparently rolling further development of the research infrastructure action plan in terms of a roadmap process and with the inclusion of significant research organisations could provide a basis for research policy decisions for long-term planned and extensive research infrastructures.

- **Motivation**

Investments in research, science and innovation are essential for a country's future-oriented social and economic development. A competitive research infrastructure is an indispensable cornerstone here, which contributes to securing the attractiveness of science, research and business location Austria.

A modern research infrastructure is, however, not only indispensable for the international competitiveness of research in Austria, but rather also increases the attractiveness of research centres for renowned scientists. It is also essential for training scientific young talent. This fundamental importance of research and research infrastructure was in particular taken into account by the policy-makers in the Austrian Government's Research, Technology and Innovation Strategy, in various studies and recommendations, and regularly in the government programmes, most recently and expressly in the 2017–2022 government programme.

In its recommendations the Austrian Council also emphasises the importance of the research infrastructure in securing the science and research location. With the recommendation to award funds of the RTD National Foundation, in 2015 (special tranche) the

Austrian Council initiated a programme for the R&D infrastructure funding and with the 2017 recommendation enabled a second tender. In the recommendation to award funds of the RTD National Foundation for 2019 and the Austria Fund for 2018, due to the restricted financial options within the scope of the Foundation, the Austrian Council emphasises the need to provide long-term secured funding for the research infrastructure area.

The topical priorities of the government programme in the area of innovation and digitization with regard to the "Overall strategy with an agreement on research, technology and innovation as well as optimisation of the governance structure" were included in the "Future initiative for research, technology and innovation" presentation to the Cabinet on 16 August 2018. This also specifies that a research funding act on the basis of the core elements therein must be drafted and presented to the Cabinet at the RTI Summit in spring 2019.

The Austrian Council expressly supports the option of long-term plannability connected with this for research institutions and research funding bodies, which can be guaranteed by concluding multiannual agreements.

Based on the key importance of a modern research infrastructure, in addition to the named core elements, the Austrian Council recommends also including the financing of long-term funding of the research infrastructure as a further key element in the Research Funding Act, and therewith enabling and supporting long-term planning.

recommendations

⁵⁷ European Strategy Forum on Research Infrastructures.

Appendix

Scope of research infrastructure spending

To date the funding sources for research infrastructure in Austria have always been varied. The total amount of investments in research infrastructure⁵⁸ of all players in Austria most comprehensively approaches Statistik Austria's "Expenditure for systems and equipment" indicator. Approximately EUR 582 million were quoted for this in 2015. A large part of this is invested in the corporate sector (EUR 399.6 million), of this approximately EUR 38.4 million in the cooperative area. The third level education sector invested EUR 149.6 million, of which EUR 113.4 million went to universities (hospitals not included). A smaller share goes to the public sector (EUR 25 million; rural hospitals not included) and the private non-profit sector (EUR 2.3 million). If we add the cooperative area⁵⁹ and assume that non-profit research institutions are funded 90

percent from the public sector, in 2015 the research infrastructure was supported with approximately EUR 194 million⁶⁰ of public sector funds.

For the situation in the Austrian financing landscape and the investments in research infrastructures an analysis⁶¹ was performed in 2015 as commissioned by the RTI Task Force Work Group 4, Research Infrastructure. This shows how, excluding the corporate sector, more than 90 percent of all investments in research infrastructure are funded by the public sector. The core financing of the universities, with performance agreements, higher level education infrastructure funds⁶² and programmes (initiative funds) for funding research infrastructure⁶³, is the most important funding source here. Up to 30 percent of the investment costs are financed by third party funds – largely from public sector sources (FFG, FWF, EU).

⁵⁸ Expenditure and financing for R&D, expenditure for systems and equipment; STATcube – Statistik Austria's statistics database.

⁵⁹ AIT, JR and the competence centres among others are mapped in the cooperative area.

⁶⁰ The assumption that approximately 90 percent of the research infrastructures of the non-profit and public sector research institutions are financed with public sector funds is used for the calculation. See, Research infrastructure funding: RTI policy controlling and promotion in the national and international context. Heller-Schuh, B., Kasztler, A., and Leitner, K. H. Austrian Institute of Technology (2015).

⁶¹ Ibid.

⁶² Up to PA period 2016–2018.

⁶³ University infrastructure I–III; Research infrastructure IV; Modernisation of equipment at universities (the tenders of the listed programmes took place between 2002 and 2012).

Statements 2018

Statement on regulations for the implementation of capacity-oriented, student-relevant university financing (UniFinV) – Statement of 22 June 2018

Position of the Austrian Council

The Austrian Council expressly supports the introduction of capacity-oriented study-related university funding. With the coming into force of these regulations on the implementation of university funding, a first if still small step towards performance-oriented funding of the universities is enabled.

The universities are provided approximately EUR 11 billion for the 2019–2021 performance agreement period. With the beefing up by approximately EUR 1.3 billion already decided on in June 2017, measures to improve the supervision ratio and study quality in particular will now be implemented. Despite the increase in the number of professors targeted here, the plan is already behind the supervision ratio at universities in Switzerland or Germany. The beefing up of staff levels is also linked with increased requirements for infrastructure and facilities, which by far over-stresses the budgetary flexibility of the universities.

The Austrian Council sees an option for operating study place management with the mechanism of study place funding. However, the framework conditions of study law would have to be urgently adjusted accordingly for this, and the autonomy of the universities with regard to selecting their students would have to be expanded. Should there also be real successes in the study place funding here, measures, which both increase the commitment of students to their university and the university to its students, would be urgently required.

Financing teaching

With this model of study place financing, in the future 96 percent of the budget for teaching and 2 percent each for the competition indicators 1a and 1b will be awarded via the basic indicator 1 for “examination-active” attended study courses (“correctly run bachelor, master and doctoral studies”). The share “awarded in competition” for teaching over all universities therefore equals approximately EUR 38.2 million⁶⁴ or, on the example of indicator 1a, approximately EUR 500 per graduate.

The Austrian Council sees more room to manoeuvre with these regulations within the scope of the competition-oriented indicators, whereby the legal framework would be provided up to 20 percent for this. The flexibility to extend the scope of competition-oriented indicators after examining the effects must therefore be a given. Further and/or other performance-oriented indicators must be considered, so output-oriented funding can be optimised.

Financing research

The same applies for the research financing pillar, which is calculated at approximately 91 percent via basic indicator 2 (“Staff in selected uses according to subject groups in FTEs per calendar year”). Added to this is a share of eight percent, which is awarded via competition indicator 2a, and a share of one percent, which is awarded via indicator 2a.⁶⁵

Via indicator 2a from 2019 approximately EUR 80 million can therefore be awarded competi-

⁶⁴ Source: Untergliederungsanalyse UG 31 – Wissenschaft und Forschung, BVA-E 2018 und 2019.

⁶⁵ Note: For “artistic” universities a share of 0.1 percent was specified for the competition indicator 2a; for the competition indicator 2b a share of 0.005 percent.

statements

tion-oriented, whereby only revenue that has been gained from the EU, the FWF, the FFG and from the Jubilee Fund of the Austrian National Bank (ÖNB), is considered for the distribution of the funds provided for this. An increase in the currently awarded in competition share and an extension with regard to the output indicators to be used for this would also have to be considered in the future.

Removing efficiency barriers

As already outlined in the Austrian Council's statement on capacity-oriented study-related university funding⁶⁶, with the budget provided for the coming performance agreement period the precarious financing situation at the universities would actually be mitigated somewhat. Competitive basic research funding, as already recommended several times and recently called

for once again with the funding of an excellence programme, is of course still lacking as an important element of effective research funding. A performance and capacity-oriented study access model should also be rolled out further and, as also already addressed above, the applicable study law should be revised, to enable the universities to offer quality in teaching and demand the appropriate performance from the students.

The necessary increase in competitive research funding is also referred to here once again. The deficit in competitive funding of basic research compared with the leading research nations is too big for a country in which high-tech and top rate research guarantee economic success, and increasingly acts as an impediment to the performance and international comparability of scientific research in Austria.

Statement on drafting the technical colleges development and funding plan 2018/19 – 2022/23 – Statement of 21 December 2018

Position of the Austrian Council

The further development of the technical colleges sector, both the quantitative expansion and the extension of the offered study portfolio, is an essential control element for a cross-organisation design of the entire higher education area. The Austrian Council believes the overriding goal lies in shaping a differentiated education system with clear training profiles for third level education providers for the social requirements and needs of the economy.

The goals mapped in the technical colleges development and funding plan run in the right di-

rection here, whereby mechanisms and measures should be applied with far more enthusiasm.

(i) Quantitative expansion

The Austrian Council emphasises the goal of increasing the amount of students at technical colleges in the medium term to 30 to 40 percent of the entire higher education area. This drafting of the technical colleges development and funding plan 2018/19 – 2022/23 nonetheless stipulates an expansion in the places for

⁶⁶ Statement on the draft of a federal law, with which the University Act 2002 – UA will be amended (capacity-oriented, student-relevant university financing). Austrian Council, 14 Sept. 2017.



first-year students, which remains far behind the expected dynamic and the Austrian Council's recommendation^{67/68}. With the increase by 1,450 first-year student study places by 2022/23 (300 study places per annum on average), it is still behind the quantitative increases of recent years (more than 400 study places per annum).

The prospects of restructuring the higher education area and shaping the expansion of the technical college study places with capacity-oriented access and study place management at the universities are therewith delayed further. The urgent requirement for graduates and specialists for the economy will therefore not be sufficiently covered.

(ii) Portfolio development

The portfolio development worked out and proposed as part of the "Zukunft Hochschule" (future university) project has been largely accepted into the development plan.

Quantitative expansion plans and targets, which should be controlled in the coming period by management at the technical colleges would be a welcome addition for the five cited development fields (STEM and digitization, applied health sciences, applied economics, translation and interpretation, and thematic combination studies such as economics/law, health/law, engineering/management), which, however, are not included in the development plan.

(iii) Structural developments

The structural developments included in the development plan are entirely welcome.

The socio-demographic structure at technical colleges has developed very positively, in partic-

ular on the basis of the offering of extra-occupational and occupation-enabling study courses. The targeted further expansion in occupation-enabling studies, which can be combined with actual occupation and supervision responsibilities must therefore be enthusiastically supported (currently 35 percent of technical college study courses are organised as extra-occupational and 18 percent are mixed⁶⁹).

Further focus points such as "Dual study courses" can in particular be beneficially expanded in meeting regional labour market requirements. Also positive here are the illustrated measures, which the development plan provides for in the areas of "Gender and diversity", "Permeability", "Cooperations", "Internationalisation", "Mobility" and "LLL strategy". The specification of quantitative measurable targets and target horizons, which are to be achieved in the coming period, on the other hand is missing with the formulation of priorities.

The Austrian council suggests applying the development plan for technical colleges more intensively, whereby firstly a factual evaluation of the set priorities would be enabled and secondly positive incentives could be created, which would motivate a positive development with regard to goal achievement.

Also not illustrated in the technical colleges development and funding plan is a human resources development strategy, which goes beyond any improved possibility for promotion via closer cooperations between the technical colleges and the universities – in the form of "cooperative promotion". With growth in the technical college sector an increase in the staff levels at technical colleges must also be target-

67 Austrian Council: Recommendation for the further development of the technical colleges sector in the Austrian education and science system. Vienna, May 2017.

68 Austrian Science Council: Technical colleges in the Austrian higher education system, analyses, perspectives, recommendation. Vienna, May 2012.

69 Student Social Survey 2015.



statements

ed. A higher share in permanent staff is recommended, which is also a requirement for high-quality supervision of students and the expansion of applied research at technical colleges.

(iv) Financing

The funding rates per student and study year covered according to the standard costs model on the basis of the study place management were last increased in the 2016/17 study year and according to this draft remain at the same level for 2018 to 2023. Due to the annually increasing operating costs, the Austrian Council believes an indexing of the standard costs must be integrated, at least where a threshold value of the consumer price index of 10 percent is crossed.

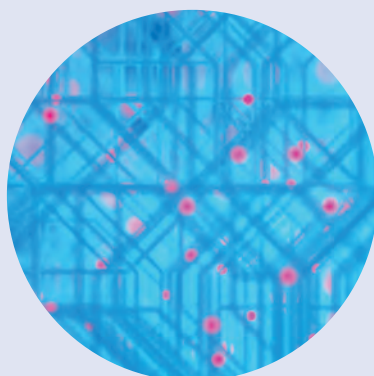
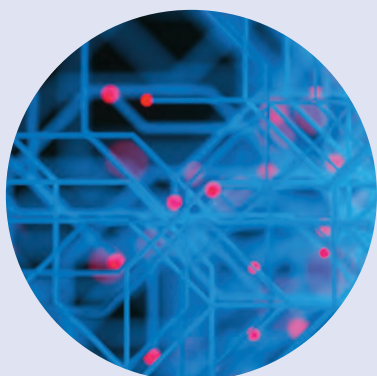
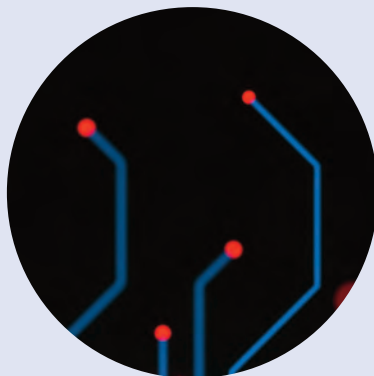
(v) Application-related research and development at technical colleges

Application-related research and development is a requirement for accrediting technical college study courses against the background of offering graduates the ability to tackle both the educational goals and applied research issues.

This draft of the technical colleges development and funding plan actually lists the competitive R&D funding programmes provided by the Government to fund research, but the further development of the technical colleges and their importance as an essential connector for knowledge transfer between companies and the universities is not taken into account. Planning for the further development of the competitive funding mechanisms for technical colleges is not addressed herein.

The Austrian Council suggests focusing on the funding recommendations cited in its recommendation for the further development of the technical colleges sector⁷⁰. The funding programmes have been analysed on the basis of the available data and the expert discussions held on the number and quality of the submitted applications in the COIN set-up, COIN networks and Josef Ressel Centres funding mechanisms. The recommended remuneration of the funding mechanisms is oriented on a needs-based strengthening of the research expertise at the technical colleges, in order to boost them in their assignment as research partners and in their role in knowledge transfer.

⁷⁰ Austrian Council: Recommendation for the further development of the technical colleges sector in the Austrian education and science system. Vienna, May 2017, p. 15–16.



Work areas, reports and studies 2018

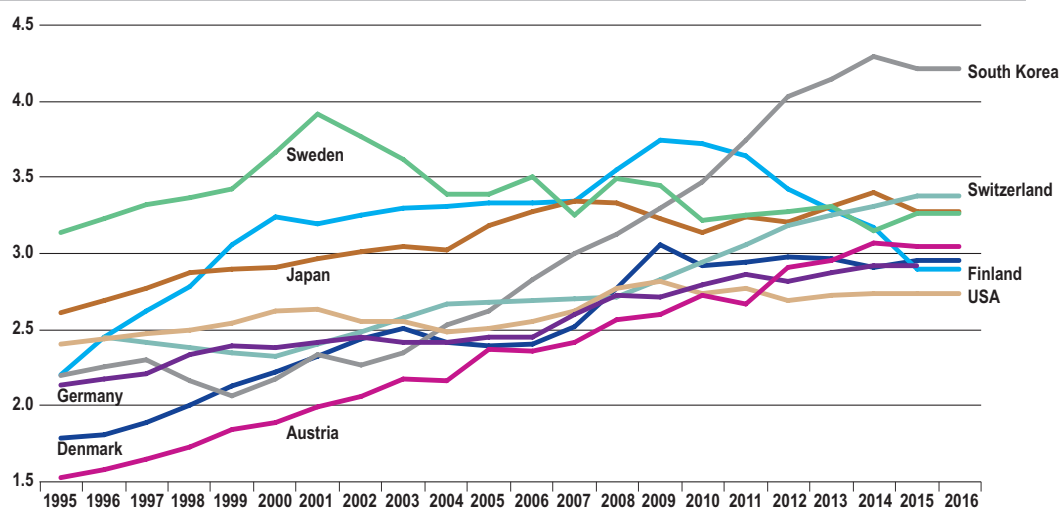
Report on Austria's Scientific and Technological Capability 2018

Priorities 2018: Innovation efficiency

The Austrian Government's RTI Strategy was adopted on 8 March 2011 by the Cabinet and had the goal of making Austria join the group of innovation leaders. The 2020 time horizon set here will soon be upon us. The Cabinet commissioned the Austrian Council to continuously monitor the goal achievement here, the results of which are presented to the National Council annually as part of the Report on Austria's Scientific and Technological Capability. The Report on Austria's Scientific and Technological Capability 2018 primarily focuses on

the discrepancy between innovation input and output and analyses the efficiency of Austrian innovation activities compared to the leading countries in detail. The Report concludes that inefficient structures hinder Austrian innovation performance and the goal of becoming an innovation leader therefore cannot be achieved. The Report was presented to the general public in Vienna at the Haus der Musik on 5 June by Council Chairman Hannes Androsch, Managing Director Ludovit Garzik and Project Manager Johannes Gadner.

Figure 5: R&D rates of selected countries, 1995-2016



Source: OECD-MSTI, WIFO calculations; missing values have been supplemented with average values or the average annual growth rate.

Key results

Innovation efficiency: Higher input dynamic than output dynamic

- With an R&D rate of 3.15 percent Austria is number two in the EU behind Sweden.

In its RTI Strategy the Austrian Government set itself the goal of increasing the research rate by 2020 in order to join the European leaders. This goal and the European target value of an R&D rate of three percent were already achieved in 2014. Over the years Austria has therefore continuously worked its way up into the top league in an impressive catch-up process. With a research rate of 3.15 percent for 2016 (the most recent year with EU comparative data),⁷¹ in the EU Austria is in second place behind Sweden, by more than one percentage point higher than the EU 28 average (two per-

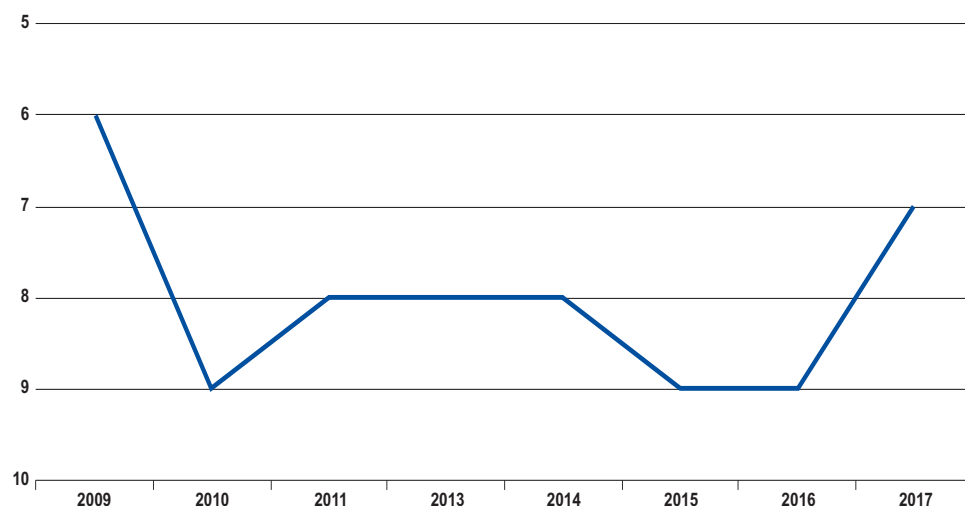
cent), and worldwide among the five best-placed countries. Only Israel and South Korea with an R&D quota of approximately 4.2 percent, Japan (4 percent) and Sweden (3.3 percent) are ahead of Austria.

- In the EIS Austria is therefore at exactly the same position it had when the RTI Strategy was being worked out.

This is in contrast to Austria's positions on the European Innovation Scoreboard (EIS), on which the RTI Strategy and its overriding objective are oriented. According to the EIS, Austria is currently ranked number 7 in the EU (or 9 when non-EU members such as Switzerland and Iceland are also included), and therefore recently once again took the lead in the "Strong

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Figure 6: Austria's position in the European Innovation Scoreboard (EIS), 2009–2017



Source, European Innovation Scoreboard, 2009–2017. The EIS was renamed from EIS (t-1) to EIS (t) in 2013, so that 2012 (= 2013) is now missing.

⁷¹ According to Statistik Austria's global estimate, the R&D quota in 2018 will rise to 3.19 percent.

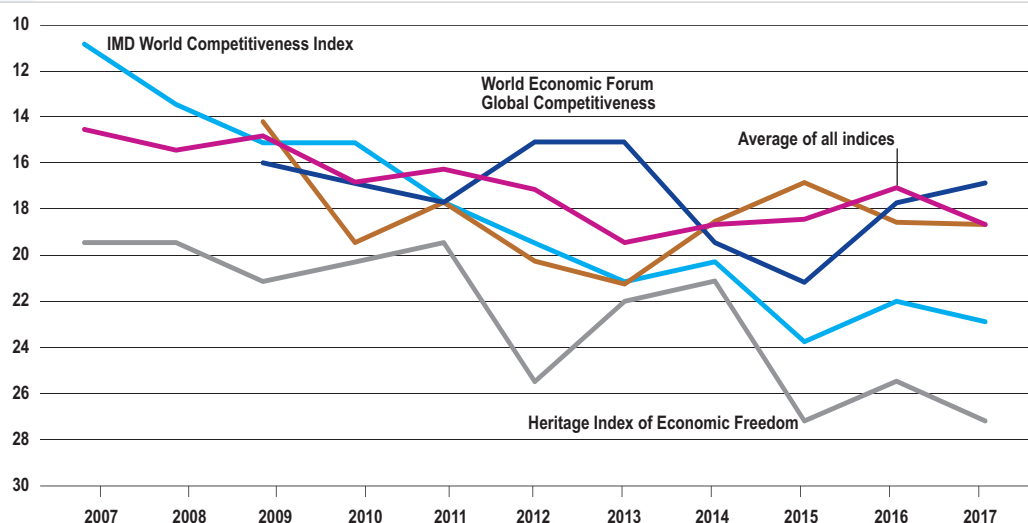
innovators” group. With its return to the head of the chasing pack, Austria is however at exactly the same position it was ranked at nine years ago when the RTI Strategy was being worked out. In these nine years it evidently has not succeeded in getting closer to its strategic objective of securing places to move up into the group of leading innovation nations, as planned in the RTI Strategy. The gap to the innovation leaders today, following years of decline or stagnation, is once again at the same level it was at in 2009.

- *Austria's position in international rankings is stagnant or regressing.*

The EIS is only one prominent example among many here. If we consider the most important international rankings for innovation performance, competitiveness and so on over the course

of recent years, on the whole we can see a stagnating or even backward trend. Even if individual rankings, such as the Global Competitiveness Report 2017–2018 of the World Economic Forum or the EIS 2017, recently again showed an upward trend, on the whole the trend is indeed going clearly downward. At best Austria is mostly in the forward midfield, so it is not in a lead position in the area of R&D expenditures. These findings are also confirmed in the annual Monitoring Report of the Austrian Economic Chamber, which summarizes Austria's performance in more than 150 international rankings. Across and beyond all analyses and indicators it shows a clearly negative trend in recent years. Regardless of the respective survey methods and indicators used, on the whole these rankings only show, “... average, for a high-income country with low rankings and

Figure 7: Austria's position in selected international rankings



Source: IMD, World Competitiveness Yearbook 2017; Heritage Foundation, Index of Economic Freedom 2017; INSEAD, Global Innovation Index 2017; WEF, Global Competitiveness Report 2017–2018; own research.

deterioration in many places.”⁷² The lead places on the other hand are mostly occupied by the innovation leaders, which are also chosen as reference countries for this report.

- *Conclusion Inefficiencies block Austrian innovation performance*

If we compare the relatively high financial inputs to the outputs or outcomes generated from it, which is moderate compared to the leading innovation nations, it quickly becomes clear that inefficiencies block the performance of the Austrian RTI system. Obviously there has only been an insufficient conversion in Austria of the high input into corresponding scientific and technological output or into marketable innovations and business success resulting from them.

Efficiency barriers in the education, university, start-up and research area

- *Education area*

In the education area the problem of education inheritance, the high social selectivity and the insufficient expansion of all-day education in particular are serious efficiency and performance barriers. At the same time significantly poorer performances are yielded compared to the leading innovation nations. On the whole this contributes to the input-output ratio in the education system having significant improvement potential, which could be exploited with structural reforms.

- *Universities and basic research*

In the universities and basic research area, in addition to the insufficient funding situation relative to the leading countries, problems in the area of governance at the universities and uncontrolled student flows in particular present an obstacle to increased performance. The imbalance connected with student access to universities and technical colleges in particular ob-

structs improved performance. Added to this, the low awarding of funds in competition compared to the leading countries for basic research is in particular one of the major efficiency barriers of the Austrian RTI system.

- *Innovative start-ups*

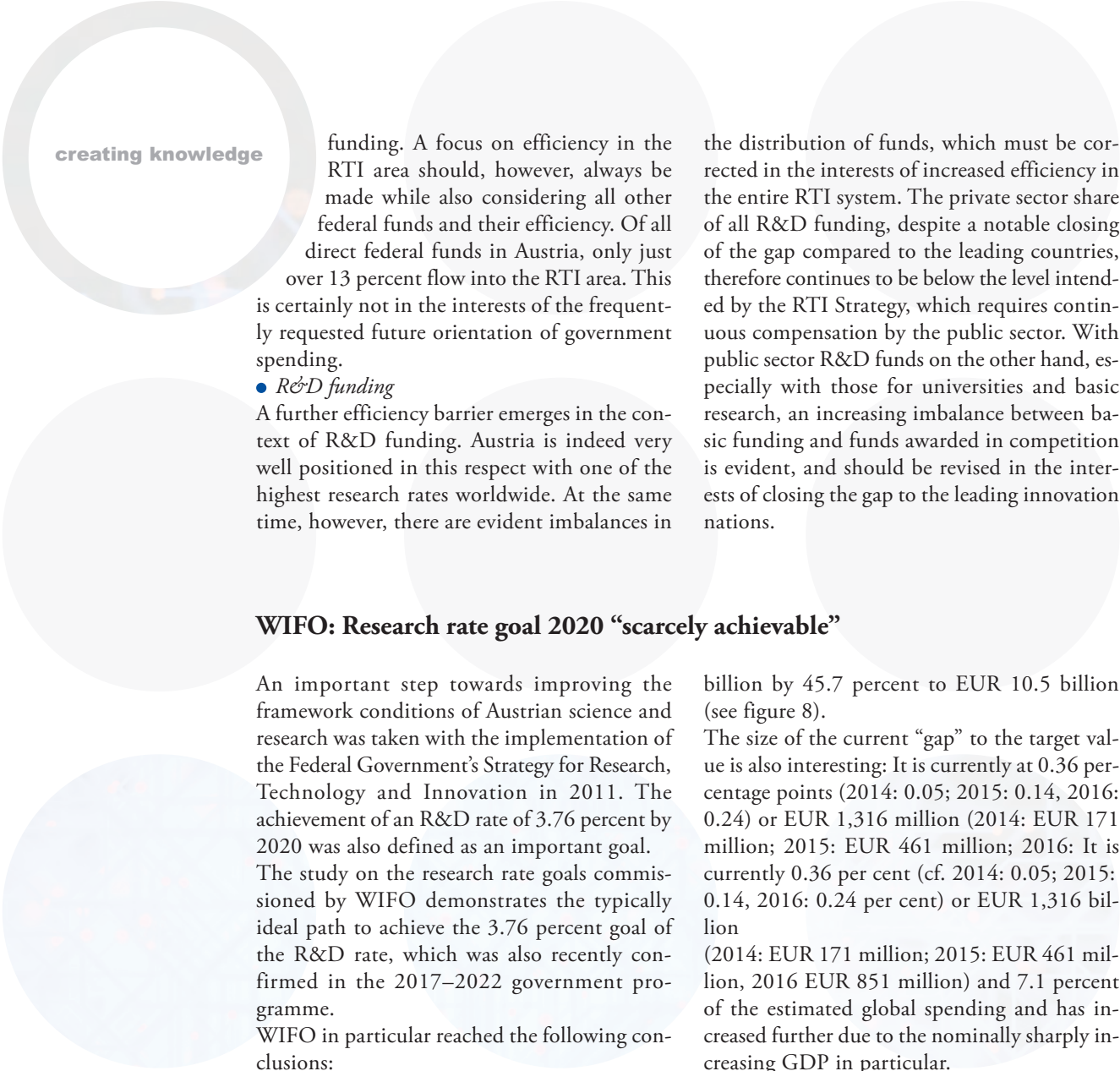
In the area of innovative start-ups, the adverse bureaucratic, regulatory and taxation framework conditions and the insufficient availability of private financing through risk capital or crowdfunding can in particular be identified as key efficiency barriers. Along with the familiar and serious problems of the Austrian capital market, costs and the times it takes to set up a limited company and its legal structure must in particular be emphasized here. Despite some improvements in recent years, the lack of funding options and insufficient start-up regulations in Austria effectively continue to create detrimental framework conditions for start-ups and the growth of young companies.

- *Research funding*

An extremely complex system of how federal government funding flows from the ministries via the agencies down to the individual research institutes has established itself in the area of research funding. It exhibits signs of over-regulation, fragmentation, unclear responsibilities and is characterised by a complicated, non-harmonised set of rules for individual mechanisms, which together generate high friction losses and obstruct an efficient distribution of resources for research funding. However, due to the restrictive data situation in Austria, there is a lack of information on how the efficiency of the entire research funding system can be improved, and in particular also the interaction between the mechanisms of sharply increased tax incentives for research funding and direct research

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72 Tichy, G. (2017): Mangelnde Effizienz als Erfolgsbremse. In: WIFO-Monatsberichte, 2017, 90(9), pp. 677–699, pp. 690.



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funding. A focus on efficiency in the RTI area should, however, always be made while also considering all other federal funds and their efficiency. Of all direct federal funds in Austria, only just over 13 percent flow into the RTI area. This is certainly not in the interests of the frequently requested future orientation of government spending.

● *R&D funding*

A further efficiency barrier emerges in the context of R&D funding. Austria is indeed very well positioned in this respect with one of the highest research rates worldwide. At the same time, however, there are evident imbalances in

the distribution of funds, which must be corrected in the interests of increased efficiency in the entire RTI system. The private sector share of all R&D funding, despite a notable closing of the gap compared to the leading countries, therefore continues to be below the level intended by the RTI Strategy, which requires continuous compensation by the public sector. With public sector R&D funds on the other hand, especially with those for universities and basic research, an increasing imbalance between basic funding and funds awarded in competition is evident, and should be revised in the interests of closing the gap to the leading innovation nations.

WIFO: Research rate goal 2020 “scarcely achievable”

An important step towards improving the framework conditions of Austrian science and research was taken with the implementation of the Federal Government’s Strategy for Research, Technology and Innovation in 2011. The achievement of an R&D rate of 3.76 percent by 2020 was also defined as an important goal.

The study on the research rate goals commissioned by WIFO demonstrates the typically ideal path to achieve the 3.76 percent goal of the R&D rate, which was also recently confirmed in the 2017–2022 government programme.

WIFO in particular reached the following conclusions:

Based on the current value of 3.06 percent, an increase in R&D expenditures by 38.5 percent from the current EUR 11.3 billion to EUR 15.7 billion in 2020 is required to achieve the 3.76 percent target. With a steady closing of the gap to the public sector target share of one third (currently 36.6 percent), the public sector financing of the spending would have to increase from the current EUR 4.1 billion by 26.1 percent to EUR 5.2 billion; private from EUR 7.2

billion by 45.7 percent to EUR 10.5 billion (see figure 8).

The size of the current “gap” to the target value is also interesting: It is currently at 0.36 percentage points (2014: 0.05; 2015: 0.14, 2016: 0.24) or EUR 1,316 million (2014: EUR 171 million; 2015: EUR 461 million; 2016: It is currently 0.36 per cent (cf. 2014: 0.05; 2015: 0.14, 2016: 0.24 per cent) or EUR 1,316 billion

(2014: EUR 171 million; 2015: EUR 461 million, 2016 EUR 851 million) and 7.1 percent of the estimated global spending and has increased further due to the nominally sharply increasing GDP in particular.

In an optimistic scenario and a pessimistic scenario with current trends continuing as they are, WIFO calculates the probable size of the R&D rate in 2020 (while including the usual confidence intervals and uncertainty factors).

In the optimistic variant the R&D rate in 2020 achieves a value of 3.29 percent, and is therefore 0.47 percentage points below the target value, but higher, for example, than in Germany or Denmark at the moment.

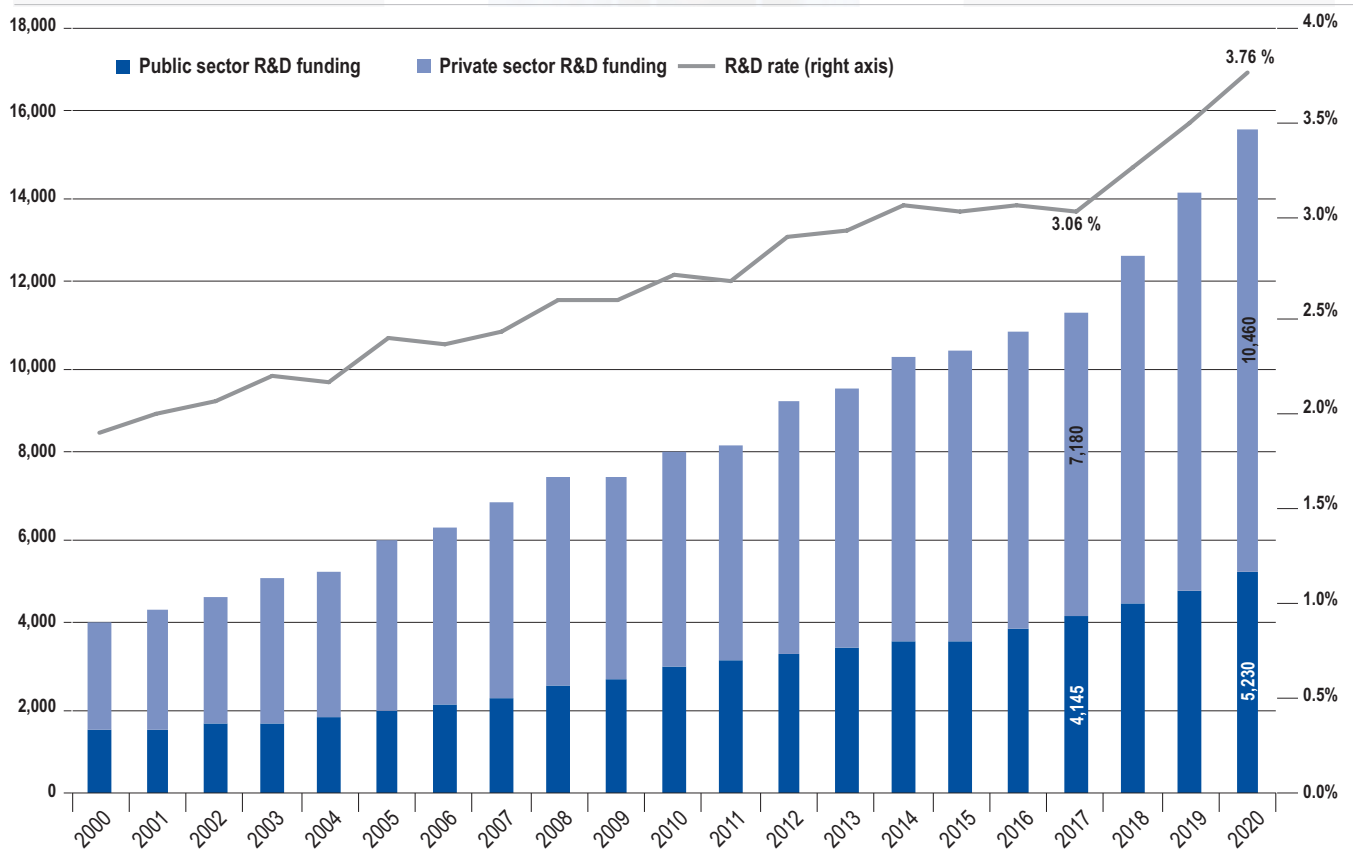
In the pessimistic variant the calculations produce a value of 2.98 percent, whereby it falls below the 2017 starting level.

Austria's dynamic catch-up process with regard to its R&D intensity from 1995 to 2007 has consequently flattened out noticeably in the years since the economic crisis began in 2008. On the whole, the prospect of achieving the R&D rate goal of 3.76 percent in 2020 com-

pared to the previous year's study has fallen further, especially on the basis of the nominally sharply increasing GDP. With the given framework conditions it appears highly unlikely the goal will be achieved, even if the calculations provided are interpreted with caution and are based on assumptions about the further development of the economy and RTI activities.

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Figure 8: Financing path to achieve the R&D rate target of 3.76 percent in 2020 in EUR millions



Source: WIFO research rate targets 2020. The calculation is based on an R&D rate of 3.06 percent in 2017 assumed at the time of publication. According to Statistik Austria's global estimate of 19 April 2018 the rate was actually 3.16 percent.

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Competitiveness of knowledge-based institutions – study of the rate of the input-output ratio

The Austrian Council's study, "Competitive Capacity of Knowledge Driven Institutions", examines the input-output ratio at regional level. The project's initial observation is that the competitiveness of regions is critical for their future development if they want to succeed.

Generally speaking many national economies currently invest massively in their education and research systems. To acquire these investments the respective regional innovation system must transform knowledge into economic models. Products and services can then be devel-

oped, which generate macroeconomic effects and create a monetary equivalent, which can in turn be invested in new knowledge. After an investment in its knowledge system a region should be in a position to find the best interfaces at which innovation gaps can be closed. One of the main problems here is that the greatest part of the annually available human capital flows into risk-averse career models, which do not require any conversion of knowledge into innovation. The reasons for this development are rooted in the cultural framework of the respective ecosystem. The hypothesis is



therefore that the thinking of the respective (knowledge-based) institutions' management plays a major role in a region's competitiveness. The culture of entrepreneurship is passed on from top to bottom – or at least it should be. Management's thinking is therefore an important factor for these institutions' capacity to contribute to improving the regions' competitiveness.

Knowledge-based enterprises, and especially universities, are also increasingly under competitive pressure with regard to their surroundings and must further develop accordingly. On the basis of proven scientific models, the study analyses how universities correct the imbalance between supply and demand, whereby the focus is on the results in measurable economic regions. How certain universities define their market positioning and their unique selling

point, in order to create clear target markets for students and teachers, and the results they want to achieve for different target groups are of particular interest here. The question arises as to whether and to what degree the regional economy (in contrast to the global dimension) is part of the market positioning.

Universities are considered in the study as organisations with governance, management and executive structures. These areas are transformed into a model that enables an extensive analysis and evaluation of different case studies. Academic base units in particular and their structures, financial situation and culture are analysed for this. The focus point of the work here is on the examination of the orientation of knowledge-based companies with regard to regional competitiveness.

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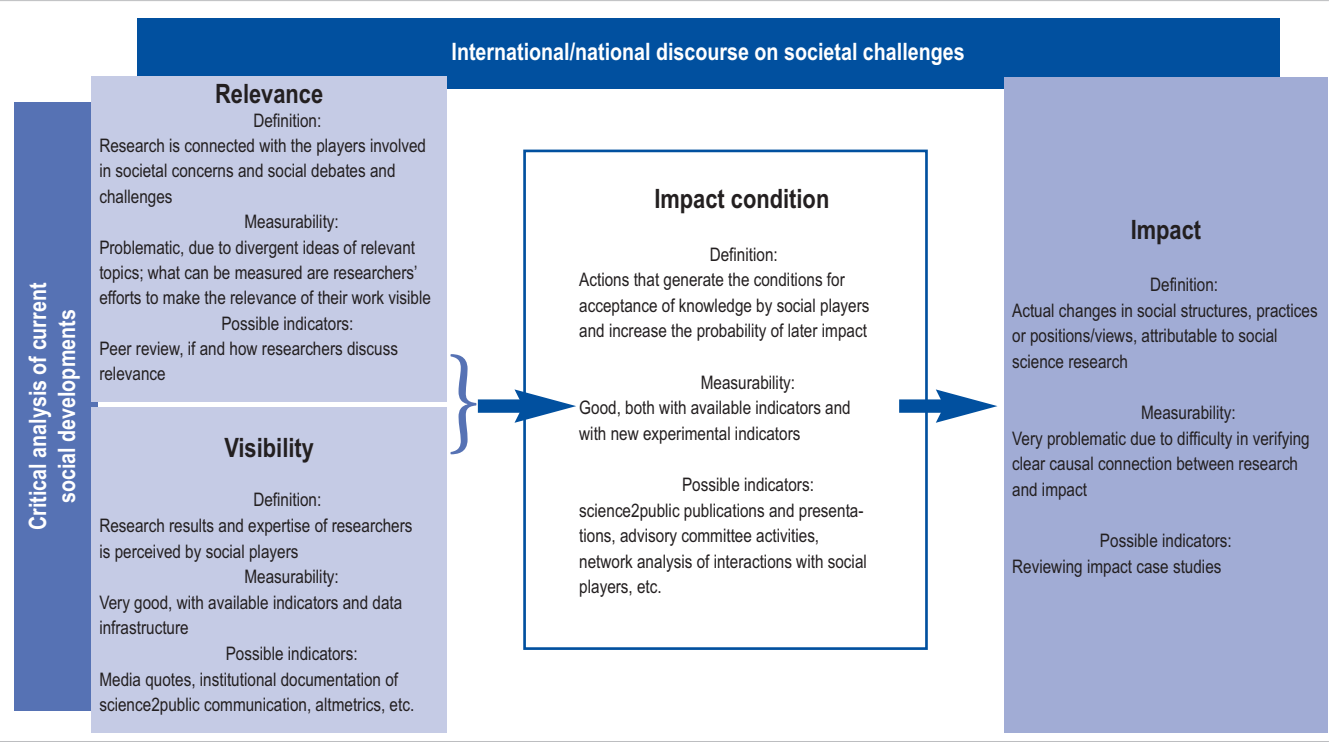
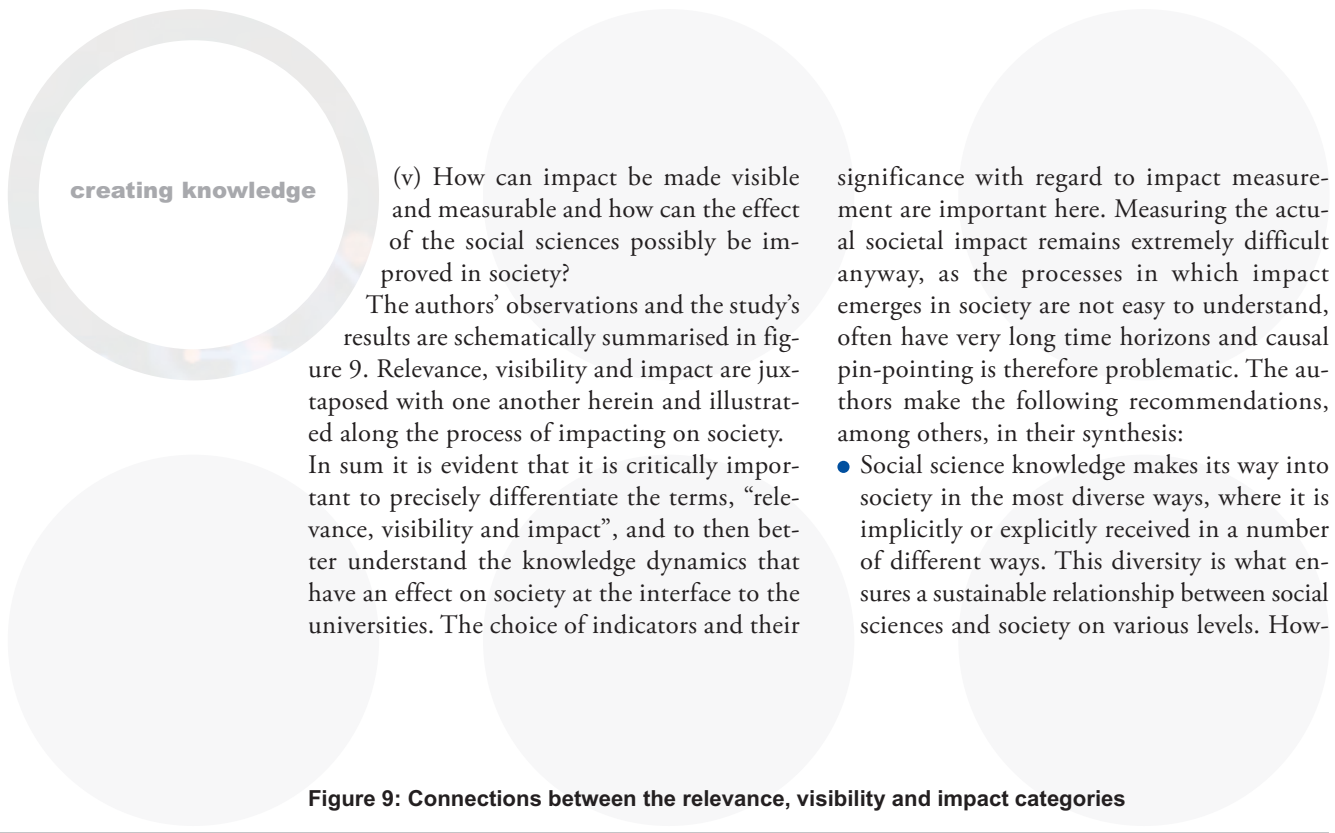
The societal impact of social science knowledge in Austria: Modes of action, measurement, potential

In recent years the question of the societal impact of science and innovation has become increasingly more relevant. The increase in the social relevance of research therefore also becomes an important topic in research and innovation policy. The visualisation of the impact of research on society is often seen as a condition for promoting social relevance. Numerous trials, appropriate indicators and representation methods must therefore be developed to be able to record and compare and therefore also illustrate the societal impact, if only along general lines at least.

From this development the social sciences have now also been recorded, this having been the case for science and technology fields for some time now. In an exploratory study Ulrike Felt and Maximilian Fochler from the University of Vienna considered three major social science disciplines – sociology, political science and communication science. This allows a broad

view of different forms of the impact on society. The authors also oriented themselves on the following questions:

- (i) What are the (possible) ways for social science knowledge to permeate society and how can the different forms of interaction between social sciences and social players/fields be described and categorised?
- (ii) What main forms of impact are described in the three disciplines and which changes in society are identified by social science knowledge?
- (iii) What expectations are implicitly and explicitly made by the general public/politicians/the media/natural sciences on the social sciences?
- (iv) What does social science knowledge mean for the social development in the region and what role do proximity to and distance from research institutions play to interact with social players?



Source: Felt, U. / Fochler, M. (2018), The societal impact of social science knowledge in Austria. Vienna.

ever, these different categories do not enjoy the same attention in today's institutional perception. While media presence, for example, is closely documented, other important activities such as collaborative-participative/ action-oriented research with stakeholders or contribution on socially relevant advisory boards are often omitted from the institutional perception.

- The societal impact of research is significantly more difficult to measure than scientific impact (although whether or not the indicators used are always beneficial and helpful is also discussed more and more here). There are a number of reasons for this, which apply for all sciences, problems with the time horizon between the generation of knowledge and social change, for example. Also aggravating with the social sciences is the fact that their knowledge is mostly not implemented in specific objects or technologies, but rather is picked up by social players as orientation knowledge. In most cases it therefore cannot be clearly proven when and to what degree knowledge or the interaction with a social scientist has resulted in a specific change in a specific area of society.
- Impact in the sense of actual changes in society, which are connected with social science knowledge cannot be broadly recorded and measured as part of existing indicator systems and processes. Documenting impact requires extensive additional surveys in each individual case, which entail considerable resource expenditure. Exhaustive measuring and documenting of impact is therefore not logically possible, but rather must always be limited to selected individual examples. However this also means that only a smaller part of the actual impact is documented.
- The prerequisites for impact are easier to ascertain and measure than the actual impact itself. Specifically the efforts of researchers to increase the visibility and societal relevance of their research are conditions for later possible impact.
- If we consider the currently available documentation systems, the greatest potential is in documentation of the creation of impact conditions.
- International experiences show that striking the right balance between narrative approaches and quantifiable indicators is important. National systems with longer-term experience in measuring societal impact in evaluation contexts in particular prefer a narrative illustration of impact and only use quantitative indicators as support for the narrative.
- The question as to what specific goal this should be done with, before designing and implementing a system for recording the societal impact of the social sciences, is critical here. It is about a new form of distribution of resources? Or is it about creating incentives for a more "mission-oriented" focus in social science research and participating more actively in working on social problem areas? Is it about the knowledge of social sciences flowing better into shaping society, as part of an evidence-based policy for example? Or is it about publicly justifying why social sciences receive funds and support?
- With the specific setting up of measurement and documentation systems it is important to first decide on the level of aggregation that the societal impact of research is to be measured on. In the international context, for example, measuring impact as part of evaluations is therefore applied almost exclusively at relatively high aggregated levels (departments, faculties).
- The diversity of scientific fields, both in the comparison with the natural sciences and within the social sciences, must be considered within the scope of the measurement and documentation of impact, because the paths on which impact happens and the societal effects of social science knowledge are very different in the different science areas.
- Generally speaking indicators for measuring societal impact require additional infrastruc-

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tures and resources, as it is not beneficial to redefine existing indicator systems for measuring the public presence of science as systems for measuring impact.

- An important limiting factor for doing social science research, which explicitly targets the creation of impact, are the scarcely available options for funding appropriate research projects in Austria.
- Finally it must be said that one of the greatest sources of potential for the increase in the societal impact of the social sciences lies with

the institutions, and the universities in particular. The study results reveal that researchers often feel considerable ambivalence with regard to the institutional appreciation of impact-relevant activities, which can result in these activities being somewhat minimised. That universities therefore also recognise the performances in the area of creating impact possibilities accordingly would be an essential requirement for further increasing the efforts of researchers to impact on society through their knowledge and expertise.⁷³

Diverse excellence: Case studies of excellent universities

The term “excellence” has grown massively in importance in recent years in the research policy discussion. A study commissioned by the Austrian Council and carried out by the Institute for Higher Studies (IHS) therefore discussed the term “excellence” for the first time in its different regional and language significance and its unfocused use in dealing with higher education policy issues. On the basis of a systematic literature review, the authors Lorenz Lassnigg, Martin Unger, David Binder, Berta Terzieva and Bianca Thaler compared the term starting with the basic dimensions of “functional topics” (teaching, research and third mission), “socio-political topics” (access, equality, justice), “factual technical topics” (quality management, governance) and “globalisation and objectification”. Pioneering directions were also pinpointed, which have significantly characterised the term “excellence” over recent

decades, and therefore have a significant influence on education and education policy. Examples here would be “Search for Excellence”, “New Public Management” or the importance of international “Rankings”.

Six universities were chosen for the case studies of excellent universities, which, on the basis of at least one special feature, can prove the diversity of excellence and can present interesting discussion topics for dealing with higher education policy in Austria:

- Arizona State University focussing on research excellence, diverse mass access and strong regional impact.
- The University of Edinburgh, a research university with a magnificent historical tradition, with its start-ups and technology transfer.
- Aalto University with its strong focus on innovations and entrepreneurship.

⁷³ The study commissioned by the Austrian Council is available in German and English: <https://www.rat-fte.at/publikationen.html#2018>

- The University of Copenhagen, which rose impressively in international rankings thanks to rigorous changes in the third level education system in Denmark.
- The University of Twente (Netherlands) with its clear focus on PhD training.
- The University of Duisburg-Essen, at which

heterogeneity is seen as an opportunity and diversity as a contribution to excellence.

The study commissioned by the Austrian Council was supplemented in a second edition in 2018 and is also available in an English version.⁷⁴

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Relevance and potential of frugal innovations for Austria

The “frugal innovations” topic has to date only been afforded little attention. The Austrian Council therefore commissioned a qualitative-exploratory study with the goal of examining the potential and relevance of frugal innovations for Austria. The Institute of Technology and Innovation Management at the Technical University of Hamburg subsequently provided first findings on the strategic imperative of frugal innovations for Austrian companies on the basis of a multi-method approach. The study shows how some Austrian companies have already developed frugal products and services for developing and emerging economies. Others on the other hand marketed frugal solutions on the domestic market, where there is a clear trend towards voluntary modesty and moderate lifestyles in certain parts of society. Many users, especially older people, feel overburdened by the (avoidable) hyper-complexity of technical solutions, while in other parts of society there is the desire to use simpler and more robust products. Products and services, which combine top quality performance focussing on core requirements with affordability, are increasingly more important in further guaranteeing a continuously high

standard of living. Furthermore, environmental concerns mean it is also necessary to reduce the global consumption of increasingly scarcer resources. Frugal innovations can therefore make a positive contribution to the United Nations’ “sustainable development policy goals”.

Austria has a competitive, knowledge-based and R&D-intensive economy, which actively operates international trade. Much of its exports currently go to other developed national economies in Europe, and to Germany in particular. It therefore appears advisable for Austria to also build a similarly strong market position in the unsaturated, rapidly growing markets of emerging economies such as China and India. A requirement for this are quality but nonetheless affordable products and services. To achieve this goal Austrian companies would have to perform a paradigm change from “technology of exclusivity” to “technology of inclusivity”. The benefits of top rate research in such different areas as digitization, biotechnology, nanotechnology and so on would have to be exploited in this respect, so that, in addition to the premium segment, companies would also create solutions for the frugal segment.

⁷⁴ The study is available at: <https://www.rat-fte.at/publikationen.html#2018>



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The study⁷⁵ concludes the result that innovation policy in Austria should be oriented more on the promotion of frugal innovation – from a purely technology-oriented approach to a more comprehensive and extended innovation approach, which includes innovations in marketing and design. Awareness of the opportunities, potential and risks of frugal innovations must therefore be increased and companies must be supported in building frugal innovation capacities. Furthermore, research and innovation collaborations with emerging economies, which on the

basis of their market size, their technological capacity and their access to open global innovation networks act as frontrunner markets for frugal innovations, should also be intensified. Finally, the existing regulatory standards and regulations should also undergo continuous checks to avoid over-regulation. If these requirements are met, it can be assumed that Austria can also further expand its global competitiveness in the future and at the same time make a positive contribution to the global, “sustainable development goals”.

Framework conditions for starting innovative companies in Austria

Due to their positive macroeconomic effects, start-ups make an essential contribution to the dynamic of national economies, by creating jobs, increasing international competitiveness and knowledge diffusion, for example. In the “Global Startup Ecosystem Ranking 2017”, however, in which internationally important start-up regions are compared, Austrian cities have so far made absolutely no appearance. Reasons for Austria’s low significance in the global start-up ecosystem can in particular be attributed to bureaucratic hindrances, the lack of funding options and cultural factors, such as the scarcely defined corporate culture and risk appetite among the Austrian population. With regard to the bureaucratic and financial aspects of the start-up process, numerous studies, the GEM Austria Report 2016 among others, therefore refer to the unfavourable framework conditions for starting an innovative company that still prevail in Austria. With regard to the time and costs required for a start-up in the in-

ternational comparison, the information varies depending on the data accessed. In the “Starting a Business” sub-index of the World Bank’s “Ease of Doing Business” index Austria is 111th among 190 nations. According to the index, starting a limited company in Austria takes 21 days, whereby the company founders must run through eight formal steps. In the group of OECD countries with high incomes by contrast, the average required is only about eight days and five formal steps (World Bank 2017). According to the “Small Business Act for Europe” published by the European Commission, a start-up in Austria takes eight days on average (compared with about three days in the EU-wide average) whereby eight procedures are required (EU average: five) and an average of EUR 244 in costs are incurred for these procedures (EU average: approximately EUR 360). The report also shows that with regard to the administrative framework conditions for start-ups, since 2008 Austria has not improved to any

⁷⁵ https://www.rat-fte.at/files/rat-fte-pdf/publikationen/2018/180913_Frugale%20Innovation_Endbericht.pdf

significant degree, despite numerous policy reform initiatives. The Global Innovation Index 2017 also emphasises the “Ease of Starting a Business” category in Austria as a particular weak point. This data indicates how Austria continues to lose its connection with other countries in the international context with regard to the administrative framework conditions for innovative start-ups.

The “Overview of the steps that are generally required in Austria to start a company” on page 32 illustrates the complexity and slowness connected with the formation of a new company in Austria. The more unusual and less easy it is to standardise the business purpose, as is the case with innovative, research-based companies, the more complicated and more difficult it is to predict the procedure.

To provide a deeper insight into the hindrances and obstacles, the Research Council commissioned SME Research Austria, with the inclusion of the legal expertise of RPCK | Rastegar Panchal, with an analysis of the respective framework conditions.

According to this analysis (URL) the three biggest hurdles in the start-up process are:

1. The generally legally obligatory involvement of a notary, the time and financial expense of which experts and company founders believe to be excessive.
2. The process to be entered in the commercial register.
3. Generally the inflexibility of the legal form of a limited liability company, especially with regard to the formation of share classes.

These obstacles are made additionally difficult depending on the business purpose by further regulations (trade regulations, for example), which necessitate interaction with various inter-

ested parties (chambers of commerce and so on).

To reduce the time required and the financial costs, but also to improve the comprehensibility of the processes and the perception of a start-up as a complicated process,

- the requirements of the mandatory notarial act and the notarial certification must be removed from company law or at least heavily restricted,
- the inspection obligations of the register court should be limited and (feasible) implementation periods should be provided for,
- clear, company-friendly deadlines should be defined, within which the court must perform the respective process, including more effective sanctions with non-compliance with the deadline, helpful formal instructions and sample applications should be published in advance as authoritative and English should also be provided with the commercial register and English-language information and instructions on the processes should be provided.

Finally, the fundamental consideration as to whether or not the commercial register is correctly in place at a court (commercial) is recommended, as the client orientation and the “service concept” must be front and centre with such a register. The underlying rethinking of the “sovereign authority” into a “service facility” is appropriate and required in the near-term in any case.

On the whole it would appear appropriate to accelerate, simplify and make the respective procedures generally more transparent. In the area of trade regulations a step has already been taken here in the right direction.

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Social business

It is now also undisputed that a series of societal challenges lie ahead of us, and meeting them is key to sustaining prosperity and the stability of our society. The increasing pressure created by the problems caused by demographic shifts, migration and the digital divide can no longer be absorbed by the state alone.

Social innovations that go beyond the scope of the traditional welfare state are therefore required to meet such challenges. Social companies or “social enterprises” play a very important role here. With their economically, socially, culturally and ecologically oriented business models, these offer innovative solution mechanisms for the societal challenges of our time. At the interface of economy and society they complement both social state measures and civic activities with the goal of providing stimuli for the positive development of society, environment and local communities.

Social enterprises share the following traits⁷⁶:

- Social or non-profit goal as the purpose and objective of the business activity.
- Profits are largely reinvested to achieve this social goal.
- Their organisational or ownership structures reflect this goal.

GEMSE

Based on the increasing importance of social enterprises for innovative social change, since 2014 the Austrian Council has been a member of the multi-stakeholder group for increased social entrepreneurship (German: GEMSE – Gemeinsam mehr Social Entrepreneurship),

which works to create appropriate framework conditions for social enterprises and social innovation. Other members of GEMSE include Arbeit Plus, Ashoka, aws, Impact Hub, IV, RPCK | Rastegar Panchaland and the Austrian Business Agency. The most recent additions are FFG, pi’nphi and SENA, the recently founded advocacy group for social entrepreneurs.

Social entrepreneurship in Austria

Social entrepreneurship is no short-term or temporary trend, but rather represents a new form of doing business and economic thinking, which will sustainably change our way of working in the future. Many European and non-European industrial nations have already picked up on this development, as has the European Union itself, and already presented its Social Business Initiative in 2011. Austria, however, is still lagging behind here, and developments that point in the right direction, such as the Social Business Call based at the aws, will probably not be continued, despite their success. Appropriate framework conditions and financing possibilities for social enterprises are also still lacking in the country.

Ten key points

From more than thirty organisations, ten key points for social enterprises and social innovation in Austria were therefore worked out in 2014. Quite a bit has since been achieved for social entrepreneurship – but much has still to be done. To drive the further development of this area forward these ten key points were revised in 2018 and published as part of a press conference. They are:

⁷⁶ “Initiative for social entrepreneurship”, European Commission (European Commission announcement of 25 October 2011).

1. Funding of incubation programmes and local infrastructure
2. Development and expansion of education (further education) measures
3. Creation of conditions for cross-sector collaborations
4. Ensuring sustainably financed funding structures, which are open to social enterprises and social innovations
5. Mobilisation of private capital through tax incentives
6. Provision of growth finance
7. Expansion of alternative forms of financing
8. In-depth implementation of the EU Social Business Initiative
9. Reforming of the taxation framework conditions for non-profit status
10. Use of room to manoeuvre with new procurement law

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Left to right:
Birgit Tauber FFG,
Günter Benischek
 Social Banking Erste Bank,
Johannes Puhr Fair Finance,
Walburga Fröhlich atempo,
Constanze Stockhammer
 Austrian Council,
Marlis Baurecht aws



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Mobilisation and use of risk capital as part of innovation and growth finance

In view of the importance of risk capital as one of the key bases for innovation-driven growth, the economic policy of the development of an active, self-supporting risk capital sector must be given the highest possible priority. This applies all the more, given that the expenditures for RTI funding have a significantly greater effect when the investments made with them are multiplied in their value creation with risk capital. Only then do the supported projects make it quickly to the market as innovative solutions. The body politic must therefore create the correct supply and demand-side framework conditions for innovation and risk financing and remove existing market obstacles.

Study objective

The Austrian Council commissioned WPZ Research under the guidance of Prof. Christian

Keuschnigg to perform an appropriate study to identify suitable framework conditions. The objective of the analysis is to determine how risk capital for innovation and growth finance mobilises and which mechanisms and framework conditions can support the use of risk capital in general and smart capital in Austria in particular. Starting with the question, “What economic importance does risk capital have in Austria compared to other countries?”, an insight will in particular be provided into the approaches, paths and initiatives of countries that are better equipped with risk capital, how supply and demand of smart capital can be better controlled in this country, and therewith growth processes supported and secured more effectively – according to the overriding innovation and economic policy goal of making Austria an innovation leader.

Austrian Startup Monitor

Background

Technology and knowledge-based start-ups are of key importance for economic growth, job security and structural change. Numerous RTI policy initiatives and measures were therefore implemented in recent years to promote the setting up to research, technology and knowledge-intensive companies with high growth potential (start-ups). The increase in the number and growth of research and knowledge-intensive start-ups were also formulated in the Government's RTI Strategy as an important goal. The establishment and development of start-ups is also supported with the provision of risk capital, specific services and funding by the public sector.

In RTI policy terms those young companies that have actual growth potential and can become

rapidly growing companies are especially interesting here. Even if there is information about the general start-up dynamic and the Austrian start-up ecosystem, to date there is nevertheless still a lack of systematic and reliable data on the start-up dynamic and development in the area of research and technology-intensive start-ups with growth potential.

Objective

Important empirical bases for the start-up, economic and RTI policy are provided with the Startup Monitor created by the Austrian Institute of Technology (AIT) in cooperation with Austrian Startups and the Institute for Entrepreneurship and Innovation at the University of Vienna. Con-

sidered as start-up companies here are those young companies that not only realise especially innovative business ideas, but rather also have the will and potential to internationalise and grow intensively.

The Austrian Startup Monitor records Austrian start-ups continuously and follows their development over the course of their existence. Regular data on the company development is also collected and prepared on the basis of different data

sources. Setting up a database connected with this also enables statements on the long-term development. The identified companies are also surveyed annually with selected questions. This then allows further-reaching analyses (sentiment indicators).

These two data sources (database and survey) form the basis for the regularly published report. The data is also an important source for further analyses for policies and basic research.

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“Additive manufacturing – a roadmap for Austria”

Background

Additive manufacturing, so technologies with which material is applied layer-by-layer and turned into three-dimensional objects (3D printing), is critically important for business location Austria, especially with a view to future developments. What is still missing for better leverage of existing potential, however, are the analysis of existing obstacles and an estimate of future possibilities for additive manufacturing at location Austria.

The Austrian Council therefore already commissioned an exploratory pre-study in 2016, which identified the numerous factors relevant for the future development of additive manufacturing (AM) and formulated theses on the interaction of these factors. In a second step it now appears beneficial to intensify this knowledge further in a follow-up project.

Objective

This confirmatory study once again commissioned with the IFI (Institute for Innovation

Management of Johannes Kepler University in Linz) has the goal of quantifying theses worked out in the preliminary stage with confirmatory research access for especially relevant areas of the Austrian economy. As part of a quantitative online survey of relevant players in the area of additive manufacturing in Austria the potential and risks for additive manufacturing will be identified for the 2025 time horizon.

The results of this quantitative analysis will then be interpreted on the basis of the qualitative results of the pre-study. In addition to the evaluation of the hypotheses, proposals for action on how the obstacles can be reduced and the potential of additive manufacturing in Austria optimally leveraged in the time horizon until 2025 are also derived for research, entrepreneurial practice and policy making. These theses can then serve as the basis for a follow-up policy brief with explicit recommendations to the body politic.

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HYVE Contest – the “Re:thinking Europe” companion project

As an addition to the “Re:thinking Europe” book project, the Austrian Council also initiated a companion process, designed to collect the most diverse views on realigning the European project and the future of the European Union in the broadest possible form. An online consultation format was developed for this with the German company HYVE in the form of a contest. The discussion with the community was oriented on the importance of the EU in an unclear, complex world with special focus on education, science and innovation in Europe. From the opinions and perspectives gathered via a web platform from the crowd, ideally additional inputs can be generated for future strategic planning in the

R&D area, whereby unconventional ideas in particular can be given to enter into the discussion.

The contest was freely accessible online following formal registration. To ensure enthusiastic participation material prizes in the form of tickets for the European Alpbach 2019 Forum, provided by AIT, and book prizes were awarded. The official contest start came with the book presentation of “Re:thinking Europe” at the beginning of September 2018 and ended in December 2018. A total of 68 ideas were submitted, whereby the majority came from Austria (37) and Germany (21). Further ideas and contributions can from participants in the USA (4), North Africa (3) and Asia (3).

Left to right:

Ludovit Garzik,
Hannes Androsch,
Helga Nowotny,
Johannes Gadner
all Austrian Council





International activities

Study trips to Delhi and Bengaluru / India – 27 January to 2 February 2018

India has been demonstrating impressive growth for some years now. No other national economy of its immense size can expand globally at a similar speed. With a forecast gross domestic product plus of approximately 7.4 percent for 2018, India is set to surpass China (with approximately 6.6 percent for 2018). The growth, however, assumes a relatively low starting value, where India's GDP in 2017 was approximately USD 2,600 billion, and China's by contrast was at USD 12,200 billion, so about five times as high. But with regard to growth dynamic, India takes the lead position in the group of emerging economies (BRICS = Brazil, Russia, India, China and South Africa). In 2018 the three other countries grew rather more moderately, with South Africa expected to show a plus of 1.5 percent, Russia 1.7 percent and Brazil 2.2 percent. India by contrast continues on a fast growth course. According to Indian Prime Minister Narendra Modi, his country's economic performance will increase to volume of USD five trillion by 2025, and therefore double.

On the Indian subcontinent worlds collide in the truest sense of the word. India is a multicultural and diverse economic region with fascinating differences between the individual federal states. A multilingual nation with 23 official languages and well in excess of 100 spoken languages. The rapidly growing Indian middle class is often cited in reports as the motor of the country's economic growth. This statement should, however, be considered in local dimensions, as in India the talk of this "income class" already starts with an availability of USD 10 per day. And of course intolerable poverty still prevails in large parts of the population.

The challenges for the future therefore remain immense. If the current trend continues, ap-

proximately 1.8 billion people will live in India by the end of the century. Even with favourable forecasts, an economic miracle will therefore realistically not happen, or perhaps only appear in sub-areas. The economic growth of more than eight percent required to create the necessary jobs probably cannot be achieved for the long term, despite all efforts under Prime Minister Modi.

The "Make in India" initiative will boost domestic production immensely. Cornerstones of the initiative here are the improvement and expansion of the infrastructure, reduction in bureaucracy and better power supply. Five industrial corridors will also connect the centres of Delhi, Mumbai, Calcutta, Bengaluru, Chennai and the east coast region, along which industry clusters and approximately 100 smart cities will emerge. The creation of millions of new industrial jobs is planned herewith, and in particular with the creation of "national manufacturing investment zones".

India has therefore developed into one of the top innovation destinations in Asia and now secured place number three among twenty-five innovation centres worldwide. This was in particular possible due to the enormous progress in technology start-ups over the last ten years. The market for this is estimated at USD 32 billion. More than 5,000 tech start-ups were already counted in 2017, of which more than 700 are "advanced tech start-ups" with the main focus on analytics, artificial intelligence and the Internet of Things. The most important start-up hubs are based in Bengaluru, Delhi and Mumbai.

To provide an insight into this fascinating economic region and the rapid developments in the tech sector, in cooperation with the Austrian Institute of Technology in January 2018 the Aus-

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Austrian Council organised a study trip to Delhi and Bengaluru under the guidance of Council Chairman, Hannes Androsch. The Austrian Embassy offered valuable local support with Ambassador Brigitte Öttinger and the “Außenwirtschafts-Center NewDelhi” team under the guidance of Oskar Andesner.

The study trip focussed on talks with representatives of research institutions and companies,

in particular from the areas of digitization, IT and computer sciences, as well as representatives from the National Cyber Security Council, the Council of Scientific & Industrial Research (CSIR), the Indian Institute of Technology (IIT), the Confederation of Indian Industry (CII), AVL India Pvt. Ltd., the Karnataka State Council of Science (KSCST), the Indian Institute of Science (IIS), TATA Consultancy Services (TCS) and NASSCOM – Warehouse and IBM Research India.

International councils meeting in Helsinki, Finland – 22 and 23 November 2018

The annual meeting of European research and innovation councils was held in 2018 at the invitation of the Finnish Council on 22 and 23 November in Helsinki. The central theme was the progressive digitization with its opportunities and challenges. The meeting was opened with a presentation by Anita Lehtikoinen, Permanent Secretary at the Ministry of Education and Culture, who spoke about current developments in Finland and the future of the work in progress. She was followed by Olli-Pekka Rissanen, Special Advisor at the Ministry of Finance, with his

presentation on ethical information policies in the age of artificial intelligence.

Also anticipated with great interest, as every year, were the brief reports of the various European Council formations. The Austrian Research Council in particular reported on current political developments, such as the pending process for a new RTI Strategy, the development of a research funding database, the planned Research Funding Act and the consolidation of the Austrian Councils for Science and Research planned for 2020.

First-hand information on current developments in US American science and research policy – USA trip and ARIT – 4 to 10 December 2018

First-hand information on current developments in US American science and research policy – USA trip and ARIT – 4 to 10 December 2018

US President Trump in office since January 2017 has also effectuated changes in the United States' science and research policies, the actual effects of which will probably only be discernible in their full scope in the long term. To inform itself at first-hand about current developments here the Austrian Council organised a delegation trip in conjunction with the paral-

lel visit by Federal Minister Faßmann to Washington D.C.

Among others, appointments with Christoph Aubrecht (from the European Space Agency at the World Bank and the United Nations), Robert Atkinson (founder and President of the Information Technology and Innovation Foundation – ITIF), José Arrieta (United States Department of Health and Human Services – HHS), Prachi Vakharia (founder of Womani-um.org), Marcia McNutt (President of the National Academies of Sciences – NAS) and Rush

D. Holt (CEO of the American Association for the Advancement of Science – AAAS) were held. During a joint lunch there was also an opportunity to exchange information with Dan Porterfield (CEO of the Aspen Institute) and Eric Waldo (Executive Director of Michelle Obama's Reach Higher Initiative). The Austrian Research and Innovation Talk

(ARIT) followed by the ASCINA Awards were then held on 8 December. This BMVIT and BMBFW event organised annually by the Office of Science and Technology Austria (OSTA) Washington offered plenty of opportunities to make and maintain contacts with Austrian scientists, researchers and innovators working in the USA, Canada and Mexico.

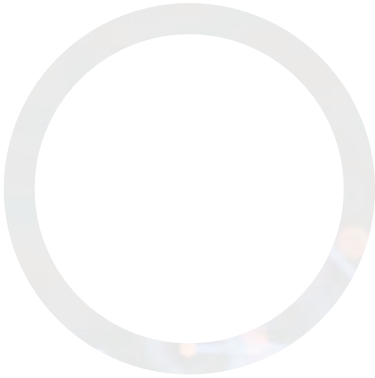
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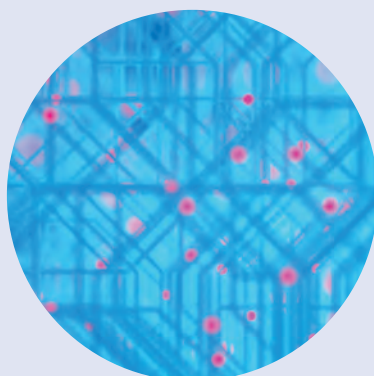
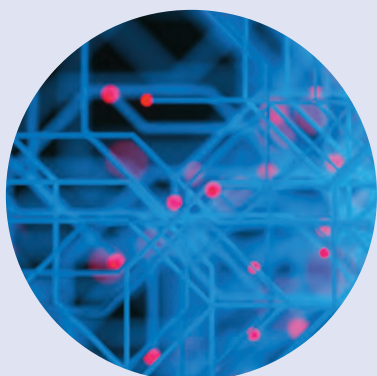
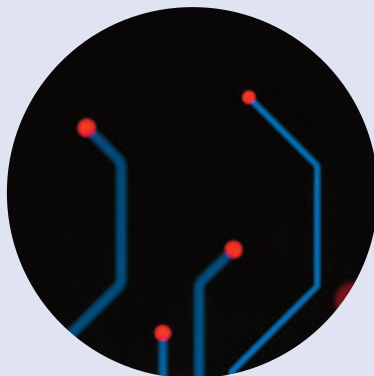


Left to right.:
Klement Tockner FWF,
Gerald Steiner
University of Krems,
Magdalena Klemun MIT,
Federal Minister Heinz
Faßmann BMBWF,
Sonja Schmid
Virginia Polytech Institute &
State University and
Hannelore Veit ORF



Enthusiastic
attendance
at ARIT







events

“Affordable Excellence”: Frugal innovations offering opportunities –

4 October 2018

As part of an event organised together with the ICEP (Institut zur Kooperation bei Entwicklungs-Projekten – institute for cooperation with development projects) entitled “Affordable Excellence”, on the basis of the study compiled for the Austrian Council by TU Hamburg (see also chapter, “Creating knowledge”), among other things the discussion covered how frugal innovations can also be provided in Austrian companies, which markets Austrian companies can open up with frugal products and services, and what implications this has for Austrian innovation policy, if it wants to support companies in developing frugal innovations.

The starting point of the event was the obser-

vation that a large part of Austrian exports currently go to Europe. If Austria also wants to build a similar strong market position in the unsaturated rapidly growing markets in developing and emerging economies, according to one of the key results of the Austrian Council’s study it will require affordable and at the same time high quality products and services.

Following the keynote by Rajnish Tiwari, who presented the study commissioned by the Austrian Council in his presentation, there was a podium discussion with Ludovit Garzik (Austrian Council), Sabine Mayer (Strategy Department, FFG), Rajnish Tiwari (TU Hamburg-Harburg) and Lisa Wohlfahrt (Fraunhofer IAO).

RTI Platform Austria: In dialogue with the federal states –

11-12 January and 21-22 June 2018

Two RTI Platform Austria meetings were also held in 2018 for the continuous, intensive information exchange between the federal states and the funding agencies. In the platform founded in 2007 the Austrian Council in particular participates in coordinating and supporting the meetings, and believes this regular exchange is an important stimulus provider for measures and ideas in the region.

As part of the first meeting in January in Graz, in accordance with the current conditions – keyword: “new government coalition” – the effects of the Government’s work in the regions in particular were a key part of the discussions, and the OECD’s report on the “Innovation Po-

licy: Austria 2018” topic and the long-term finance planning were also discussed. As a guest appearance the “Industry 4.0” platform also presented its work area, to then discuss the acceptance and handling of data in light of the new General Data Protection Regulation in the dialogue with the platform’s participants.

The summer date at the end of June in Velden (Carinthia) focused, among other things, on the OECD’s interim report, whereby the platform members suggested a more prominent presentation of the regional aspects. The Austrian Council then introduced the content worked out in the autumn with the OECD as part of a feedback discussion.

Long Night of Research 2018: New visitor record – 13 April 2018

With what was now already the eighth Long Night of Research, current projects, new findings and technologies were presented in all nine federal states in exciting, understandable and entertaining ways. Numerous exhibitor organisations provided a look behind the scenes of their research work at a total of 265 locations.

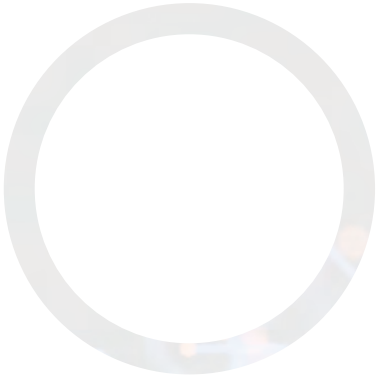
With approximately 228,000 visitors, those in charge, organisers and exhibitors enjoyed a new record and constantly growing interest by the general public in the topics of the future. In cooperation with the coordination office of the Long

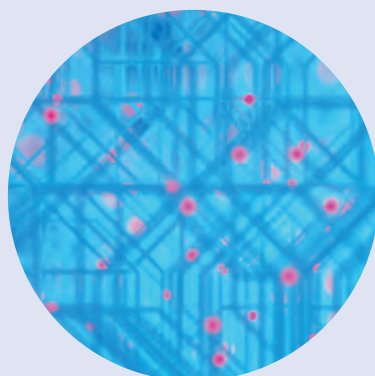
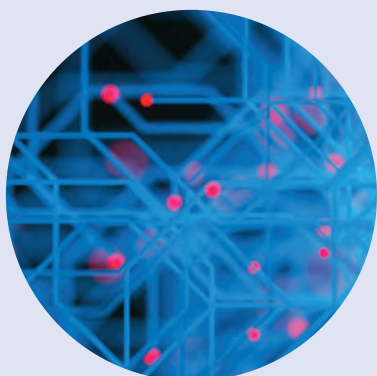
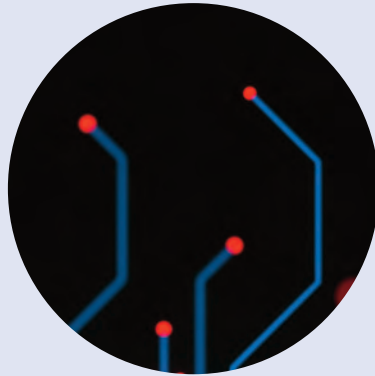
Night of Research, the Austrian Council actively participates in coordinating the content and communication between the departments and the federal states.

The nationwide activities for the Long Night of Research 2018 were financed by the Federal Ministry of Education, Science and Research (BMBWF), the Federal Ministry of Transport, Innovation and Technology (BMVIT) and the Federal Ministry for Digital and Economic Affairs (BMDW). The Austrian Research Promotion Agency (FFG) is responsible for the legal and financial administration.



Hannes Androsch (Council Chairman)
and Mayor of Vienna
Michael Ludwig visiting
the Long Night of Research





Review 2018

The look back at 2018 also includes the years before it, as we now find ourselves at the end of a strategy process that began with the publication of the nationwide research and innovation strategy and with the Austrian Council's annual Report on Austria's Scientific and Technological Capability in 2012 and will finish in 2020. The changes and advances we have been able to pinpoint during these years in the Austrian innovation ecosystem conclude on a sober note. The continuing political commitment to an increase in public sector investments in

the research and innovation system certainly is a success story. Unfortunately, however, this commitment is not sufficient for an equally required further development of the processes and institutions. Some strong lobbies would have to have been dealt with here, for which sadly the political energy simply wasn't there. The unpleasant feeling of constantly watering a plant but seeing no growth because of the adverse environmental conditions remains. The result is that civil service and political players must "embellish" the plant, even though it really has remained quite small.



Outlook for 2019

Ludovit Garzik
Head of the Secretariat

We've started into the new year with high hopes. Many activities for the coming months were revealed in the presentation to the Cabinet in August 2018, an agenda that has accumulated over the past ten years. From a research funding act to a research database through to consolidation of the council formations – all long overdue. Clayton Christensen already stated two decades ago that the implementation of change processes is in the hands of those peo-

ple that built the system up into what it now is. It is therefore not easy to also integrate strategic planning into a successful implementation process. Together with the Secretariat, the Council Board will also ensure every possible energy and expertise is included in the implementation of the planned projects, so that we can report a successful implementation at this point next year in our review.

Geschäftsstelle des RFTE seit 2018 auch zuständig für den Rat für Robotik und Künstliche Intelligenz

the austrian council

Austrian Council's Secretariat now also responsible for the Council on Robotics and Artificial Intelligence since 2018

The Austrian Council for Robotic and Artificial Intelligence (ACRAI) was set up by the Federal Ministry of Traffic, Innovation and Technology in autumn 2017. This advisory board will support the body politic in working out the Artificial Intelligence Mission Austria Strategy 2030 (AIM-AT 2030), whose goal is to utilise the opportunities for our country offered on the basis of technological developments in the best possible way and at the same time to be able to control the risks connected herewith.

Univ. Prof. Dr. Sabine Köszegi, Full Professor for Labour Science and Organisation at the Institute of Management Sciences of Vienna University of Technology, was appointed as the Board's Chair. The Austrian Council's Secretariat was entrusted with the secretarial function, and now operatively supports the Council Board of the ACRAI in its activities. This includes the continuous supervision of its content work, its public relations work and the organ-

isational administration of the Council's work.

The "Positively shaping Austria's future with robotics and artificial intelligence" white paper was presented in November 2018 as its first public statement.



Prosthesis medical research project

The Members of the Austrian Council

Advisory Members

Univ.-Prof. Dr. Heinz Faßmann Austrian Federal Minister of Education, Science and Research

Norbert Hofer Austrian Federal Minister of Transport, Innovation and Technology

Hartwig Löger Austrian Federal Minister of Finance

Dr. Margarete Schramböck Austrian Federal Minister of Digitisation and Business Location

the austrian council



**Dr.
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Chairman of the Austrian Council
Industrialist, former minister of finance and former consultant to the World Bank. Member of the Senate of the Austrian Academy of Sciences (ÖAW) and Head of the Supervisory Board of the Austrian Institute of Technology (AIT)



**Univ.-Prof. Dr.
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Deputy Chairman of the Austrian Council
Head of the Institute of Medical Genetics at the Medical University of Vienna, Vice Chairman of the Bioethics Commission at the Federal Chancellery (since 2009)



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Jakob Edler**

Director at the Fraunhofer Institute for System and Innovation Research, Munich



**Dr.
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Company founder, computer and risk capital businessman in the UK, Co-founder of Silicon Fen ("British Silicon Valley")



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Sabine Herlitschka, MBA**

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**em. Univ.-Prof. Prof. Dr.
Helga Nowotny**

CEO of Infineon Technologies Austria AG



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Sylvia Schwaag-Serger**

Deputy Vice Chancellor of Lund University, Sweden



**Dr.
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The Secretariat

The Secretariat supports the Austrian Council both in terms of organization and content, in particular with regard to preparing and organising the meetings of the Austrian Council and work groups, and in respect of communication both within the Council and externally. The operations of the Austrian Council are financed by the Ministry of Transport, Innovation and Technology. The Head of the Secretariat, Deputy Head of the Secretariat and members of staff (in alphabetical order):



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