RESEARCH ASSESSMENT AND CAREER PATHS FOR RESEARCHERS: NATIONAL RECOMMENDATIONS FOR AUSTRIA IN THE CONTEXT OF THE EUROPEAN RESEARCH AREA

FINAL REPORT AND RECOMMENDATIONS OF THE AUSTRIAN HIGHER EDUCATION CONFERENCE WORKING GROUP ON CAREERS IN RESEARCH IN THE CONTEXT OF THE EUROPEAN RESEARCH AREA

Research Assessment and Career Paths for Researchers: National Recommendations for Austria in the Context of the European Research Area

Final report and recommendations of the
Austrian Higher Education Conference Working Group
on careers in research in the context of the European Research Area

Publisher:

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Design: Andreas Pirchner, me@andreaspirchner.com

Print: Druckerei Wograndl, Mattersburg

Funded by:

Federal Ministry
Republic of Austria
Education, Science
and Research

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1 Mission and working methods

In May 2022, a working group on careers in research in the context of the European Research Area (ERA) was established on behalf of the Austrian Higher Education Conference. It was the core element of Initiative 3, namely strengthening human resources for science and research in Austria, of the National Action Plan for the European Research Area (ERA NAP).[1] The aim of this working group was to develop recommendations for attractive, permeable and sustainable career models in the Austrian higher education and research system, taking into account the ERA. Specific national recommendations should lead to an increase in intersectoral, interdisciplinary and transnational permeability and contribute to the further development of existing career models in terms of implementing European instruments and standards. The ongoing development of *The European Charter for Researchers* and *The Code of Conduct for the Recruitment of Researchers*,[2] current developments in the area of research assessment and factors influencing mobility, among other things, were taken into account.

The ERA Policy Agenda[3] acts as the framework in this regard at the European level, in particular through:

- ERA Action 4 (Promote attractive and sustainable research careers, balanced talent circulation and international, transdisciplinary and intersectoral mobility across the ERA); and
- ERA Action 3 (Advance towards the reform of the Assessment System for research, researchers and institutions to improve their quality, performance and impact).

Important European reference documents reflecting current developments in this area include the *Agreement on Reforming Research Assessment*[4] and the *Council Recommendations on a Framework for Attracting and Retaining Talent in Research, Innovation and Entrepreneurship in Europe*.[5]

The working group developed its recommendations between June 2022 and February 2024 during three one- to two-day workshops and eight regular meetings, as well as numerous subgroup meetings.

In accordance with its mandate, the working group addressed the Austrian context of research careers and current career paths. Obstacles for trans-sectoral mobility, the current practice of evaluating research in the context of appointment processes, and career counselling were all given special

attention. The recommendations are aimed at higher education institutions, which train the majority of researchers and are central to career planning and development, as well as at employers of researchers from all sectors – from research institutions to companies and public bodies – but also at funding organisations, politicians, and researchers at different career stages.

The development of recommendations regarding the ratio of temporary to permanent positions at universities and research institutions was not part of the mandate. This issue must be considered separately, taking into account (and, if necessary, questioning) the organisational forms and the mandate of the respective institutions, the legal framework for termination options, demographic change, ways of ensuring thriving working conditions, as well as intergenerational equity and the competitiveness of institutions.

2 Introduction

The historical perception of universities as stable employers offering secure jobs (permanent employment) with little necessity for academic competitiveness has changed significantly. Researchers with ambitions for professorship and for obtaining research funding are continuously facing challenging international competition and need to be flexible (including geographically). Only a certain proportion of researchers will remain at universities in the medium to long term, with the majority moving elsewhere, not always voluntarily. According to Eurostat, in 2021, 56% of the total of 2 million researchers in the European Union were employed in the private sector, 32% at higher education institutions and 11% in the public sector.[6] In Austria, around 56,500 full-time equivalent researchers work in the scientific sector, of which just over 16,200 are in the higher education sector (29%) and just over 36,000 are in the business enterprise sector (64%).[7]

The strict division between basic research in the university sector (*universitär-akademischer Bereich*) and applied research at other higher education institutions (*(Fach-)Hochschulen*) and in the private sector is no longer applicable. Innovation and value chains are often highly interdisciplinary and intersectoral. This is constantly opening up exciting new fields of activity, job profiles and career paths. The training and support of researchers therefore represents an essential investment for the entire research and innovation landscape and not just for the universities themselves. It is therefore an indispensable prerequisite for maintaining the competitiveness and prosperity of the entire European Union.

The development of career paths and career models for researchers cannot be viewed in isolation from the development of research itself. Research is becoming increasingly diversified and relies on a broad range of methods, infrastructures and forms of organisation depending on the discipline, field and relevant research landscape. Boundaries between disciplines are also becoming blurred, and disruptive innovations are challenging previous assumptions at an ever-increasing pace. This demands flexibility both in organisations and in the design of individual and institution-based career paths. Accordingly, diversified career concepts and career models must be considered in the context of inclusive, inter- and transdisciplinary, intersectoral, international and diversity-conscious research. Appropriate attention must also be paid to lateral career development.

Research is constitutively characterised by international exchange and a global research community. Promoting research therefore always requires

facilitating cooperation between researchers across national borders. Conditions (cost of living, income, pension entitlements, language, legal and institutional framework conditions, etc.), however, vary significantly, especially at the international level, and therefore often hinder mobility. Changing research location means being prepared to move your whole life to a new city or, even, country, either temporarily or for an unknown period of time. The reasons for changing research location often lie not only in the intrinsic motivation of researchers to conduct research in a different context but also in the added value for potential career advancement. It is these factors that overcome the attraction of a researcher's previous life. Taking into account the diverse sources of motivation for a move, it is important to remove obstacles to the extent possible and to make research mobility attractive even when it is not linked to apparent career advancement. This can only be achieved by the members of the ERA working together. Isolated national or institutional measures can only contribute in part to achieving this aim. At the same time, it is essential for Austria to do everything in its power to offer the most attractive environment possible for researchers from all over the world in order to be able to successfully compete for talent in the long term.

3 Diversity of career paths and attractiveness to employers

Typically, the classic research career culminating in a professorship at a university or research institution is conveyed as the most desirable path. The career aspirations of individuals show that being a university professor is still seen as the pinnacle of an academic career. This is also fostered at the structural level by key indicators based on professor equivalents in performance agreements with the Federal Ministry of Education, Science and Research at public universities and in accreditation procedures at private universities. The numerous other career paths in research and innovation within and outside of universities are often not well known, not yet tangible enough or appear less attractive.[8] These alternatives include career opportunities for researchers at other types of higher education and research institutions, in companies, non-governmental organisations and public administration, as well as the option of founding a start-up or other forms of self-employment. Research-supporting roles (research managers,[9] data scientists, data stewards, researchers in core facilities, etc.) are also becoming increasingly important in the university context and beyond.[10]

As professional opportunities other than professorships are often considered less prestigious, young academics often neglect to find out about alternative career paths and to acquire relevant qualifications and initial experience during their training and doctoral phase.[11] Although there will be few long-term career options within their own university department, they often do everything they can to stay in that familiar environment for as long as possible. Leaving a specific organisation, for example once project funding has ended or the maximum total duration of fixed-term employment has been reached (e.g. under section 109 of the Austrian Universities Act), is therefore often experienced as a failure and researchers are left without a back-up plan supported by the appropriate qualifications. The possibility of failure is, however, inherent in the nature of competitive research practice and contemporary project culture.

Nowadays, researchers feel less of a sense of belonging to the organisations in which they are currently active than to their academic communities. These professional and cross-organisational networks are a source of self-assurance and a benchmark for academic achievement. Conversely, individual academics can enjoy an excellent reputation in their (international) academic community but not be employed, or only precariously, in an organisation without structural support.[12]

Diverse types of higher education institution, research institution and organisation in the non-academic sector open up the opportunity for diverse and complementary career path portfolios. The many differences can, however, also severely restrict mobility between institutions – both nationally and internationally – if connectivity and creditability are not ensured. Barriers can be of a legal nature (incompatible employment rights), financial (difficulty in transferring social security and pension entitlements within the EU or between employers) or cultural and organisational (ignorance of alternative professional options and differences in prestige of alternative career paths; selection modalities that focus exclusively on a limited set of sector-specific parameters and explicitly or implicitly disincentivise trans-sectoral and non-linear careers). The ability to

connect internationally is essential for any research location: 36% of academic and artistic staff at public universities do not have Austrian citizenship; among professors, the figure is 45%[13] and has been rising steadily for years.

The Austrian Universities Act, which also applies to private universities with regard to professorships, offers substantial opportunities for establishing career models for various target groups. International hiring and appointment procedures for professorships and tenure-track positions are mandatory, in order to ensure excellence. Numerous public and private universities have established institution-specific, internal career models, in particular for mid-career levels up to (tenure track) professorship,[14] which may also include options for permanent appointments.

At universities of applied sciences, researchers and teaching staff often work in more than one type of working environment (university, corporate, etc.). Accordingly, formal career models vary and are less relevant. Appointment procedures differ greatly between institutions.

University colleges of teacher education recruit their academic staff from both the university and school sectors. Professorships can be obtained through external qualifications or through further academic qualifications gained in the course of employment. In addition to having academic ambitions, junior staff are required to have an interest in the school education system and a willingness to take on a variety of teaching duties.

In terms of career development, institutions outside of the higher education sector focussing on basic research generally aim for a rapid increase in academic independence and subsequently group leadership or professorship. Employment contracts at such institutions, in contrast to those at universities, often come without teaching duties. A high degree of mobility is common in most disciplines, particularly in early career phases. The (international) permeability between research institutions in basic research is usually good and can be supported by internationally compatible career models. The landscape of research institutions in Austria, however, is highly diverse. Such institutions are operated on the basis of various legal foundations and forms of funding and also differ in terms of levels of disciplinary diversity. Preparing young academics for a career outside academia is therefore complex in this sector and requires specific career models with follow-up scenarios in the higher education and/or the private sector.

Recommendations

→ Higher education institutions and research organisations should make greater use of the opportunities available for **designing innovative career models**. A transparent, attractive, gender- and diversity-sensitive and sustainable portfolio of career paths and models should be developed, presented clearly and implemented soundly. The portfolio needs to correspond to the respective type of higher education and, at the same time, ensure the best possible trans-sectoral and international connectivity:

- Career models in research should be designed and labelled in accordance with the European classification R1 to R4.[15] Particular attention should be paid to the design of senior positions below professorship level, using the existing opportunities for tenure-track positions;
- By involving trans-sectoral actors such as (research-intensive) companies, potential public employers or entrepreneurs, alternative career paths should be identified in research and innovation outside the higher education system. (Prospective) researchers should be enabled to obtain relevant qualifications early in their careers. Positive connotations and a strengthened reputation for alternative career paths also play an important role. As well as employment in a wide range of sectors, entrepreneurship should also be recognised as a career option;
- Specific career paths in research support (e.g. research managers, researchers in core facilities and data stewards) should be developed, presented transparently and supported with corresponding career models for further advancement.

→ Higher education and research institutions should develop an **overall systemic approach to human resource development** that goes beyond their own organisation. Institutions should openly promote and support career development in such a way that researchers can develop both within and outside of the organisation. This is also beneficial in terms of employer branding, as researchers see organisations that act in this way as supportive and recommend them to others in their community.[16]

→ Higher education institutions, other research institutions, as well as the private sector and public employers that recruit researchers, should use **job profiles and selection criteria in a consistent manner** with specific, ideally **cross-sectoral and internationally comparable, competence profiles** (e.g. **ResearchComp**,[17] R1–R4). Competences and prior achievements should be considered holistically and 'translated' into the appropriate job profile and career stage. ResearchComp comprises seven competence areas (cognitive abilities, doing research, managing research, managing research tools, making an impact, working with others and self-management), which are broken down into 38 competences and 389 learning outcomes at 4 proficiency levels. Such a broad yet clear system makes it easier to 'translate' similar skills and knowledge acquired in different settings in a context that is not sector-specific. This also opens up better opportunities for researchers to return to higher education or research institutions after a period outside of the academic sector.

Examples of good practice

- The **University of Technology, Vienna** (TU Wien) Career Centre job profile catalogue[18] uses specific job profiles to clearly show alternative career paths outside of the academic sector and links these to the skills required and potential salaries. The University of Technology, Vienna offers specific support to its academic staff at the doctoral candidate, postdoctoral and tenure-track level to successfully complete their respective career stage and includes opportunities beyond higher education institutions.[19]

- The career model for academic staff at the **Austrian Academy of Sciences** (OeAW)[20] offers structured career prospects based on career stages that are compatible with the European Commission's R1–R4 model and are common practice internationally. Instead of going through all stages of the career model at the Austrian Academy of Sciences itself, young scientists are expected to develop their scientific profile at various institutions in Austria and abroad. There is a tenure option for advanced postdoctoral researchers with outstanding scientific achievements. A special feature is a separate category of research associates, *Academy Scientists*, who are particularly active in areas that are specific to the research portfolio of the Austrian Academy of Sciences. The scheme is currently undergoing a review and revision process. A career model for research support scientists is due to be established.

- The **Ludwig Boltzmann Gesellschaft** (LBG) includes a cross-sector comparison of career levels and job titles between itself, universities and the private sector in the presentation of its career models.

- In September 2023, the **University of Utrecht** in the Netherlands announced that it would no longer differentiate between academic and support and administrative staff, as such a division under employment law leads to inevitable differences in value and perception.[21]

- The **HR Excellence in Research Award of the European Commission**[22] supports research organisations in implementing the 40 principles of *The European Charter for Researchers*[23] and *The Code of Conduct for the Recruitment of Researchers*. Employers with an individualised action plan for the further development of a human resource strategy are more attractive to researchers from the entire ERA and beyond. An individualised action plan also facilitates an internationally compatible design and presentation of career paths.

4 Establishment and advancement of career counselling

Given the situation outlined above, it is essential that researchers in their respective career phase are made aware of the need to plan the next steps of their career, and are advised and supported in doing so. This needs to be done in a timely, transparent and holistic way, including intersectoral and interdisciplinary career options, as well as career options in research support.

The majority of higher education institutions currently offer career counselling and HR development for researchers, although the type, scope and focus of those services vary greatly. At universities, the focus of the counselling services is usually on academic careers, with the goal of a professorship in the same higher education segment or on the specific career models for academic staff at their own institution. The target group is mostly those at the doctoral candidate or postdoctoral stage.

The communication of other career options (e.g. research in other sectors or in research support) and the active involvement of sectors outside of the higher education sector in career counselling is rare and tends to take place in fields of study whose proximity to the economy is evident (e.g. STEM). In fields where the job profiles and opportunities outside of academia are less obvious or known, such involvement and the opportunity to gain insights and initial practical experience would be all the more important.[24]

"In any case, there is still a great need for support here, which the universities acting on their own can only provide at a slow rate, that is in the medium to long term at best, in part because their own core interest lies or must lie in the qualification of their own young academics".[25] This was the conclusion of a study on career development opportunities for doc-

toral students and graduates in Austria published in 2022 by the Institute of Advanced Studies. There is a need to significantly strengthen career counselling services to cover both a comprehensive perspective (e.g. in the context of HR development, doctoral candidate/postdoctoral services) and career options specifically outside of the academic sector. Intersectoral, interdisciplinary career counselling extends beyond the respective university or research organisation and has an impact on the entire research and innovation landscape. Addressing this challenge must therefore be considered (and financed) on a cross-organisational, joint basis. Increased cross-organisational and cross-sectoral advisory and information services, used by various research institutions, funding organisations and other sectors, would make it possible to effectively adopt an overall systemic approach and exploit synergies. Comprehensive offers would provide researchers from different organisations and sectors with the opportunity to exchange experiences, learn from each other and develop sustainable networks. This would also support trans- and interdisciplinary research concepts and could have effects that would go far beyond career counselling.

Recommendations

- Higher education institutions and other research organisations should establish and expand **proactive, early, transparent and systematic career counsellin**g for researchers with regard to possible career options and the related framework conditions in all sectors, especially for (potential) doctoral candidates and postdoctoral researchers. Such advice should not be anchored in isolation within the individual's own institution but should include cross-organisational elements (networks and peer learning) and offer links to partners outside of higher education institutions and intersectoral partners. In this way, alternative career paths can not only be pointed out but also made tangible, and sustainable networks can be formed.

- Career counsellors should preface the career counselling process with a personal assessment of the researcher's current situation through self-reflection by the researcher regarding skills, strengths, preferences and (current) life goals. In the next step, these ideas should be assessed against the opportunities available on the labour market, for example in the form of labour market information, expert advice on specific career paths and personal experience, for example through personal exchange or practical taster sessions in a specific occupational field. The planning of possible next career steps should be supported by 'translation' of existing skills (e.g. with the help of the ResearchComp competence framework), and by specific training.

- Researchers should proactively manage the planning of their own career in good time and demand support in doing so. Their own preferences, goals and abilities should be critically reflected upon and used to identify the best choices for them. Proactive provision of information about career options in the researcher's own organisation and beyond would open up a wide range of professional possibilities.

Examples of good practice

- The **Ludwig Boltzmann Gesellschaft (LBG) Career Centre**[26] offers both its own doctoral candidates and postdoctoral researchers, as well as external researchers, a wide range of career guidance and formats for the further development of relevant research career skills. In addition to the cross-organisational orientation, the focus on intersectoral collaboration and leadership and management in research are unique selling points. The Career Centre offers a holistic, bundled range of services and thus complements the offerings of other organisations.

- **EURAXESS**[27] and the **ERA Talent Platform** offer a variety of free online tools for the development and implementation of counselling services, such as self-assessment tools and the transnational EURAXESS REBECA mentoring programme. The latter can be used to establish contact with experienced researchers outside of the academic sector or with research managers.

- **Vitae**[28] is a non-profit programme of the Careers Research & Advisory Centre Ltd in the United Kingdom that has been dedicated to the career development of researchers for around 50 years. It is aimed both directly at researchers and, in particular, at institutions, which it supports in the development of strategies and policies for career counselling and development. The Vitae Researcher Development Framework,[29] which describes the diverse competences and characteristics that successful researchers need at each career stage, is particularly well established.

- The **University of Graz PostDoc Office**[30] offers services and information for postdoctoral researchers to create the best possible environment in which they can develop and reflect on their career goals. Support services include HR (career) advice, financial support, training, networking opportunities, coaching sessions with external experts, a peer mentoring programme and events, such as an annual writing retreat.

5 Promoting young talent – a management responsibility

Group leaders have a significant influence on research culture, the prestige of career options and consequently the actual career development of researchers. As a rule, research group leaders and professors have obtained their (management) position primarily on the basis of their outstanding research achievements. As they are usually still working intensively on their own specialist careers, which are essential for their status in the research community, management tasks are frequently an additional responsibility for which no proper preparation is provided.[31] People in these positions often do not realise that leadership requires its own set of skills and cannot be done 'on the side'. In fact, the scope of responsibility shifts more and more towards management, leadership and responsibility for the career development of team members in the course of an individual's career.

Supervisors make decisions as to which junior researchers they support not only on the basis of meritocratic criteria but also according to social criteria. Habitus similarity or unconscious bias should therefore be taken into consideration.[32] The value of different career paths is usually implicitly conveyed by supervisors. The supervisors are perceived as role models and most of them have worked successfully and exclusively in the traditional academic system, which can lead to young researchers considering primarily that area for their own professional career. Training programmes would be useful to counter these problems, especially for prospective group leaders before setting up their first research group. So far, comprehensive programmes have rarely been offered by higher education and research institutions, and are even less frequently demanded by researchers.

Recommendations

→ Higher education and research institutions should offer **leadership training** to all those who are likely to take on leadership responsibilities before they start in that role. (Mandatory) participation at an early stage would sensitise the target group to this area of responsibility and would provide them with the relevant skills. Institutions should take into account the specific characteristics of leadership and provide for formats adapted to appropriate career development. A certain degree of obligation to complete the course before, or on reaching, certain career steps (e.g. founding a research group or fulfilling the qualification agreement) seems advisable in order to give the topic of leadership appropriate importance in an organisation and for that individual's own career development.[33]

- Higher education institutions and other employers should support, empower and urge group leaders to take responsibility in mentoring and developing young researchers.
- Group leaders and supervisors should give their employees sufficient time to acquire career-enhancing skills at all career levels.
- Group leaders should give timely, clear and empathic feedback to early career researchers regarding their proficiency, employment opportunities and future prospects. Employment options in their own disciplinary environment should be presented as being just as valuable as opportunities in other sectors.
- Group leaders should regularly review their own competence set as supervisors (e.g. using ResearchComp), take advantage of coaching or training programmes and cultivate (leadership) skills outside of traditional research activities in accordance with their own career development.
- Researchers should proactively request feedback from their supervisors at an early stage in their role and on a regular basis to ensure that the career path they have chosen or are aiming for matches their own personality and skills profile. This will help to evaluate whether there is a realistic chance of achieving their goals, and to acquire or develop the relevant skills and qualifications.

Examples of good practice

- The **Ludwig Boltzmann Gesellschaft** (LBG) offers several leadership programmes for researchers at different career stages.
- The summer school **LEAD_able**[34] teaches transferable skills for a (leadership) career inside or outside of academia for researchers or junior group leaders shortly before or after their doctoral dissertation.
- The **Leading Researchers Programme**[35] supports research group leaders or senior researchers who are about to take on a leadership position in understanding and reflecting on their own leadership role.
- The **LExA (Leadership Excellence Award in Research)**[36] is intended to emphasise the importance of leadership skills in an academic environment.
- As part of the **Innovators Programme of the Austrian Research Promotion Agency (FFG)**, the INNOVATORINNEN leadership programme[37] offers women from application-oriented or cooperative research, research and innovation entrepreneurs and practitioners support in implementing research and innovation missions within or outside of their organisations, in establishing network contacts and in acquiring leadership skills.
- The **Leadership Academy** of the **German Scholars Organization**[38] supports German-speaking early- and mid-career researchers from all disciplines at universities and other research institutions in setting up a research group, acquiring leadership skills and exploring career options in Germany. There is a focus on supporting (German-speaking) academics abroad and returnees.

6 First stage researchers

Academic careers usually begin with a doctoral programme. The focus of the doctoral dissertation is on learning how to perform independent research, as well as on developing and answering a specific research question. Few doctoral candidates will later become professors but the curricula of doctoral programmes generally focus strongly on specialist skills necessary for entry into a subsequent traditional research career in academia. Supplementary programmes can often only be completed in a researcher's free time and are therefore less in demand.

Anchoring doctoral students in structured doctoral programmes or doctoral schools and employing them for the purpose of completing their dissertation are two central quality aspects of doctoral training, which have proliferated in Austria over the last 15 years. In particular, the funding scheme of the doctoral colleges and, more recently, the doc.funds programme of the Austrian Science Fund (FWF), as well as the Marie Skłodowska-Curie Actions doctoral programmes of the EU research framework programmes, have made an important contribution. Nevertheless, the proportion of employment among doctoral students is still too low, with major differences between disciplines. According to key indicator 2.B.1 in the intellectual capital report of Austrian public universities for 2022, only 45.1% of doctoral students are employed by their university.[39]

Doctoral students are essential for the internationalisation of Austrian universities. During the winter semester of 2022, 41% of the approximately 20,000 doctoral students in the country did not have Austrian citizenship, with that percentage having almost doubled since 2012.[40] Some of those students had completed their secondary schooling in Austria but most had only come to Austria to study, more and more students coming only to pursue a doctoral programme.[41] Special attention must be given to the needs of this group. At the same time, it is crucial for career development that young researchers from Austria are able to gain experience abroad (e.g. in the course of their doctoral studies) and are financially and structurally secure during this time.

Recommendations

→ Universities and institutions with the right to award doctorates should:

- Base the establishment and further development of doctoral programmes on the Salzburg Principles for Doctoral Training,[42] which remain valid today almost 20 years after their establishment, and the Principles for Innovative Doctoral Training of the European Commission.[43] In addition to the role of the high-quality research work of doctoral students, the perception of those students as researchers, diversity, responsible supervision and structured training, the teaching of transferable skills and the opportunity to work in an interdisciplinary and cross-sectoral manner were also assigned a special role. Doctoral schools and doctoral colleges contribute significantly to the implementation of structured doctoral training and to the quality assurance of the programme;

- Offer, or even require, initial career counselling for doctoral students before they are admitted to a doctoral programme;

- Highlight career opportunities in research and innovation outside of the academic sector at an early stage. This is not only an important task in terms of caring for young academics but also increases the take-up of the complementary training on offer. Training content and acquired skills should also be made clearer for employers outside of the academic sector. 'Translatability' can be achieved with the help of competence frameworks such as ResearchComp that are applicable at the trans-sectoral and international level;

- Support thesis-related research stays abroad. Support from a supervisor and an extension of a doctoral candidate's employment contract in the event of a stay abroad of, for example, at least six months are essential for this.

→ Funding bodies and policymakers should significantly increase the proportion of funded doctorates in Austria in order for doctoral study in the country to be even more attractive to international talent and to recognise doctoral students as researchers who are paid for their work.

→ Institutions and funding organisations should make greater use of, or facilitate, intersectoral doctoral programmes, for example through programmes such as doc.funds.connect.

Examples of good practice

- Many institutions, such as the **Doctoral Centre of the University of Vienna**[44] and the **Doctoral Academy of the University of Graz**,[45] offer support measures and career advice for doctoral candidates, including options outside of academic research. These measures also have a structural impact on the organisation.

- The **Graduate School** at the **Institute of Science and Technology Austria** offers a structured, interdisciplinary doctoral programme based on the Principles for Doctoral Training and the Principles for Innovative Doctoral Training of the European Commission. Doctoral students are initially accepted onto the programme without being directly assigned to a research group. In this first phase, they complete a training programme consisting of courses and so-called rotation projects in various research groups.

- The **doc.funds.connect** funding programme of the Austrian Science Fund (FWF) enables the implementation of doctoral colleges, in which public universities and universities of applied sciences work together to qualify young researchers in basic and applied research. The doctoral networks funded as part of the **Marie Skłodowska-Curie Actions** require that doctoral students are employed full-time and are offered training for the development of interdisciplinary skills. Strong involvement of non-academic organisations (e.g. the private sector, non-governmental organisations and public administration) in the research and training programme of the respective doctoral networks offers insights into other research-relevant contexts.

7 Assessment of research and researchers

The range of tasks that universities are expected to cover has broadened considerably in recent decades. The archetypical core tasks of research and teaching have gradually been expanded to include a steadily growing third mission, ranging from knowledge transfer and entrepreneurship to mission orientation and the reduction of scientific scepticism, all the way to sustainability issues. This change in academic and scientific culture is also slowly being reflected in an increasingly multidisciplinary concept of quality. This transformation raises both the question of the weighting between performance dimensions and the question of the right, as well as a feasible and suitably resourced, balance between quantitative and qualitative assessment elements.

Traditionally, the recruitment of researchers, particularly in STEM subjects, including medicine and life sciences, has focussed heavily on publications in highly cited journals and the acquisition of third-party research funding. The focus on a few quantitative indicators for recruitment and tenuring, which are only meaningful to a limited extent when applied to the individual researcher, has come under significant criticism internationally in recent years. There are numerous initiatives that advocate a more balanced and broader performance assessment of research and researchers, with the most recent being CoARA, the Coalition for Advancing Research Assessment,[46] a community initiative developed and supported by the European Commission. Customized competence and research performance portfolios should be used as quality benchmarks for hiring or for awarding research projects. In addition to qualitative assessment, appropriate quantitative indicators should be used responsibly. The aim is not only to achieve greater fairness and transparency, and to take account of the diversity of the essential tasks of research and science, but also to achieve greater effectiveness, permeability and innovative strength for Europe‘s competitiveness as a labour market and economy.

Many of these initiatives have their origin in the open science movement, which encourages making the research process traceable from the idea to the result, reusing research data and creating more transparency and efficiency in the research and innovation process. In addition to open access publications and access to FAIR[47] research data, open

science practices also include open source software, pre-registration and peer review of protocols prior to conducting studies, as well as participatory research approaches. These practices do not currently play a significant role in the appointment of professors at Austrian universities, as a study[48] commissioned by Open Science Austria in connection with the ERA initiative "Strengthening human resources for science and research in Austria" clearly showed. The aim of the study was to use the appointment process for professors to understand how Austrian universities conceptualise the quality of researchers and their academic work and how they implement this in practice. The study shows a surprisingly diverse picture of how universities 'choreograph' appointments in accordance with section 98 of the Austrian Universities Act. This also demonstrates the great scope for a range of practices and opens up many worthwhile starting points for internal and cross-institutional discussions on quality concepts and quality assurance.

Hiring decisions in research are taken on the basis of past performance that was achieved in diverse environments and under diverse conditions to determine an individual's potential in the sense of a 'bet on the future'. The aim is to base personnel selection, performance evaluation and tenuring on transparent, gender- and diversity-sensitive, qualitative and quantitative criteria that are appropriate for the position in question and take into account a broad spectrum of relevant competences and (research) achievements. As hiring decisions – especially appointments to full professorship – are seen as the most potent strategic instrument at universities (with the same applying to the recruitment of key researchers at other institutions), the vigorous examination of concepts of excellence and evaluation of (research) performance is essential for the development of any institution.

Recommendations

- Higher education and research institutions should base the evaluation of research and researchers on a **broad range of** (preferably qualitative) criteria **that are tailored to the respective job profile and subject area**. International developments dedicated to reforming evaluation of researchers, such as CoARA, should at least be discussed in depth at the institutional level. Preferably, they should be supported and implemented in a way that is adapted to the respective institution, scope and discipline. It seems crucial to conduct this open discourse transversally across hierarchical levels and subject areas in order to enable a **common, lively and viable concept of quality and its actual implementation**. The advantage of being involved in international initiatives such as CoARA lies in the opportunity to learn from other institutions and jointly find new solutions to existing challenges. Moreover, it ensures that researchers and institutions can integrate into international career paths and recruitment. Austrian higher education and research institutions should therefore engage in a close exchange of mutual learning, use of synergies and ensuring connectivity.

- Higher education and research institutions should develop **guidelines** that make the (internally) developed common quality standards, assessment processes, practices and instruments, as well as the responsible use of quantitative indicators, explicit and comprehensible. In this way, appointment and selection committees, as well as group leaders and managers, can develop and implement a common, institutional concept of quality. In larger, more diverse institutions, but also in institutions that are open to various alternative career paths, this might be in the form of a common framework that is adapted to the respective subject areas. The discussion process required for this is an important building block in the development of an institution's research and quality culture.

- Higher education and research institutions should develop a common concept of quality (in general or for a specific tender) that is **explicit and therefore transparent** by specifically **implementing criteria catalogues** in the various performance areas such as research, teaching, third mission or services for the academic community. It is important to define which specific expectations are linked to the respective performance dimensions and how these are weighted in relation to each other. The structuring of criteria and application documents should also take into account the question of the kind of evidence that is required to assess the various dimensions of quality.

- Higher education and research institutions should offer members of selection and appointment committees, as well as all group leaders and managers involved in personnel selection, high-quality training programmes and active support in **recognising and avoiding often unconsciously distorted and therefore unfair assessments of performance (bias)**. These programmes should be mandatory and structurally anchored.

- Higher education and research institutions should anchor **external perspectives** in the assessment of researchers and research as an essential element with regard to international quality standards. It must be taken into

account, however, that, for example, reviewers should receive as much detailed information as possible about the strategic profile of the advertised position or the subject of the evaluation.

→ Group leaders and researchers at all career levels should actively participate in the **discussion process on assessment of research and researchers** at their own higher education or research institution and beyond (e.g. within the framework of CoARA). These can be structured processes for the development of institutional standards or informal discussions with colleagues, supervisors and employees. In addition, group leaders and researchers should take advantage of existing offers of anti-bias training and training in the field of research assessment.

Examples of good practice

→ **CoARA**[49] is a European initiative launched in 2022 that promotes a holistic assessment of academic performance that makes greater use of qualitative indicators. The University of Graz[50] was the first Austrian university to join CoARA, in line with its partners in the Arqus European University Alliance, and has already established a comprehensive implementation programme.

→ **Utrecht University**[51] takes a very broad approach to open science and research assessment. Despite its previous high position, it withdrew from the Times Higher Education Ranking because rankings ”put too much emphasis on comparison and mutual competition” instead of promoting collaboration and openness in scientific research. In addition, the university sees such rankings as an inadmissible narrowing down to a few parameters that does not fulfil the principles of CoARA.

→ The **University of Graz**[52] relies on comprehensive anti-bias measures to prevent unconscious bias in teaching and research, especially in recruitment processes. For example, it developed the MOOC “Getting through everyday university life: being diversity-sensitive, bias-conscious and inclusive”.[53]

→ Through mandatory anti-bias training for managers, which is set out in the Gender Equality Plan,[54] the Institute of Science and Technology Austria underscores the importance of this topic.

8 Diversity of researchers and inclusivity of institutions

The research community, even if recruited internationally, is still much more homogeneous than society as a whole, which is becoming increasingly diverse. One indicator of this is the fact that the level of education of an individual in Austria strongly depends on the educational background of that individual's parents. Others are the 'leaky pipeline', which is still strongly segregated by gender, and the strong horizontal gender segregation among students and researchers. There are major differences between the disciplines, as emphasised by many findings on unidata,[55] the higher education statistics information system run by the Austrian Federal Ministry for Education, Science and Research.

Without a more diverse student population, a more diverse composition of researchers and other employees at higher education and research institutions will not be possible. In particular, the education system from primary education onwards and societal perception of traditional role models play a decisive role in the future development of diversity at research institutions. Above all, the reduction of horizontal gender segregation is a key objective. The aim is to get more girls and women into STEM fields and more boys and men into education, childcare, nursing and social professions.

Research institutions are called upon to become more diverse in terms of all dimensions of inequality: to attract more women, more researchers from socially disadvantaged families, more people of colour, more neurodivergent researchers and more researchers with disabilities to their institutions. Both the National Strategy for the Social Dimension at Universities[56] and the Austrian Higher Education Conference recommendations for broadening gender competence in higher education processes,[57] which are firmly supported by the Austrian Higher Education Conference, are important in this regard. Experience gained locally at higher education institutions or learning analytics should be increasingly incorporated into developing appropriate measures.

Recommendations

- Higher education and research institutions should consistently consider gender and diversity as a cross-cutting issue in all measures taken with regard to the development and establishment of career paths and support programmes.
- Higher education and research institutions should develop the gender and diversity competences of their entire staff. In particular, the awareness of those in HR development, committee and commission members, group leaders as well as (quality) managers should be raised through gender and diversity-related training in order to reduce unconscious bias.
- Equality plans should be seen as an instrument for organisational development and should be implemented consistently.
- Higher education and research institutions should develop proposals that expand the performance assessment criteria with regard to academic careers (e.g. when deciding on the content of tenure track agreements, when defining the requirements for professorial appointments or in the criteria for evaluation). The respective research and teaching focus as well as outreach activities (such as knowledge transfer and third mission) should be given weighted consideration, as should individual life phases.
- Higher education and research institutions should develop systemically effective measures to attract underrepresented groups, such as young female talent for science and technology or young male talent for the care or education sector, in cooperation with schools and other stakeholders (business, administration, etc.).
- Higher education and research institutions should fully implement accessibility requirements (United Nations Convention on the Rights of Persons with Disabilities).
- Higher education and research institutions should establish consistent data monitoring. This is the prerequisite for developing and expanding evidence-based measures to provide appropriate support for underrepresented groups at each academic career stage.

Examples of good practice

- For the implementation of ERA Action 5 ”Promote gender equality and foster inclusiveness”, the **ERA-NAP 2022–2025**[58] includes a set of measures on gender equality. These are aimed at promoting the development and implementation of gender equality plans, integrating the gender dimension into research questions and addressing gender-based violence at higher education and research institutions.

- With regard to transparent data monitoring, the **Vienna University of Economics and Business** has developed a pioneering tool, namely its digital and interactive gender equality report.[59] The aim of digital gender monitoring is to visualise gender equality data more effectively and present them interactively so that users can adapt the analysis to their own interests. The digital report also improves the accessibility, transparency and comparability of data.

- The pilot project **Promotion without Limits** (PromoLi), which involves nine universities, is a support programme for people with disabilities and/or chronic illnesses who want to pursue a career in science or the arts.[60]

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