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Researchers' Report 2014

Country Profile: Germany

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1. Key data

National R&D intensity target

With an R&D intensity of 2.98% in 2012[1], Germany is above the EU average and has virtually achieved the 3% national target. About one third of German R&D investment comes from public sources and two thirds from private sources – a distribution that has remained fairly stable over the last decade.

In the period 2000-2011, federal public research budgets, which represent more than half of public spending on research, were expanded substantially. Federal spending on research and development increased by 71% between 2000 and 2013. However, at *Länder* level, growth in R&D expenditure, including university expenditure on R&D was much lower. R&D intensities vary strongly between German *Länder*, ranging in 2011 from 1.43% in Schleswig-Holstein and 1.49% in Saarland to 5.08% in Baden-Württemberg, the European region (NUTS II level) with the highest research intensity. Berlin (3.56%), Bavaria (3.16%) and Hesse (3.02%) also have R&D intensities that are already above the German national target.

A recent survey of the *Stifterverband für die Deutsche Wissenschaft*[2] revealed that internal R&D spending of the business sector is expected to amount to EUR 53.84 billion in 2012 (+5.3% in nominal terms compared to the year before) and about EUR 56 billion in 2013 (+4%). Research intensity is especially high in the automobile sector, which represents nearly one third of total German business R&D investment.

Concerning EU funding Germany has allocated EUR 25.5 billion of ERDF Structural Funds to research, innovation and entrepreneurship with a 47.1% absorption rate. Germany counts 11 000 participants in the EU FP7 programme and receives the highest amount of FP7 funding in absolute terms (EUR 4.3 billion). Its success rate of applications is above average (24% compared to an EU average of 20.4%), but FP7 funding as a % of GDP is below the EU average.[3]

Key indicators measuring the country's research performance

The figure below presents key indicators measuring Germany's performance on aspects of an open labour market for researchers against a reference group and the EU average[4].

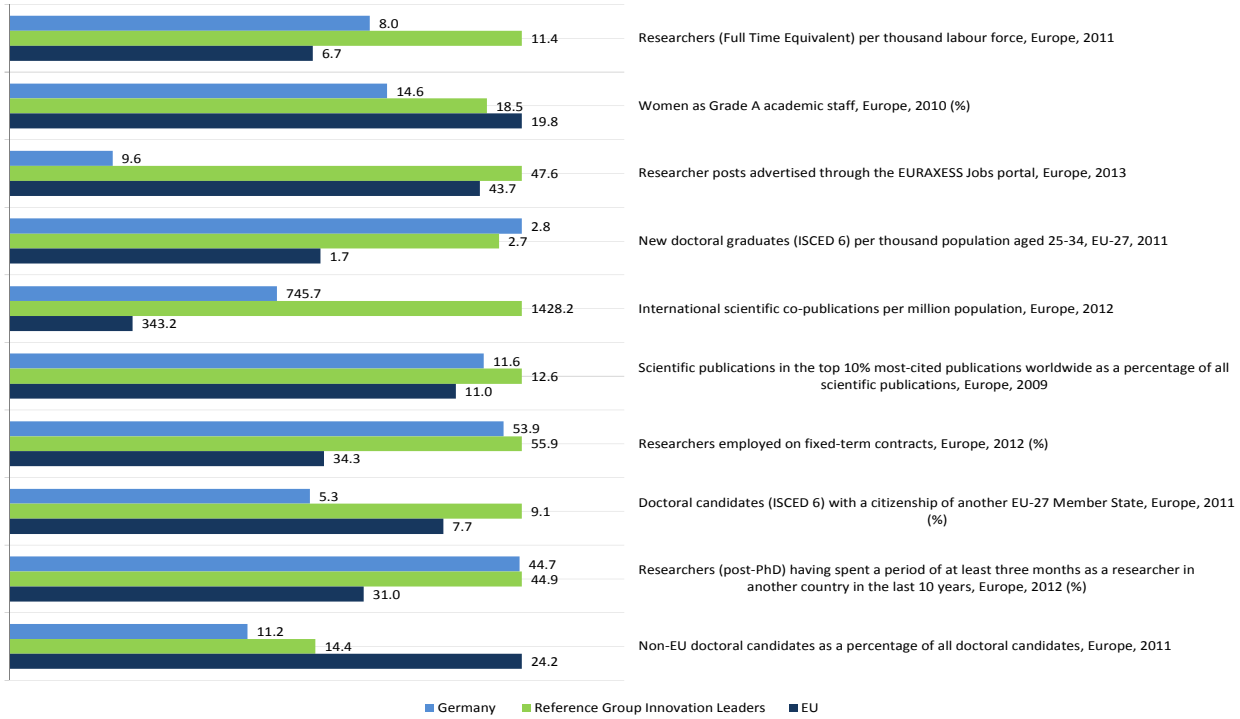
[1] BMBF estimations as of December 2013.

[2] Available at: http://stifterverband.info/statistik_und_analysen/index.html

[3] European Commission (2013), "Research and Innovation performance in EU Member States and Associated countries. Innovation Union progress at country level 2013"

[4] The values refer to 2013 or the latest year available.

Figure 1: Key indicators – Germany



Source: Deloitte
Data: Eurostat, SHE Figures, EURAXESS Jobs Portal, UNESCO OECD Eurostat education survey, Innovation Union Scoreboard 2014, MORE2.
Notes: Based on their average innovation performance across 25 indicators, Denmark, Germany, Finland and Sweden show a performance well above that of the EU average. These countries are the "Innovation leaders"[5].

Stock of researchers

The table below presents the stock of researchers by Head Count (HC) and Full Time Equivalent (FTE) and in relation to the active labour force.

Table 1: Human resources – Stock of researchers

Indicator	Germany	EU Average/Total
Head Count per 1 000 active labour force (2011)	12.32	10.55
Head Count (2011)	520 561	2 545 346
FTE per 1 000 active labour force (2011)	8.02	6.75
Full time equivalent (FTE) (2011)	338 608	1 628 127

Source: Deloitte
Data: Eurostat

2. National strategies

The German federal government and the *Länder* have put in place a range of measures aimed at training enough researchers to meet Germany's R&D targets and at promoting attractive employment conditions in public research institutions. The table below presents key programmes and initiatives intended to implement these objectives.

Table 2: National strategies

Measure	Description
Excellence Initiative (Federal government and the *Länder*) (ongoing)	Since its launch in 2005/2006, the Excellence Initiative has provided funds for the advancement of science and research at German universities. The Grants Committee selected a total of 39 universities from 13 Länder: 45 graduate schools and 43 clusters of excellence made it through the science-based selection process, while the institutional strategies of 11 universities won over the Committee in the third funding round.

[5] European Commission (2014), "Innovation Union Scoreboard 2014"

Measure	Description
National Report on Junior Scholars ('BuWiN') (ongoing)	The National Report on Junior Scholars provides statistical data and research findings on doctoral students and doctorate holders in Germany. The second report, which was published in 2013, focuses on the training and career development of researchers from their first professional qualification through to their doctorate, and then in the subsequent phase of further academic training right up to their transition into a professional career in research, academia or other fields[6].
Higher Education Pact 2020 (Federal government and the *Länder)* (2007-2015)	The Higher Education Pact 2020 aims to create additional university places in response to a rising number of students at German universities. Between 2007 and 2010, the Pact led to the creation of 182 193 new university places. In June 2009, the federal government and the *Länder* decided to extend the Higher Education Pact for the period 2011-15. As a result of a growing demand for higher education, some 625,000 additional university entrants are expected over this time period. The federal government is increasing its contribution to more than EUR 7 billion altogether[7]. The *Länder* have promised to increase their budgets accordingly.
High-Tech Strategy 2020 (Federal government) (ongoing)	The High-Tech Strategy 2020 aims to create lead markets, intensifying cooperation between science and industry, and improving the general conditions for innovation. Its priorities in the areas of science and technology are climate/energy, health/nutrition, mobility, security and communication. In addition, the Strategy has been aligned with the Europe 2020 Strategy to ensure that national and European research and innovation policies are closely aligned.
Pact for Research and Innovation (Federal government and the *Länder)* (2005-2015)	In 2005, the Federal Government and the *Länder* introduced the Pact for Research and Innovation, a research funding initiative for non-university research institutions and the German Research Foundation (DFG). The Pact was renewed in 2009 and may apply even beyond 2015. As a result of the Pact, funding for the German Research Foundation (DFG), the Fraunhofer-Gesellschaft (FhG), the Helmholtz Association (HGF), the Max Planck Society (MPG) and the Leibniz Association (WGL) has increased by 5% yearly.
R&D funding by the *Länder* (ongoing)	The *Länder* support research and development under a variety of funding programmes and measures. These *Länder* programmes focus, for example, on the creation of excellent research and innovation clusters (*Länder* excellence initiatives and priority programmes), researcher training and support for regional industry. All in all, the *Länder* spent EUR 9.7 billion on research and development in 2010. *Länder* expenditure on R&D is projected to have risen by EUR 645 million to EUR 10.3 billion in 2011[8].
Strategy of the Federal and Länder Ministers of Science for the Internationalisation of Higher Education Institutions in Germany (April 2013)	The strategy focuses on policy goals in nine different fields of action. These include improved regulatory frameworks for the internationalisation of higher education institutions (in order inter alia to facilitate joint qualifications with foreign counterparts), establishing a culture of welcome and an international campus. Other fields of action are improved outward mobility, taking steps to make it more attractive to study in Germany, attracting students and excellent academics from abroad, expanding international research cooperation and creating cross-border programmes.[9]
Examples from the *Länder* (ongoing)	**Research initiatives (Rhineland-Palatinate)** Since 2008, the Research Initiative has strengthened the competitiveness of the universities in the Rhineland-Palatinate through personnel, investments and third-party funding. The overall strategy of the state government is aimed at improving the competitiveness of each university through an autonomous profile-building process based on their existing strengths. **LOEWE – State Initiative for the Development of Scientific and Economic Excellence (Hesse)** LOEWE is a state initiative launched in 2008 in addition to the existing institutional funding of research institutes in Hesse. Funding under the Initiative is intended to make universities and research institutes in Hesse more competitive in the national and

[6] Available at: http://www.buwin.de/buwin/2013/, English summary available at: http://www.buwin.de/site/assets/files/1002/buwin2013keyresults.pdf

[7] For more information, see http://www.gwk-bonn.de/fileadmin/Pressemitteilungen/pm2013-06.pdf (in German only)

[8] GWK Report: "*Steigerung des Anteils der FuE-Ausgaben am nationalen Bruttoinlandsprodukt (BIP) als Teilziel der Lissabon-Strategie und der Strategie 2020*" (Increase in the share of R&D expenditure in national GDP as one of the goals of the Lisbon Strategy and the 2020 Strategy), December 2012

[9] Available at: http://www.bmbf.de/pubRD/Internationalisierungsstrategie_engl.Fassung.pdf

Measure	Description
	international context in the long term. In order to enhance the profile of research work in Hesse, the funds are intended to be used mainly for start-up financing of new centres and focus on universities, and institutions cooperating closely with universities in Hesse. Since 2011, the LOEWE budget has been EUR 90 million annually. **Strategy for Research and Innovation (Bavaria)** In 2011 the Bavarian State Government approved a master plan for research, technology and innovation policy based on an analysis of regional strengths and potential for innovation. The key stakeholders were involved in the development of the strategy, which contains medium to long-term targets and makes a selection of prioritised application or technology fields. It is implemented through concrete actions, e.g. "Bavaria FIT" which since 2008 has invested EUR 1.5 billion in the development of research infrastructure, the promotion of R&D in enterprises and the promotion of technology-oriented start-ups. Energy research is a central priority of Bavarian Research and Technology policy. In the framework of a new programme (which started in 2012), an investment of about EUR 490 million will finance 34 projects until 2016. This sum is being invested in infrastructure and in the creation of new professorships (e g. nine professorships and a staff of about 150 employees at Energy Campus Nuremberg) and the recruitment of a large number of new science staff (e.g. Research Cluster "Solar Technologies go Hybrid" which employs about 115 junior scientists).

Source: Deloitte

3. Women in the research profession

Measures supporting women researchers in top-level positions

In 2010, the percentage of women grade A academic staff was 14.6% in Germany compared with 18.5% among the Innovation Union reference group and an EU average of 19.8%[10].

The proportion of women in the research profession is taken into account in the target and performance agreements between the *Länder* and the universities as well as in the performance-based allocation of basic budgets in the universities.

In addition, there are a number of incentive programmes to promote the appointment of women researchers. The table below describes key measures to promote the appointment of women researchers to top-level positions.

Table 3: Measures supporting women researchers in top-level positions

Measure	Description
Female Professors Programme (BMBF[11]) (2008-2017)	Running since 2008, the programme promotes outstanding women researchers. Since then, 270 additional women professors have been appointed at German higher education institutions. Following a positive evaluation of the programme's contribution to developing equal opportunities in higher education institutions, the Joint Science Conference of the Federal Government and the Heads of Government of the *Länder* (GWK) decided in 2012 to continue the programme for a second period of five years until 2017.
Fraunhofer (2013-2019)	The Wissenschaftscampus (Science Campus) event is dedicated to female students. Key aspects of the four-day event are "Working in Science" and "A Career as a Manager". TALENTA, a support and development programme, aims at female scientists and female graduates at Fraunhofer. For two years, participants get support for their own career development. Until 2019, about 400 female scientists are to be promoted.
Funding line "Promoting women for academic leadership positions" (WGL) (ongoing)	As one of the categories for the competitive allocation of funding from the Joint Initiative for Research and Innovation (SAW procedure), the Leibniz Association has created a tool for establishing research groups led by women.

[10] See Figure 1 "Key indicators – Germany"
[11] Federal Ministry of Education and Research

Measure	Description
Helmholtz Postdoc-Programme (HGF) (ongoing)	To promote equal opportunities, it is intended to grant at least 50 per cent of the positions in this programme to women. For a programme description, please see Chapter 6 "Working Conditions".
Mentoring Programme for women researchers in Leibniz Institutions (WGL) (ongoing)	Through this one-year programme, highly qualified women researchers at postdoc level have been prepared for their future in leading academic positions. After a successful pilot in 2011/12, the programme was extended to all Leibniz Institutions in Germany in 2013 and is now offered annually[12].
Pact for Research and Innovation (Federal government and *Länder*) (2005-2015)	In 2012, the research-performing organisations within the Pact for Research and Innovation (FhG, MPG, HGF, WGL) have introduced organisation-specific flexible quota systems, the so-called cascade model (*Kaskadenmodell*). The goal is to increase the ratio of female scientists at a certain level of qualifications to the ratio in the qualification level directly below, taking into account field-specific potential and fluctuations of personnel within the organisation based on realistic but ambitious transition times. The research organisations report annually to the federal government and the *Länder* on the progress made.
Taking the Lead Mentoring Programme (HGF) (ongoing)	This mentoring programme is designed for young women working in science following completion of their doctorates and in mid-level administration. It aims to prepare motivated candidates to work in high-level (management) positions. Women researchers are encouraged to improve their networking within the Helmholtz Association on a long-term basis.
W2/W3 programme for outstanding women researchers (HGF) (ongoing)	As part of the Pact for Research and Innovation, the HGF aims to attract outstanding women researchers to high-level positions. In particular, this initiative aims to attract excellent researchers (back) from abroad. Approximately five positions on the Professorship level (W2/W3) pay scale are financed every year. The funding volume is generally a lump sum of up to EUR 1 million for W3 positions and EUR 750 000 for W2 positions over a period of five years. This finances the position itself and the necessary resources.
Examples from the *Länder:* (ongoing)	**Baden-Württemberg:** The **Margarete von Wrangell Postdoctoral Training Programme for Women** aims to increase the ratio of female professors by funding an employment relationship. The programme is currently financed equally by the *Land* and the European Social Fund. However, the higher education institutions bear the costs of funding the last two years of the five-year period of employment. The **Mathilde Planck Lectureship Programme** targets working women who would like to gain teaching experience at a university of applied science, an art or music college or the Baden Württemberg Cooperative State University (DHBW). The award of temporary lectureships enables the participants to establish contacts with higher education institutions and to qualify for a professorship at this type of institution. The **Brigitte Schlieben-Lange Programme** offers fellowships for doctoral candidates and post-docs as well as professional fellowships to women with children. The **Mentoring and Training Programme (MuT)** aims at the advancement of junior women researchers and their careers by building and fostering mentoring relationships in academia. **Bavaria:** Bavaria promotes the careers of women through to professorship with a special budget to create equal opportunities for women in research and teaching. In 2013 this budget amounted to around EUR 3 million. It finances, inter alia, post-doctoral scholarships and skills development grants. **Bayern Mentoring:** The *Land* Conference of Women's Representatives of the Bavarian Universities of Applied Science has been running this Bavaria-wide project since 2005. The aim of Bayern Mentoring is to support and promote young women taking MINT courses with a view to their future careers and thus increase the share of women in MINT professions. **Hesse:** Through the Mentoring Network for Women in Natural Science and Technology at all Hessian universities, women students and doctoral candidates in the natural sciences

[12] Available at: http://www.leibniz-gemeinschaft.de/karriere/wissenschaftlicher-nachwuchs/leibniz-mentoring/

Measure	Description
	and technology receiving counselling from professionally experienced female mentors. Close cooperation with enterprises and research institutes provides concrete job options. The mentoring programme "ProProfessur" supports junior scientists for 18 months. The two-year mentoring programme "SciMento-hessenweit" supports female PhD students and post-docs in the natural, engineering and life sciences at all Hessian universities with the aim of preparing them for a scientific career. **North Rhine-Westphalia:** One of three central issues for the Programme for Gender Equity in Higher Education Institutions is to support and fund young women researchers. Between 2012 and 2015 EUR 1.5 million are being dedicated annually to the funding for and support of positions for female assistant professors and female assistants in higher education institutions. **Saarland:** The **Saarland University (UdS) Excellence Programme for Female Researchers** sets out to support young women researchers at the UdS through special qualification and mentoring measures. The aim is to increase the share of women in attractive professional and leading positions and to boost the share of female applicants for professorships[13].
Examples from German Universities (ongoing)	**TANDEMplus programme (RWTH Aachen)** The mentoring programme TANDEMplus is a cooperative project of RWTH Aachen University, Karlsruhe Institute of Technology (KIT) and Forschungszentrum Jülich GmbH. The programme targets women Ph.D. students in the final stage of their doctoral thesis as well as women post-docs from natural sciences or engineering who are striving for a leading position in academia or business. **IFS-Mentoring (University of Cologne)** Launched in 2012, the Mentoring Programme for International Female Researchers matches mentees – international female PhD students or postdoctoral research scientists – and experienced professors.

Source: Deloitte

Measures to ensure a representative gender balance

Germany has not introduced a statutory quota in the research system. However, the science organisations and universities apply DFG equal opportunities standards and the so-called cascade model. Stakeholders take gender mainstreaming into account when filling positions of responsibility. In addition, four German science organisations (FhG, MPG, HGF and WGL) have agreed[14] to capitalise better on women's scientific potential (including in positions of responsibility). The Federal Government and the *Länder* as funding providers expect organisations to make active recruitment efforts and define self-imposed targets.

In 2010, the percentage of female doctoral students at non-university research institutions was 43%[15] at the HGF, 41% at the MPG, and 49% at the WGL. Given the relatively high numbers of female doctoral students, the German government has not taken any particular action to improve gender equality at doctoral level, despite great differences between subjects.

Parental leave

Six weeks before giving birth and eight weeks after giving birth are legally defined as the maternity protection period. In addition, parents have the right to parental leave before the child reaches the age of nine. Parental leave can be taken by one parent or shared between both parents. Per child, it is limited to three years (including the maternity protection period).

The table below provides information on parental leave conditions in individual funding organisations.

[13] Available at: http://gleichstellung.uni-saarland.de/index.php?id=14

[14] Pact for Research and Innovation (Federal government and the *Länder*) (2005-2015)

[15] Percentage for 2011

Table 4: Examples of individual science organisations - Maternity leave

Measure	Description
Alexander von Humboldt Foundation (AvH)	AvH fellows can extend their funding period for up to three months, based on the statutory period of protection set out in the Maternity Protection Act. This option also applies if the fellowship is scheduled to end during the statutory period of protection. The fellowship can be interrupted for up to 18 months if the birth falls within the funding period or if a child under the age of 12 needs to be cared for. Research fellows who are accompanied by children below the age of 12 can choose between extending their fellowships by up to 12 months or receiving a grant towards child care costs in the Georg Forster (HERMES) and Feodor Lynen Fellowship Programmes. Single-parent research fellows can apply for an additional flat-rate child allowance (EUR 400 for the first child and EUR 100 for each additional child).
German Research Foundation (DFG)	Fellowships provided by the DFG are extended for the statutory period of maternity protection. Fellowship recipients (men and women) with children can extend their fellowships for up to 12 months. Alternatively, any unused months of this extension can be converted into financing to cover substantiated child care costs (money instead of time). A monthly flat-rate child allowance is paid for children of fellowship holders under the age of 18 (EUR 400 per month for the first child and an additional EUR 100 for each additional child).
German National Academy of Sciences Leopoldina	Leopoldina grants are automatically extended by one year if the grant recipient gives birth during the grant period. Funding for child care costs can be provided instead.
Max Planck Society (MPG)	Grants and funding contracts offered by the MPG can be interrupted. There are far-reaching measures to support young women researchers and enable them to return to their research as quickly as possible (part-time work, child care facilities, or a family component in the grant itself – i.e. an increased grant to cover child care costs or grant extensions, or 'part-time' grants).
German Academic Exchange Service (DAAD)	DAAD scholarship holders can extend their funding period for the statutory period of protection. This option also applies if the scholarship is scheduled to end during the statutory period of protection. The scholarship can be interrupted for up to 18 months if the birth falls within the funding period or if a child under the age of 12 needs to be cared for. Incoming scholarship holders, who are not entitled to benefit from publicly funded child allowance, are awarded a monthly child allowance of the same amount. Outgoing postdoctoral scholarship holders who are accompanied by children below the age of 12 can request an extension of the funding period for up to 100% (maximum: 12 months). Alternatively, any unused months of this extension can be converted into financing of child care costs. Additionally an allowance is paid for children under the age of 18 (EUR 400 per month for the first child and EUR 100 for each additional child).

Source: Deloitte

4. Open, transparent and merit-based recruitment

Recruitment system[16]

The majority of researchers in Germany are employed as civil servants (*Beamte*) or public sector employees (*Angestellte*). The openness of appointment procedures for civil servants and public sector employees is guaranteed by the constitutional principle of selecting the best applicants (competition-based procedure). The principle is supported by gender equality legislation to promote the position of women ("*Bundesgleichstellungsgesetz*" of 2001 and additional Länder laws) and anti-discrimination legislation ("*Allgemeines Gleichbehandlungsgesetz*" (AGG) of 2006).

Recruitment procedures for university teachers (mainly professors) are traditionally strongly competition-based. In addition, the *Länder* Ministries are increasingly transferring the right to appoint staff to the respective universities and research institutions. Furthermore, the openness of advertisement and recruitment procedures in the higher education sector is guaranteed under the *Länder* Higher Education Laws. The most recent *Länder* Higher Education Laws not only contain stipulations on the traditional supra-regional and public advertising of vacancies, but they also explicitly require that vacancies be advertised internationally (depending on the importance of the position or in some cases as a general rule). Exceptions are permitted only in special cases.

[16] The most-used private Internet portal for job advertisements is www.academics.de

The involvement of external experts (in general from outside the institution), along with a comparative evaluation of applications, aims to ensure transparent and competitive recruitment of university teachers. In Germany, it is traditionally not possible to become a professor at the institution of higher education where the person received his/her academic training. The strictly regulated exceptions under *Länder* legislation were introduced on the basis of tenure-track models[17] in order to ensure more transparent and faster career paths for upcoming scientists. Junior professors[18] who have previously held fixed-term contracts and whose work is considered excellent in their specific subject area, may[19] be granted a permanent contract. As a rule, however, the researcher must have gained the doctorate required to set out on such a career path outside the institution of higher education which is recruiting him or her. This is in the interest of ensuring academic openness. Compulsory international advertising of every fixed-term or permanent vacancy for researchers is the rule. Exceptions may, however, be allowed in justified cases.

Open recruitment in institutions

The table below presents information on open recruitment in higher education and public research institutions.

Table 5: Open recruitment in higher education and public research institutions

Do institutions in the country currently have policies to …?	Yes/No	Description
– **publish job vacancies on relevant national online platforms**	Yes	There is no legal obligation to publish job vacancies on national online platforms, but most organisations do so. The platform www.academics.de/www.academics.com is a central, fee-charging commercial site for job vacancies in academia. "Academics" is a joint venture for Germany, Austria and Switzerland of the leading German weekly "Die Zeit" and the academic journal "Forschung und Lehre" and achieves high visibility. It also provides additional services. It is important for universities and research institutions to publish their job vacancies on academics.de. Personnel departments at universities then have to consider whether it is worthwhile for them to publish job vacancies on EURAXESS as well.
– **publish job vacancies on relevant Europe-wide online platforms (e.g. EURAXESS jobs)**		See above.
– **publish job vacancies in English**	Partly	
– **systematically establish selection panels**	Yes	
– **establish clear rules for the composition of selection panels (e.g. number and role of members, inclusion of foreign experts, gender balance, etc.)**	Yes	For professorial positions
– **publish the composition of a selection panel (obliging the recruiting institution)**	Yes	
– **publish the selection criteria together with the job advert**	Partly	
– **regulate a minimum time period between vacancy publication and the deadline for applying**	Yes	For all positions
– **place the burden of proof on the employer to prove that the recruitment procedure was open and transparent**	Partly	According to paragraph 22 of the general anti-discrimination legislation (AGG), the burden of proof that there has been no discrimination based on race, ethnic origin, gender, religion, world view, disability, age or sexual identity passes to the employer if the applicant can produce evidence to suggest that such discrimination has taken place.
– **offer applicants the right to receive adequate feedback**	Partly	As a result of the shifting of the burden of proof arising from paragraph 22 of the AGG, most institutions decline

[17] Not all Länder or universities have tenure-track models and their structure differs from university to university

[18] Junior professors are usually civil servants and they are appointed temporarily for up to 6 years

[19] Their performance has to be evaluated as excellent and a professorial position has to be available, if there is no tenure track model in place

Do institutions in the country currently have policies to …?	Yes/No	Description
		to give applicants a reason for their rejection, as they feel that they would be in danger of exposing themselves to legal proceedings if they provide information that is overly specific.
– **offer applicants the right to appeal**	Yes	Applicants can take legal action against decisions arising from application procedures: competition complaints (for civil servants) and the AGG.

Source: Deloitte

EURAXESS Services Network

In 2013, the number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was 9.6 in Germany compared with 47.6 among the Innovation Union reference group and an EU average of 43.7[20].

The publication of job vacancies on relevant Europe-wide online platforms such as EURAXESS Jobs is only one of many indications of an open, transparent and merit-based recruitment system. Countries such as Germany, which report a relatively low number of research posts advertised on the EURAXESS Jobs portal per thousand researchers in the public sector, have set up national systems.

The EURAXESS Germany website (www.euraxess.de) contains regularly updated information as well as an FAQ Section on entry conditions, social security, taxation, accommodation and administrative assistance.

5. Education and training

Measures to attract and train young people to become researchers

The *Länder* have put in place a set of measures aimed at raising young people's interest in science, particularly in MINT subjects (mathematics, informatics, natural sciences and technology). Moreover, universities offer events for pupils or have special partnerships with schools to raise young people's interest in science. The table below summarises practical measures implemented by individual science organisations and Higher Education Institutions (HEI) aimed at attracting and training young people to become researchers.

Table 6: Human Resources – Key programmes and initiatives

Measure	Description
Fraunhofer Gesellschaft (ongoing)	Long-term programmes for children and young people are an integral part of the Fraunhofer Gesellschaft's efforts to encourage and train young people to become researchers. Fraunhofer regularly organises the "KidsKreativ!" competition for children up to six years old. Together with the "MINT-EC" association, it organises annual workshops for pupils aged 10-12 with a focus on chemistry, technology/physics, IT/mathematics and biology. It also organises summer academies, some of which are open to young people from Austria, Germany, Italy, Liechtenstein and Switzerland. Fraunhofer Talent Schools (lasting several days) for 15-18 year olds provide an opportunity to get to know the Fraunhofer research landscape. A Talent Take Off programme offers different forms of support to young people embarking on a university degree. The "Strascheg Center for Entrepreneurship" and the long-established "TheoPrax" programmes promote the entrepreneurship skills of pupils from different school types.
School Labs Initiative (Helmholtz Association) (ongoing)	More than 50 000 pupils visit the 24 school labs at the Helmholtz Centres every year to conduct experiments and to learn about interdisciplinary scientific thinking and work.
Student Universities ("Schülerunis") (ongoing)	The majority of German universities offer excellent students from secondary schools the opportunity to attend lectures and courses, and earn credits while still at school. "Schülerunis" are supposed to help students decide on the right course of study before receiving their secondary school diploma, the "Abitur". The students are nominated by the cooperating schools and selected by the universities. "Schülerunis" exist at numerous universities e.g. the Ruhr-University Bochum, Stuttgart University or the TU Dresden.

[20] See Figure 1 "Key indicators – Germany"

Measure	Description
Tiny Tots Science Corner (Haus der kleinen Forscher - HdkF) Initiative (Helmholtz Association) (ongoing)	This initiative aims to increase the interest of children in science and technology by giving them an opportunity to conduct experiments and solve problems on their own. The Foundation develops workshops and teaching material for nursery school teachers and elementary school teachers, organises annual campaign days and provides comprehensive background information and experiments online. More than 30 000 teachers have already taken part in the training activities. The initiative has reached more than 28 000 nurseries and teachers and over one million children. The Helmholtz Association has decided to provide additional funding of about EUR 16 million until 2014. The Federal Ministry of Education and Research (BMBF) will provide an additional EUR 2 million for including six- to ten-year-old children until 2015.

Source: Deloitte

Doctoral graduates by gender

The table below shows the number of doctoral graduates in Germany by gender as a ratio of the total population.

Table 7: Doctoral graduates by gender

Indicator	Germany	EU Average
New doctoral graduates (ISCED 6) per 1 000 population aged 25-34 (2011)	2.8	1.7
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2011)	2.5	1.6
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2011)	3.0	1.8

Source: Deloitte
Data: Eurostat

Funding of doctoral candidates

The academic education of doctoral students is largely organised in terms of employment at higher education institutions (which are entitled to award doctorates), with jobs financed by institutional or external third-party funding as part of larger research projects. According to estimates by the Federal Statistical Office, almost two thirds of the approximately 200 000 doctoral students follow this traditional path. Almost one fifth of these are employed by a non-university research institute or another employer.

One quarter of doctoral students are supported by public funding for doctoral studies. The leader in this area is the DFG, followed by the support programmes of the Länder Ministries of Science, major organisations that fund young talented students, foundations and the DAAD. While structured doctoral courses have grown in importance, the diversity of doctoral education needs to be maintained[21]. Other more traditional and well-established forms of doctoral training should to be maintained and recognised besides structured doctoral training.

Measures to increase the number of students taking science to an advanced level

Students are exposed to research-related topics at an early stage of their academic career. For example, top-performing students have the option of pursuing a "fast track doctorate" directly after completing their bachelor's degree (e.g. the Neuroscience Programme at the University of Göttingen).

For information on measures aimed at attracting young people to become researchers, see chapter 5 “Education and training”. For more information on measures promoting gender equality in the research profession, see chapter 3 “Women in the research profession”.

Numerous German universities cooperate with companies in the area of doctoral training. For example, the Robert Bosch Centre for Power Electronics (RBZ), a research and teaching association formed by the Bosch Group, the University of Stuttgart and the Reutlingen University of Applied Science, offer Bachelor's and Master's degrees for students specialising in power electronics and microelectronics. Students can also pursue PhDs at the RBZ. The Centre's close cooperation with Robert Bosch GmbH ensures that students receive industry-relevant training.

The Helmholtz Centres collaborate closely with universities in their respective regions. The Helmholtz Association provides structured doctoral training in the form of research schools and graduate schools, and grants universities access to the Helmholtz Association's laboratories and research infrastructures. The

[21] Cf. Bundesbericht Wissenschaftlicher Nachwuchs 2013 (2013 National Report on Junior Scholars), Bielefeld 2013, p. 28.

Helmholtz Research Schools are joint programmes established on the basis of cooperation agreements between Helmholtz Centres and universities with the aim of supporting young researchers. The Research Schools provide structured doctoral training over a period of three years in areas of mutual scientific interest and scientific excellence. The Graduate Schools offer PhD students an interdisciplinary education that teaches them important skills for a career in science or the private sector.

Measures to increase the quality of doctoral training

The table below provides information on measures aimed at increasing the quality of doctoral training.

Table 8: Measures supporting the quality of doctoral training

Measure	Description
Graduate Academies and Research Schools of universities (ongoing)	In Germany, only universities are legally entitled to grant doctoral degrees. Many universities have recently established so-called Graduate Academies or Research Schools which encompass university-wide structures for the training of doctoral candidates (sometimes in close cooperation with research organisations), sometimes including offers for MA students and/or Post-docs). They function as one-stop information and support centres for doctoral candidates. They offer and coordinate various programmes for this target group, provide networking possibilities and ensure good standards in training and supervision.
Helmholtz Association (HGF) (ongoing)	Thirteen Helmholtz graduate schools[22] and 21 Helmholtz research schools have been funded since 2006. Their aim is to enhance existing training programmes both quantitatively and qualitatively. Graduate schools are designed to improve the structuring of the doctoral phase and give doctoral students stable supervision conditions and an individually agreed qualification programme consisting of scientific and interdisciplinary elements.
International PhD Programmes in Germany – IPID (DAAD) (ongoing)	In a programme entitled "International PhD Programmes in Germany", the DAAD in 2010 initiated the establishment of international structured doctoral programmes in Germany. At present, 38 international PhD-programmes are funded by the DAAD.
Leibniz Association (WGL) (ongoing)	Since 2006, 31 Leibniz Graduate Schools have been established where young researchers get the opportunity to pursue their doctoral studies in an excellent, cooperative and transdisciplinary research environment. Therefore, Leibniz Institutes offer structured doctoral studies in close cooperation with universities.
Max Planck Society (MPG) (ongoing)	There are currently more than 60 International Max Planck Research Schools (IMPRS), about 41% of these are in the areas of chemistry, physics and technology, 37% in biology and medicine, and the rest in the humanities and social sciences. Each Research School is established by one or more Max Planck Institutes. They work together closely with universities and other research institutions, some of them from other countries.

Source: Deloitte

Skills agenda for researchers

The table below provides information on programmes aimed at boosting researchers' skills.

Table 9: Measures supporting researchers' skills

Measure	Description
Fraunhofer Bildungsprogramm (Fraunhofer)	Fraunhofer`s education programme offers scientists extensive possibilities for training and career development. In particular, a modularly structured management development programme has been drawn up that takes into account the specific challenge of management in scientific context (ambidextrous leadership).
Leibniz Qualification Programme (ongoing)	This programme offers training in soft skills especially for young researchers at Leibniz Institutes. It provides the possibility of developing leadership and communication skills in particular. As the programme includes researchers at all Leibniz Institutes and therefore of almost every discipline, it also fosters cross-disciplinary networking and communication.
Max Planck Research Programmes (MPG) (ongoing)	The MPG offers special training programmes or events for all career levels. These are either organised centrally by the general administration, by each individual institute, or by PhD students themselves (PhD-Net). In the case of the International Max Planck Research Schools (IMPRS), such training activities form part of the curriculum.

[22] Graduate schools are subject-related or interdisciplinary research training groups bringing together a limited number of PhD-candidates. They serve as a hub for research-related debates and skills training and help to establish an intellectually creative exchange of opinions and of research results. They are not hybrid university structures like in the US encompassing the whole university (MA and PhD-students)

Measure	Description
Taking the Lead (HGF) (ongoing)	The HGF has developed a talent management concept for the continuous scientific and interdisciplinary education of researchers at all levels of their careers. Various mentoring programmes for young researchers offer researchers the opportunity to develop and expand their interdisciplinary skills. The programme not only includes mentoring, but also training activities (personal presentation, public speaking, individual coaching and networking).
University example: Graduate Academy at the University of Jena (ongoing)	The Graduate Academy at the University of Jena prepares early-stage researchers for their professional career in science, business and society. Its study programmes combine disciplinary and interdisciplinary topics as well as specially tailored courses in transferable skills and intensive individual supervision by a team of internationally recognised faculty members.

Source: Deloitte

6. Working conditions

Measures to improve researchers' funding opportunities

The German government has continuously increased funding for education and research in recent years and aims to raise expenditure in these areas to 10% of GDP by 2015. Between 2005 and 2012, the federal government increased its funding for R&D by 52% and for education by 70%. The *Länder*, which are directly responsible for schools and higher education in Germany, have all maintained or increased their basic funding for public higher education institutions.

Remuneration

In Germany, researchers' remuneration is subject to laws and collective agreements. Higher education institutions and non-university research institutions enjoy a high degree of autonomy. As a result, universities can grant professors variable performance-related payments and bonuses in addition to their basic salary if they have sufficient funds.

In order to recruit or retain scientists, the TVöD (*Tarifvertrag für den öffentlichen Dienst*) and the TV-L (*Tarifvertrag der Länder*) public sector pay scale allow for additional bonuses to be paid, which are covered in the special terms and conditions of the collective agreement. Employees at German universities have the right to secondary employment (up to a certain level if they are civil servants).

The Academic Freedom Act *(Wissenschaftsfreiheitsgesetz*) entered into effect on 12 December 2012. As a result, non-university research institutions will have more freedom in matters of finance and staffing, the acquisition of shares in companies and in construction projects. Bureaucracy will be minimised, competences will be pooled and authorisation procedures will be accelerated. The legislation is rooted in the positive experience gained in the pilot phase of the Academic Freedom Initiative (*Wissenschaftsfreiheitsinitiative*).

The Academic Freedom Act creates the possibility of paying scientists higher salaries and benefits than in the past (extra pay or bonuses, for example), provided non-public funds are applied for this purpose. These funds may, for example, come from foundations, donations or capital gains. By allowing German research institutions to offer more attractive salaries, the possibilities for them to recruit highly qualified people from other countries or from the private sector and also prevent a brain drain have been considerably enhanced. This reform can also be applied to employees who are not researchers themselves but work in a science-related field and make a significant contribution to a research project. This development is crucial for Germany as a base for academic, scientific and research activity and for its international competitiveness.

For further information, see the country profile on remuneration of researchers from the MORE2 study on the EURAXESS website[23].

Researchers' Statute

Academic freedom is explicitly protected under the German constitution (Basic Law of the Federal Republic of Germany)[24]. Other conditions for institutions of higher education and publicly funded non-university research establishments are regulated by law, or through collective agreements. This applies to salaries and the scope for

[23] http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies

[24] The Basic Law of the Federal Republic of Germany, Article 5, Paragraph 3

negotiation of the independent institutions, the rights and obligations associated with researcher positions, participation in research and freedom of research, and participation rights[25] of researchers in institutions.

'European Charter for Researchers' & 'Code of Conduct for the Recruitment of Researchers'

The German government supports the objectives of the European Charter & Code. To date, four science organisations - the German Rectors' Conference (HRK) on behalf of all German HEI, the German Academic Exchange Service (DAAD), the Alexander von Humboldt Foundation (AvH) and the Fraunhofer Gesellschaft - have signed the Charter & Code. In addition, seven universities, one research organisation (WZB Berlin Social Science Center), and two companies (Lead Discovery Center GmbH and Polymaterials AG) individually endorsed the Charter & Code.

German universities have begun to engage in the HRS4R process. In June 2013, the Wissenschaftszentrum Berlin für Sozialforschung (WZB) was the first institution to have gained the 'HR Excellence in Research' Logo. The general assembly of the HRK has recommended to all its member organisations that they join the HRS4R process[26]. In addition, the HRK has set up a working group to provide assistance to institutions engaging in this process and is currently aware of another nine institutions seeking to obtain the EC acknowledgement.

In practice, however, the Charter & Code is not much used as a reference. Reasons include a relatively low awareness of the Charter & Code as well as the fact that institutions do not see the need for an additional acknowledgement because the existing regulatory framework and initiatives such as 'Total E-Quality'[27] or '*Audit familiengerechte Hochschule*'[28] cover most areas of the Charter & Code.

Autonomy of institutions

The autonomy of institutions to define different profiles of academic staff is regulated by *Länder* laws on higher education. There is a structural difference in Germany between universities and universities of applied science. The former are committed to scientific research, training of young researchers and teaching, while the latter primarily engage in applied research and teaching. Under the current legislation, institutions of higher education can relieve staff of certain tasks or reduce their workload, sometimes on a temporary basis (reduction of teaching duties in favour of research or self-administration, sabbaticals, etc.)

Germany would like to maintain the close, tried and tested ties between teaching and research. Approximately 600 researchers in leading positions at non-university institutes teach and conduct research at universities at the same time. Non-university institutions – and their staff – are not obliged to teach. However, they can reach an agreement with universities to do so (for example in the form of joint appointments, honorary professorships, extraordinary professorships or as associate professors).

Career development

Career development depends strongly on the individual subject culture. The terms of appointment are regulated by law[29]. However, appointment practices are the responsibility of the individual institutions. The BMBF can include career development provisions in the evaluation criteria if support for young researchers is an objective of a specific funding measure, or if it is a prerequisite for funding. The criteria are published in the funding regulations.

The table below provides examples of measures put in place to support researchers' career development.

Table 10: Measures supporting researchers' career development

Measure	Description
Examples from the *Länder* (ongoing)	**Baden-Württemberg:** The 'Junior Professors' Programme' supports new research projects by junior professors at institutions of higher education in Baden-Württemberg and is intended to improve their working conditions. Funding is limited to three years and the

[25] *Länder* Higher Education Laws (*Länderhochschulgesetze*)

[26] Available at: http://www.hrk.de/press/press-releases/press-release/meldung/hrk-supports-european-initiative-on-quality-assurance-of-hr-management-at-heis-2357/

[27] Available at: http://www.total-e-quality.de/ (in German)

[28] Available at: http://www.beruf-und-familie.de/index.php?c=22 (in German)

[29] *Länder* Higher Education Laws (*Länderhochschulgesetze*)

Measure	Description
	institutions must provide co-funding in order to underline their interest in supporting junior professorships.
Emmy Noether Programme (DFG) (ongoing)	In order to be eligible to apply for the Emmy Noether Programme, an excellence programme for outstanding researchers to gain early scientific independence 2-4 years after gaining a PhD, the researcher has to have spent at least one year abroad. By leading their own independent Junior Research Group they prepare for a leading position in science and research or for a university teaching career.
Fraunhofer Attract Funding Programme (FhG) (ongoing)	This programme was designed to give outstanding external researchers an opportunity and incentive to further develop their ideas into practical applications in a market-oriented environment within the FhG. An evaluation of the researcher is carried after the first three years with the involvement of Fraunhofer's central human resources management and the institute's management. The evaluation aims at assessing the researcher's development prospects at the Fraunhofer or the individual institute following the end of the Attract Programme period.
German Research Foundation Coordinated Programmes (DFG) (ongoing)	In order to receive funding for Research Training Groups (and for research training group modules integrated in Collaborative Research Centres), career development provisions have to be described in the application; they are used as a criterion in the evaluation process. The Graduate Schools established as part of the Excellence Initiative of the Federal Government and the *Länder* also include career development provisions. Start-up support is available under the DFG's coordinated programmes (Research Training Groups, collaborative research centres, and research groups, priority programmes) to help young researchers in the phase immediately following their PhD.
Helmholtz-Postdoc-Programme (HGF) (ongoing)	Talented young academics may receive a grant for a period of two to three years after earning their PhD, enabling them to work independently on a research topic of their own choice and establish themselves in their field of research. To promote equal opportunities at least 50 percent of the positions in the programme are to be granted to women. The programme started in 2012 with the funding of 35 postdocs. In 2013 20 postdocs were selected for funding. The funding volume of the Initiative and Networking Fund for this programme is EUR 9 Mio for the two selection rounds.
Helmholtz Young Investigator Groups (HGF) (ongoing)	The programme targets researchers who received their PhD in the previous two to six years. Successful applicants are given the opportunity to lead their own research group and gain the necessary skills for pursuing a university career. The HGF offers young researchers an opportunity to gain academic independence at an early stage and the option of tenure following a successful evaluation. To date[30], 183 Helmholtz young investigators groups have been funded with a total funding volume of more than EUR 118 million.
Otto Hahn Groups and Max Planck Research Groups (MPG) (ongoing)	Otto Hahn Groups (three to four new groups every year) and the Max Planck Research Groups (122 in total) offer young researchers an opportunity to head a research team at an early stage of their career for a limited period of time. Researchers gain research and management experience.
ScienceCareerNet Ruhr (UAMR) (ongoing)	ScienceCareerNet Ruhr is an inter-institutional and international event and mentoring programme that is intended to combine and illustrate the potential in supporting young talent of three universities (Ruhr University Bochum, Technical University Dortmund and Duisburg-Essen University). ScienceCareerNet Ruhr focuses on two target groups, namely doctoral students or people interested in doing a doctorate and postdocs, and those carrying out post-doctoral studies in the natural sciences, the engineering sciences, the humanities, and the economic and social sciences. Participants are given the opportunity to form networks both within their disciplines as well as at inter-university level, to take part in a top-level qualifications programme and to develop enhanced career prospects.

Source: Deloitte

Shift from core to project-based funding

The basic financing of universities in Germany has remained stable over the last few years. The Pact for Research and Innovation guarantees an annual increase in institutional funding for non-university research establishments. Various other programmes have provided additional opportunities to raise third-party funding. Contracts for staff at universities and research institutions financed by third-party funding are also subject to the relevant legal provisions. This also applies to fixed-term contracts.

[30] Status November 2013

Social security benefits (sickness, unemployment, old-age)

Unlike employment contracts, which are subject to social insurance contributions, scholarships from German science organisations are flexible funding instruments – they can to a certain extent be adapted by the scholarship provider and used to provide unbureaucratic support in unexpected (emergency) situations or in specific circumstances. Scholarship recipients come to Germany from all over the world, often for a short period of time. In many cases, they have employment contracts in their own countries. Consequently, there is a broad range of individual circumstances. Structurally, therefore, the scholarship providers are in the best position to find a suitable solution for each individual case.

The AvH offers social benefits in the form of ancillary grants. Fellows and accompanying family members have to be covered by a health insurer providing sufficient coverage in Germany from the first day onwards and for the entire duration of their stay in Germany. The AvH can provide a grant of EUR 50 per month for the duration of the funding period towards the costs of health and personal liability insurance for fellows, for spouses and dependent children (up to the age of 18) who accompany them to Germany for a period of at least three months. Fellows are responsible for making sure that they have sufficient health coverage. No health insurance cover is provided under the Feodor Lynen Research Fellowship Programme for German post-docs and experienced researchers going abroad to conduct research. Health insurance has to be paid for from the fellowship grant. The Georg Forster Research fellowship programme (HERMES) contains new fellowship benefits, such as a subsidy towards a pension plan that may be granted by the AvH on application.

DFG fellowship holders are responsible for their own health insurance; it has to be financed from the fellowship. Should the recipient fall seriously ill, and should a fellowship interruption or a part-time solution not be possible, the fellowship can – in individual cases and subject to the provision of medical proof – continue to be paid. In addition, the fellowship period can be extended so that the recipient can complete his or her work and remain in the science system.

Grants offered by the Fraunhofer Gesellschaft and MPG continue to be paid for six weeks if the recipient falls ill. Beyond this period, the Max Planck Institute in question decides whether and to what extent payments will continue. The livelihood of doctoral students should be guaranteed while they are ill; any state benefits received are taken into account when calculating the grant payments. The German Academy of Sciences Leopoldina does not provide any contribution to social insurance beyond full personal scholarships covering living expenses in the place of residence.

Unemployment insurance is not provided under scholarship programmes.

In principle, grant recipients are free to make voluntary payments into the statutory pension insurance scheme (DRV), foregoing the employer contribution (and taking into account the minimum limits). The German science organisations as well as the public and private funding institutions offer additional pension insurance and other social benefits in order to maintain the attractiveness of funding instruments and reduce the risk of old-age poverty among researchers who start paying social security contributions at a later stage in life. Organisations promoting mobility are increasingly considering the provision of additional grants for post-docs to enable them to set up private pension schemes.

7. Collaboration between academia and industry

Universities, non-university research institutions (particularly Fraunhofer) and the private sector in Germany are closely interlinked, particularly in the field of engineering. For example, students are offered the possibility of pursuing a PhD in applied research in close collaboration with industry[31].

A high level of third-party funding raised by universities from the private sector[32] and the right of university employees to pursue secondary employment are additional indicators of a strong link between business and academic research in Germany.

[31] As a general rule PhD degrees are only awarded by Universities (and not by science organisations)

[32] In 2010, 21.1% of third-party funds raised by German universities came from the private sector (2005: 28.1%, 2006: 26.2%, 2007: 25.8%, 2008: 24.8% and 2009: 22.9% (Federal Statistical Office: "*Bildung und Kultur. Monetäre hochschulstatistische Kennzahlen*" (Education and

Professors at universities of applied science are generally expected to have at least five years of professional experience, three of them outside the university system.[33] The table below describes measures aimed at encouraging researchers' inter-sectoral mobility.

Table 11: Measures encouraging inter-sectoral mobility

Measure	Description
Federal programmes at the interface between science and industry (BMBF) (ongoing)	The Validation of the Innovation Potential of scientific research (VIP) initiative invites scientists from universities and research institutions to benchmark and substantiate their research results with respect to their economic benefit. An innovation mentor with an industrial background is obligatory for each project. New forms of collaboration are being promoted through the "*Forschungscampus*" (research campus) initiative closely linking academia and industry, and the "*Spitzencluster-Wettbewerb*" (Leading- Edge Cluster Competition), which is intended to keep Germany in the top league of technologically advanced nations. The high-performance clusters formed by business and science enter into strategic partnerships based on a common cluster strategy in a particular technological area. The 10 "*Forschungscampi*" and 15 "*Spitzencluster*" provide young researchers with outstanding opportunities to work at the interface between science and industry in a challenging and innovative environment.
Fraunhofer Society (FhG) (ongoing)	In accordance with the Fraunhofer's mission, the majority of its staff are integrated in projects and work on finding innovative solutions, often in direct contact with businesses. Following several years at Fraunhofer institutes (working on various projects – including international projects, completing a PhD, management experience, etc.), Fraunhofer staff often move to positions of responsibility in business or the science system (about 5% per year).
German Research Foundation (DFG) (ongoing)	Transfer projects can be proposed in conjunction with many DFG grant programmes and in all DFG-funded scientific disciplines. Transfer projects are based on results generated by DFG-funded research projects. They serve to test scientific insights in practice and in collaboration with an application partner, or develop basic-research findings into prototypes or exemplary applications. The application partner may be a commercial enterprise or a non-profit institution, especially in the public sector.
Max Planck Innovation (MPG) (ongoing)	Max Planck Innovation advises and supports researchers from the Max Planck institutes in evaluating inventions and filing patents. It presents inventions from the Max Planck Institutes to the private sector and supports researchers in setting up companies. In doing so, it fosters the transfer of results from basic research into commercially and socially useful projects.
Shared Professorship (KIT) (ongoing)	With its Shared Professorship programme, the Karlsruhe Institute of Technology (KIT) offers young researchers the opportunity to work at the university and in a commercial company at the same time. The measure, which was developed together with industry within the framework of the Initiative for Excellence as part of the KIT's Institutional Strategy, is limited to four years for any individual shared position and is funded equally by the KIT and companies.

Source: Deloitte

8. Mobility and international attractiveness

Measures aimed at attracting and retaining 'leading' national, EU and third country researchers

In 2011, the percentage of doctoral candidates (ISCED 6) who were citizens of another EU-27 Member State was 5.3% in Germany compared with 9.1% among the Innovation Union reference group and an EU average of 7.7%[34]. In the same year, the percentage of non-EU doctoral candidates as a percentage of all doctoral candidates was 11.2% in Germany compared with 14.4% among the Innovation Union reference group and an EU average of 24.2%[35].

Culture. Monetary higher education statistics) Available at: https://www.destatis.de/DE/Publikationen/Thematisch/BildungForschungKultur/BildungKulturFinanzen/KennzahlenMonetaer2110432107004.pdf?__blob=publicationFile)

[33] This applies to Universities of Applied Science but is not (as a general rule) strictly applied at Universities.

[34] See Figure 1 "Key indicators – Germany"

[35] Ibid

Universities and research establishments are free to recruit their own personnel. They are generally in a good position to attract foreign researchers thanks to their scope for salary negotiations, the international job advertisements that are prescribed by law in many *Länder*, and the various funding programmes available.

The table below presents examples of how German science organisations attract and retain leading national, EU, and third country researchers to Germany.

Table 12: Measures attracting and retaining 'leading' national, EU and third country researchers

Measure	Description
Fraunhofer Attract Programme (FHG) (ongoing)[36]	The programme offers outstanding external researchers attractive working conditions that enable them to build up their own groups at Fraunhofer institutes. Each group receives an amount of EUR 500 000 for a period of five years, half of which is financed via central funds and half via basic institute funding.
German Academic International Network (GAIN) (joint initiative) (ongoing)	The Alexander von Humboldt Foundation, the German Academic Exchange Service and the German Research Foundation founded the German Academic International Network (GAIN) as a joint initiative in 2003. The Associated Members include the Fraunhofer Society, the Helmholtz Association, the Max Planck Society, the Leibniz Association, the German Rectors' Conference, the German Cancer Aid (*Deutsche Krebshilfe*) and the German National Academic Foundation (*Studienstiftung des Deutschen Volkes*). GAIN is a network of over 5 000 German researchers and scientists working in the U.S. and Canada. It helps its members to maintain and build their international networks while they are working abroad; it further facilitates transatlantic mobility and cooperation. A monthly newsletter and a comprehensive website inform about career- and funding opportunities and recent developments in science policy in Germany. At events and meetings, GAIN members meet experts from German science, politics and industry. The annual meeting in the U.S. attracts over 300 researchers and a large number of representatives from all areas of the German research landscape. A talent fair with more than 60 exhibitors is held in connection with the conference.
Humboldt Professorship (AvH) (ongoing)	Alexander von Humboldt Professorships are awarded to internationally leading researchers in all subjects, enabling them to carry out pioneering research at universities and research institutions in Germany. Researchers enjoy freedom in shaping their own working conditions, with very few administrative obligations. The award is financed by the BMBF as part of its international research fund for Germany. As a rule, the award is worth EUR 5 million for scientists conducting experimental research and EUR 3.5 million for those working in theoretical disciplines. The funding is provided over a period of five years. The Humboldt Professorship is long-term in nature – in other words, the host institution has to ensure from the very beginning that the winner can be offered a permanent senior position after the end of the five-year funding period. Since its launch in 2008, 41 Humboldt professors have taken up their cutting-edge research in Germany.
Recruiting Initiative (HGF) (ongoing)	The Helmholtz Association has been creating extra positions for top level scientists thanks to budget increases. The initiative aims to recruit from three target groups: outstanding researchers, women scientists and researchers from abroad. The programme will run until 2015 and encompasses 40 extra positions.
Vintage Class Programme (FHG) (ongoing)	The human resources development programme "Vintage Class" aims at supporting, training, and retaining potential candidates for senior institute management positions. Its members are nominated by heads of Fraunhofer institutes and selected by a body composed of representatives of the central administration and the institutes. The members are nominated for a term of five years and act as a “think tank” within the Fraunhofer Society.
Welcome Centres at German Universities (ongoing)	A large number of German institutions of higher education have Welcome Centres. These specialised counselling and service centres support international researchers in preparing for and conducting their research stays. They provide advice and information on a wide range of topics on entry into and stays in Germany, e.g. visas, family, culture, etc. and organise leisure-time and information events on various topics. In 2013, TU Dresden Welcome Centre in cooperation with EURAXESS Germany launched a benchmarking evaluation of Welcome Centres at German Universities to investigate the various approaches, portfolios and best practice examples amongst those

[36] For more information, see table 10 “Measures supporting researchers’ career development”

Measure	Description
	responsible for integrating international researchers at German universities. The survey provides information on the financial provisions, facilities and structure of Welcome Centres in Germany[37].

Source: Deloitte

Inward mobility (funding)

The table below presents information on measures supporting researchers' inward mobility.

Table 13: Measures supporting researchers' inward mobility

Measure	Description
German National Academy of Sciences Leopoldina	The German National Academy of Sciences Leopoldina offers bridging grants (for up to 12 months) to returning researchers.
German Research Foundation (DFG) (ongoing)	DFG programmes are open to applicants of all nationalities. The project must be carried out at a German institution. Some programmes[38] aim at attracting young researchers (back) to Germany. Fellowship holders who have spent a longer period (at least 18 months) conducting research abroad can receive travel allowances enabling them to participate actively in conferences, lecture series or presentation trips to Germany and to maintain their scientific contacts in Germany. The DFG also provides relocation allowances and, in some cases, return fellowships to facilitate the re-integration of returning researchers into the German science system.
Fraunhofer (ongoing)	Fraunhofer Research Scholarships may be provided to foreign scientists holding a doctorate or other comparable qualification whose degree or postgraduate qualification dates back no more than ten years. They can conduct special research at one of the 66 Fraunhofer Institutes for up to one year. Fraunhofer and the Chinese Academy of Science grant one-year fellowships to outstanding doctoral candidates who wish to continue their PhD project in Germany with Fraunhofer.
Leibniz-DAAD Research Fellowships (WGL) (ongoing)	The Leibniz-DAAD Research Fellowships programme has been implemented since 2011 by the Leibniz Association and the German Academic Exchange Service (DAAD). The fellowships offer highly-qualified recent foreign postdocs the opportunity to conduct special research at one of the 94 Leibniz Association participating institutions in Germany for up to one year. This measure aims to further develop the internationalisation of German academic education and the promotion of international researchers who will stay important partners for German research[39].
National Contact Point Mobility (AvH) (ongoing)	The AvH promotes international cooperation by promoting researchers' mobility and reducing obstacles to mobility. In its capacity as the German National Contact Point Mobility, the AvH helps research establishments and individuals in putting together promising applications under the People Programme of the 7th EU Research Framework Programme and the Marie-Sklodowska-Curie Actions in Horizon 2020. AvH also acts as the German Bridgehead Organisation for the pan-European initiative EURAXESS – Researchers in Motion.
Research fellowships and research awards of the Alexander von Humboldt Foundation (AvH) (ongoing)	The AvH supports science cooperation between outstanding researchers from Germany and abroad. It provides research fellowships (e.g. Humboldt fellowships, Georg Forster Fellowships (HERMES)) and research awards enabling researchers from other countries to come to Germany to carry out a research project in cooperation with a host and research partner. There are programmes for post-docs, junior research group leaders (*Sofja Kovalevskaja* Awards), experienced researchers (Bessel Research Awards) and top international researchers (Max Planck Research Award (together with MPG), Humboldt Research Awards, *and Anneliese Maier* Research Awards). German nationals and educational residents can also apply for these programmes provided they have spent some time abroad[40]. German post-docs and experienced researchers can apply for Feodor Lynen fellowships for international research visits. Fellows can receive return fellowships for a maximum period of up to twelve months upon their return to Germany.

[37] http://www.euraxess.de/drmp_de/doc/yourprezi_klein.pdf

[38] For example, the Emmy Noether Programme for Young Research Group Leaders

[39] Available at: http://www.leibniz-gemeinschaft.de/karriere/wissenschaftlicher-nachwuchs/leibniz-daad-research-fellowships/

[40] German citizens and educational residents can apply if their uninterrupted, permanent place of residence has been abroad 1) for more than 10 years or 2) for more than 5 years, and their strong connections to their current country of residence can be deduced indubitably from one of the following criteria: a. they have a tenured position in their current country of residence abroad; b. they are in possession of a permanent residence permit issued by their current country of residence, as long as a permanent residence permit is not held due to German citizenship (e.g. EU Member States); c. they and/or their marital partner are a national of their current country of residence

Measure	Description
Research Grants for Doctoral Candidates and Research Stays for University Academics (DAAD) (ongoing)	Under these two programmes, the DAAD provides funding for a full PhD as well as three-month research stays at German universities for more experienced researchers.
Re-integration of German Scientists from Abroad (DAAD) (ongoing)	The programme which is funded by the Federal Ministry of Education and Research (BMBF) supports German academics of all disciplines who wish to continue their academic career in Germany following a mobility phase. Return scholarships are allocated for a maximum period of six months.

Source: Deloitte

Outbound mobility

There are no binding, standardised rules for research periods abroad, but such periods are becoming the norm in the German research system. International (work) experience is becoming increasingly valuable on the job market. The table below presents key measures aimed at supporting researchers' outbound mobility.

Table 14: Measures supporting outbound mobility

Measure	Description
Annual and Short-term Scholarships for Doctoral Candidates (DAAD) (ongoing)	The scholarships are intended for research projects abroad which form a required part of a doctoral degree and last up to one year. The programme targets PhD students of all disciplines at universities and non-university research institutions.
Feodor Lynen Research Fellowships (AvH) (ongoing)	Feodor Lynen Research Fellowships are awarded to German post-docs and experienced researchers from all disciplines. The scientific host has to be an alumnusof the Humboldt Foundation. The most recent evaluation (2012) of the Feodor Lynen Research Fellowship Programme confirmed that the programme has been successful in promoting and internationalising the academic careers of the fellows. The vast majority of fellows returned to Germany to continue their academic careers after their research stay. Altogether 85 percent of respondents are still working in research today.
German Research Foundation Programmes (DFG) (ongoing)	The German Research Foundation Programmes promote international cooperation, including stays at research institutions abroad. This includes Research Training Groups and in particular International Research Training Groups and Research Fellowships. In the Research Training Groups, doctoral students complete their doctorates in an international environment. This includes research periods at partner institutions and participation in international conferences. The DFG provides about 700 Research Fellowships[41] enabling post-docs to conduct research abroad for up to 2 years (in order to be eligible a researcher needs to be integrated into the German research system; nationality, however, is irrelevant). Under the "Money follows Researcher" principle, project grants can be taken abroad under certain circumstances if the applicant takes on a new position in a different country.
Helmholtz Association Research Grants (HGF) (ongoing)	The HGF provides grants for joint research projects carried out by German and Russian researchers (Helmholtz Russia Joint Research Groups) and by German and Chinese researchers (Helmholtz-CAS Joint Research Groups). The involvement of young researchers (doctoral students and young post-docs) is considered to be particularly important. Additional focus on regions will be addressed from 2013 by a new programme called Helmholtz International Research Groups. These collaborations with foreign partner institutions carry out research in fields of common interest. They are funded jointly by the Helmholtz Initiative and Networking Fund (IVF) and the partner institution abroad, initially for a period of three years.
Max Planck Research Grants (MPG) (ongoing)	The Max Planck Society supports international cooperation among young researchers. All doctoral students and post-docs who receive grants have the opportunity to spend a certain amount of time conducting research abroad.
Postdoctoral Programme (DAAD) (ongoing)	The DAAD Postdoctoral Programme supports German researchers who carry out independent research projects at host institutions abroad. Funding is provided for research stays from 3 to 24 months, including a research fellowship, travel allowance, family allowance and a re-integration grant.
Sabbatical Programme (Fraunhofer) (ongoing)	The Fraunhofer Sabbatical Programme supports researchers in spending up to six months teaching and conducting research at institutions abroad.

Source: Deloitte

[41] http://www.dfg.de/en/dfg_profile/evaluation_statistics/statistics/programme_related_statistics/promoting_early_career_grant_programmes/index.html#micro4183704

Promotion of 'dual careers'

German universities, non-university research institutions and companies have developed dual career networks and have set up their own dual career service centres. Currently, there are 42 dual career services at universities and institutions of higher education and at least 11 regional networks. The networks mainly provide support for finding jobs and building up networks. They also offer information, advice and support to help top scientists integrate in the region. The Dual Career Network Germany aims to raise the profile of dual career services at individual universities and across the country. The Network not only aims at promoting the exchange of best practices on working and organisational practices between the service providers, but also increases the (inter)national visibility of support programmes for dual career couples in Germany.

Portability of national grants

The "Money follows Researcher" instrument introduced by the DFG supports the portability of grants to a number of European countries. The table below presents examples of grants which are portable within the German science system.

Table 15: Measures supporting the portability of grants

Measure	Description
Alexander von Humboldt Foundation Grants (AvH) (ongoing)	AvH research fellows coming to Germany can conduct research at institutions in other European countries (with the exception of their country of origin) if this is necessary for their research project. Additional funding is provided for these research periods.
German Research Foundation Programmes (DFG) (ongoing)	Under the "Money follows Researcher" principle, project grants can be taken abroad under certain circumstances if the applicant takes on a new position in a different country. In principle, all researchers based in the Federal Republic of Germany or at a German research institution abroad who have completed their scientific training are eligible to apply, irrespective of their nationality. Those applying for a DFG Research Fellowship to go abroad have to be integrated in the German science system at the time of submitting their application. The project management is responsible for allocating grants and research positions in DFG-funded Research Training Groups, Collaborative Research Centres (CRCs) and projects.

Source: Deloitte

Access to cross-border grants

National and *Länder* programmes are not tied to nationality or place of residence. However, most programmes require applicants to have a connection to a German institution. The table below describes measures aimed at supporting the openness of grants to non-residents.

Table 16: Measures supporting the openness of grants to non-residents

Measure	Description
Alexander von Humboldt Foundation Grants (AvH) (ongoing)	AvH funding programmes support international scientific cooperation between outstanding German and foreign researchers, and are specifically for non-residents, though they have to come to Germany to take up the funding. Generally, applications from Germany are only possible if the applicant has been living abroad for some time.
German Research Foundation Grants (DFG) (ongoing)	Qualified non-Germans are welcome to apply for a DFG research grant to do research at a German research institute or, if they are integrated into the German research system, to apply for a DFG Research Fellowship to conduct their research abroad.

Source: Deloitte