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Researchers' Report 2013

Country Profile: Germany



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1. Key data

National R&D intensity target

“With an R&D intensity of 2.88% in 2011 Germany is above the EU average and is already close to the 3% national target. The gap of 0.12 percentage points currently corresponds to EUR 3 billion (German GDP amounted to about EUR 2.5 trillion in 2011). 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. Based on this distribution an additional EUR 1 billion of public expenditure on R&D will be needed (compared to 2011) to reach the R&D intensity target of 3.0%.

In the period 2000-2011 the federal public research budgets, which represent more than half of public spending on research, were expanded substantially. Federal spending on research and education increased by a further 7% in 2011 and by 12% in 2012. 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 from 1.26% in Schleswig-Holstein and 1.27% in Saarland to 4.83% (2009) in Baden-Württemberg, the European region (NUTS II level) with the highest research intensity. Berlin (3.67%), Bayern (3.1%) and Hessen (3.05%) also have R&D intensities that are already above the German national target.

A recent survey of the *Stifterverband für die Deutsche Wissenschaft* revealed that internal R&D spending of the business sector is expected to amount to € 49.4 billion in 2011 (+5.1% in nominal terms compared to the year before) and EUR 49.9 billion in 2012 (+1.2%), implying a probable increase in real terms in 2011 of slightly below 3%, and if confirmed, a slight decrease in real terms in 2012. Research intensity is especially high in the automobile sector, which represents nearly one third of total German business R&D investment. A weak point of German R&D is the relatively low level of spending in high-tech areas such as pharmaceuticals and ICT.

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”.¹

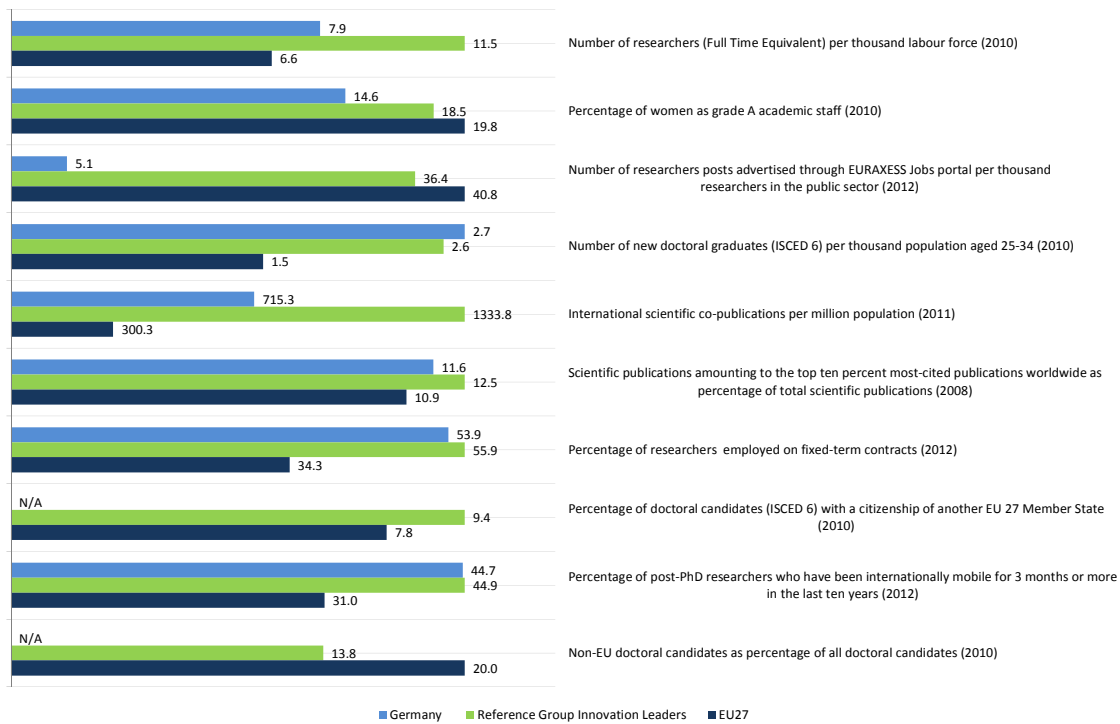
Key indicators measuring the country's research performance

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-27 average².

¹ European Commission (2013), “Research and Innovation performance in EU Member States and Associated countries. Innovation Union progress at country level 2013”

² The values refer to 2012 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 2013, MORE2
 Notes: Based on their average innovation performance across 25 indicators, Denmark, Finland, Germany and Sweden show a performance well above that of the EU-27. These countries are the Innovation leaders³.

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 (2010)	12.02	10.17
Head Count (2010)	500 952	2 435 487
FTE per 1 000 active labour force (2010)	7.87	6.64
Full time equivalent (FTE) (2010)	327 953	1 589 140

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.

³ European Commission (2013), “Innovation Union Scoreboard 2013”

Table 2: National strategies

Measure	Description
Excellence Initiative (Federal government and the Länder) (ongoing)	<p>The Excellence Initiative provides funds for the advancement of science and research at German universities. Since its launch in 2005/2006, the Initiative has promoted the creation of nearly 4 200 researcher positions at German universities. Approximately 90% of positions were created for young researchers, of whom 25% were not German residents.</p> <p>The Excellence Initiative has been extended until 2017 with a total budget of EUR 2.7 billion. Funding decisions for the third and final round of the Excellence Initiative were taken on 15 June 2012. 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 line.</p>
Federal Government Report on the Promotion of Young Researchers ('BuWin') (ongoing)	<p>This Report provides information on support measures for the promotion of young researchers. It also identifies deficits and formulates possible courses of action in various areas. Since it was first published in 2008, the report has contributed significantly to improving conditions for young researchers in Germany. The follow-up report (BuWin II) was published in 2013⁴, and covers statistical data and research findings on training, career paths and employment prospects for PhD holders in Germany⁵.</p>
Higher Education Pact 2020 (Federal government and the Länder) (2007-2015)	<p>The Higher Education Pact 2020 aims to create additional university places in response to a rising number of students at German universities. By 2015, up to 300 000 additional new entrants are expected compared to 2005. 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. The federal government will increase its contribution by EUR 2.2 billion to more than EUR 7 billion altogether⁶. The Länder have promised to increase their budgets accordingly.</p>
High-Tech Strategy 2020 (Federal government) (ongoing)	<p>The High-Tech Strategy 2020 (which was extended and rebranded in 2010) aims at creating 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.</p>
Pact for Research and Innovation (Federal government and the Länder) (2005-2015)	<p>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 is expected to apply until 2015. As a result of the Pact, funding for the German Research Foundation (DFG), the Fraunhofer Society (FhG), the Helmholtz Association (HGF), the Max Planck Society (MPG) and the Leibniz Association (WGL) has increased by 5% yearly.</p>
R&D funding by the Länder (ongoing)	<p>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 2011⁷.</p>
Examples from the Länder (ongoing)	<p>Research initiatives (Rhineland-Palatinate)</p> <p>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.</p>

⁴ Available at: <http://www.buwin.de/buwin/2013/>

⁵ "Statistische Daten und Forschungsbefunde zu Qualifizierung, Karrierewegen und beruflichen Perspektiven Promovierter in Deutschland": cf. www.buwin.de

⁶ For more information, see <http://www.gwk-bonn.de/fileadmin/Pressemitteilungen/pm2013-06.pdf> (in German only)

⁷ GWK Report: "Steigerung des Anteils der FuE-Ausgaben am nationalen Bruttoinlandsprodukt (BIP) als Teilziel der Lissabon-Strategie und der Strategie 2020" (Increasing the share of R&D expenditure in national GDP as one of the goals of the Lisbon Strategy and the 2020 Strategy), December 2012

Measure	Description
	<p>LOEWE – State Initiative for the Development of Scientific and Economic Excellence (Hesse)</p> <p>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 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.</p>

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%⁸.

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 (BMBF⁹) (2008-2017)	Running since 2008, the programme promotes outstanding women researchers. Since then, 262 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 Federal States (<i>Länder</i>) (GWK) decided in 2012 to continue the programme for a second period of five years until 2017.
Examples from the <i>Länder</i>: (ongoing)	<p>Baden-Württemberg:</p> <p>The Margarete von Wrangell Postdoctoral Training Programme for Women aims to ensure equal opportunities for women and men in science and the arts, and to increase the ratio of female professors by supporting particularly well qualified women on their way to becoming professors. Support takes the form of funding an employment relationship. The programme is currently financed equally by the <i>Land</i> 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.</p> <p>The Mathilde Planck Lectureship Programme targets working women with a university degree who would like to gain teaching experience at a university of applied science, an art or music college or a cooperative state university. 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.</p> <p>The Brigitte Schlieben-Lange Programme targets women with children who would like to balance their scientific or artistic training with family and perhaps also work, and take up or continue advanced studies, or study in parallel to their work. This programme offers funding for doctoral studies or artistic development projects as well as for preparations for a post-doctoral thesis or an actual post-doctoral thesis.</p> <p>The Mentoring and Training Programme (MuT) provides qualified female researchers who are aiming for a professorship with a suitable mentor (male or female) who gives</p>

⁸ See Figure 1 "Key indicators – Germany"

⁹ Federal Ministry of Education and Research

Measure	Description
	<p>them advice and support in their academic careers. The programme also offers training events that help the women to obtain further academic qualifications and develop their careers.</p> <p>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 professorships¹⁰.</p>
Examples from German Universities (ongoing)	<p>SciMento programme (Technical University Darmstadt) The group mentoring programme 'SciMento-hessenweit' supports women PhD students and postdocs in the natural, engineering and life sciences at all the universities in Hessen and their cooperating institutions with the aim of preparing them for a scientific career path. Women who are interested can apply year round for admission to the two-year programme.</p> <p>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 science or engineering who are striving for a leading position in academia or business. The programme combines mentoring, training and networking modules and runs over a period of a year and a half.</p>
Equal Opportunities for Scientists Campaign (German Science Organisations)¹¹ (2006-2011)	The Campaign aimed to increase the number of women in leading positions in science over a period of five years (2006-11). Its results were evaluated ¹² in 2011.
EURAXESS (AvH) (ongoing)	The AvH ¹³ provides information and advice for internationally mobile researchers, including equal opportunities issues. It refers researchers to funding and training programmes as well as to networks and communication platforms. Women researchers can find relevant information in the 'Women in Science' section of the German EURAXESS portal ¹⁴ .
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 at preparing 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, the initiative aims to attract excellent researchers (back) from abroad. Approximately five positions on the 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.
Fraunhofer Society (planned)	Fraunhofer has introduced a Fraunhofer-specific cascade model (<i>Kaskadenmodell</i>). The share of female scientists of a certain qualification level has to be lifted to the share of

¹⁰ Available at: <http://gleichstellung.uni-saarland.de/index.php?id=14>

¹¹ "Alliance of Scientific Organizations in Germany":

- Alexander von Humboldt-Foundation (AvH);
- German Academic Exchange Service (DAAD);
- German Research Foundation (DFG);
- Fraunhofer Gesellschaft (FhG);
- Helmholtz Association (HGF);
- German Rectors' Conference (HRK);
- German National Academy of Sciences Leopoldina;
- Max Planck Society (MPG);
- Leibniz Association;
- German Council of Science and Humanities.

¹² The results are available (in German) at: <http://www.wissenschaftsrat.de/index.php?id=433&=>

¹³ The Alexander von Humboldt Foundation is the German Bridgehead Organisation in the "EURAXESS" network.

¹⁴ Available at: http://www.euraxess.de/portal/frauen_in_der_wissenschaft.html

Measure	Description
	female scientists already achieved in the qualification level directly below. The overall share of female scientists at Fraunhofer is thus to grow from 23% (2012) to 26% in 2017. Other research organisations follow the same approach.
Mentoring Programme for women researchers in Leibniz Institutions (2011-ongoing)	Through this one-year programme, highly qualified women researchers at postdoc level were prepared for their future in leading academic positions. After a successful pilot period in 2011/12, the programme is to be extended to all Leibniz Institutions in Germany ¹⁵ .

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 agreed¹⁶ 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.

Maternity 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 until the child reaches the age of three. 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 maternity leave conditions in individual funding organisations.

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 (generally six weeks before and eight weeks after giving birth). 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. Special extension rules apply for German AvH fellows who go abroad for a research period: research fellows from Germany who are accompanied abroad 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. This also applies if the child is born during the funding period. As of December 2012, these extension rules also apply for research fellows coming to Germany. They can ask to extend their research fellowship by up to 12 months if at least one child of no more than 12 years of age accompanies the research fellow to Germany. Single-parent research fellows can apply for a 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 three months for new mothers, based on the three-month statutory period of maternity protection. Fellowship recipients (male 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). The national laws and regulations for maternity protection and parental leave are also applicable.
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 can be provided instead of this extension if the grant recipient produces evidence of the costs incurred. These two options can also be combined pro rata over a period of one year.
Max Planck Society (MPG)	Grants and funding contracts offered by the MPG can be interrupted. No financial

¹⁵ Available at: <http://www.leibniz-gemeinschaft.de/karriere/wissenschaftlicher-nachwuchs/leibniz-mentoring/>

¹⁶ Pact for Research and Innovation (Federal government and the *Länder*) (2005-2015)

Measure	Description
	support is provided beyond the state benefits. However, 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 up to three months based on the statutory period of protection set out in the Maternity Protection Act. This option also applies if the scholarship is scheduled to end during the statutory period of protection (generally six weeks before and eight weeks after giving birth). 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.

Source: Deloitte

4. Open, transparent and merit-based recruitment

Recruitment system¹⁷

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.

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 models¹⁸ in order to ensure more transparent and faster career paths for upcoming scientists. Junior professors¹⁹ who have previously held fixed-term contracts and whose work is considered excellent in their specific subject area, may²⁰ 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.

¹⁷ The most-used private Internet portal for job advertisements is www.academics.de

¹⁸ Not all *Länder* or universities have tenure track models and their structure differs from university to university

¹⁹ Junior professors are usually civil servants and they are appointed temporarily for up to 6 years

²⁰ 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

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)		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 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 2012, the number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was 5.1 in Germany compared with 36.4 among the Innovation Union reference group and an EU average of 40.8²¹. 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

²¹ See Figure 1 “Key indicators – Germany”

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 on entry conditions, social security, 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) aiming to attract and train young people to become researchers.

Table 6: Human Resources – Key programmes and initiatives

Measure	Description
Examples from the Länder (ongoing)	<p>Baden-Württemberg: The Ministry of Science is promoting the Network Women.Innovation.Technology Baden-Württemberg (F.I.T.) at Furtwangen University in order to increase the ratio of women taking courses in the MINT disciplines. The aims of the F.I.T. network are to support the careers of up-and-coming women computer scientists, engineers and natural scientists, and to support women MINT students through additional measures. Furthermore, the network aims to motivate and arouse the interest of girls and young women in computer science, technological careers and the natural sciences. Every year, the F.I.T. network organises special university weeks – “meccanica femminile” and “informatica femminile” – for women in the fields of mechanical engineering/electrical engineering and computer science.</p> <p>Baden-Württemberg: Dialogue MINT Teaching. More Women in MINT Courses (<i>Dialog MINT-Lehre. Mehr Frauen in MINT-Studiengängen</i>): this structural project aims to embody gender aspects more firmly in MINT teaching. An advisory process is being initiated for higher education institutions.</p>
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.
Fraunhofer Pilot Project (Fraunhofer and “MINT-EC” association) (ongoing)	Together with the “MINT-EC” association, Fraunhofer organises workshops for pupils between 10 and 12 years aimed at teaching knowledge, methods and interpersonal skills. The workshops (between three and four days) take place every year for a period of three years with a focus on chemistry, technology/physics, IT/mathematics and biology. The programme accompanies participants closely for a significant period of time.
Fraunhofer Talent Schools Initiative (Fraunhofer) (ongoing)	The Fraunhofer Talent Schools initiative takes place at numerous different institutes. The workshops (lasting several days) feature Fraunhofer researchers and give young people between the ages of 15 and 18 an opportunity to get to know the Fraunhofer research landscape.
KidsKreativ! Initiative (Fraunhofer) (ongoing)	Long-term programmes for children and young people are an integral part of the Fraunhofer’s efforts to encourage and train young people to become researchers. Fraunhofer regularly organises the “KidsKreativ!” competition for children up to six years old. The most creative crafts projects receive an award.
Strascheg Center for Entrepreneurship and the TheoPrax Programme (Fraunhofer Society) (ongoing)	The “Strascheg Center for Entrepreneurship” and the long-established “TheoPrax” programmes aim at promoting young peoples’ entrepreneurship skills. Pupils from different schools (general secondary schools, intermediate schools, vocational schools and academic secondary schools) work on business and science-related topics.
Summer Academy (Fraunhofer) (ongoing)	The Fraunhofer Society organises two-week summer academies during the school holidays to raise young people’s interest in science and technology. The Junior Academy

Measure	Description
	in Erlangen and the European Talent Academy in Lindau (featuring the participation of young people from Germany, Italy, Liechtenstein, Austria and Switzerland) are two examples of summer academies organised by Fraunhofer.
Talent Take Off programme (Fraunhofer) (ongoing)	The Talent Take Off programme offers different forms of support to young people embarking on a university degree.
School Labs Initiative (Helmholtz Association) (ongoing)	The 24 school labs at the Helmholtz Centres aim to address the impending shortage of researchers in Germany. More than 50 000 pupils visit the school labs together with their teachers every year to conduct experiments and to learn about interdisciplinary scientific thinking and work.
Tiny Tots Science Corner (Haus der kleinen Forscher - HdKF) Initiative (Helmholtz Association) (ongoing)	This initiative aims to increase the interest of young people (three to ten years old) in science and technology by giving them an opportunity to conduct experiments and solve problems on their own. The Foundation also 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 23 000 nurseries and teachers and over one million children. An additional 5 000 nurseries are to be included in the science education programme in 2013. Following the initiative's success, 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 2014.

Source: Deloitte

Doctoral graduates by gender

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

Table 7: Doctoral graduates by gender

Indicator	Germany	EU Average
New doctoral graduates (ISCED 6) per 1 000 population aged 25-34 (2010)	2.7	1.5
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2010)	2.4	1.4
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2010)	2.9	1.6

Source: Deloitte

Data: Eurostat

Funding of doctoral candidates

The single biggest means by which doctoral students in Germany finance themselves (34%) is by working as research assistants at a higher education institution or a research organisation. Scholarships are the second most common source of funding for doctoral students (28%).²²

The German Research Foundation (DFG) provides funding to about 20 000 doctoral candidates by offering them paid positions in DFG-funded projects at universities. Approximately 3 000 of the doctoral candidates funded by the DFG are fellows (or members) of Research Training Groups (RTGs). In June 2009, the DFG introduced the option of PhD students applying for positions involving spending more than half time²³ in RTGs in all subjects. This was previously only possible in engineering, physics and some other subjects in which there is strong competition for young researchers.

In 2011, the German Academic Exchange Service (DAAD) provided funding for nearly 4 700 incoming doctoral candidates (full PhD, sandwich programmes²⁴ and research stays as part of doctoral studies abroad).

²² Cf. Hauss, Kalle et al. "Promovierende im Profil: Wege, Strukturen und Rahmenbedingungen von Promotionen in Deutschland. Ergebnisse aus dem ProFile-Promovierendenpanel" (Doctoral Students in Profile: Ways, Structures and Framework Conditions for Doctoral Studies in Germany. Results of the ProFile Doctoral Students Panel), iFQ-Working Paper No. 13. Berlin 2012, p. 124

²³ Employment contracts as a PhD candidate are usually granted on a half-time basis. The option for PhD candidates to apply for positions involving more than half time employment aims to attract more people to pursue a PhD in engineering, physics and some other subjects in which there is strong competition for young researchers

²⁴ The duration of a sandwich programme is up to 24 months

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).

In 2010, the percentage of female doctoral students at non-university research institutions was 43% at the FhG, 43%²⁵ 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. 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 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. For more information on government measures aimed at attracting young people to become researchers, see chapter 5 "Education and training".

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	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 ²⁶ 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.
Max Planck Society (MPG) (ongoing)	There are currently more than 60 International Max Planck Research Schools (IMPRS), about 45% of these are in the areas of chemistry, physics and technology, 30% in

²⁵ Percentage for 2011

²⁶ 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
	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.
International PhD Programmes in Germany – IPID (DAAD) (ongoing)	In a programme entitled “International PhD Programmes in Germany”, the DAAD initiates the establishment of international structured doctoral programmes in Germany. At present, 39 international PhD-programmes are funded by the DAAD.
Leibniz Association (WGL) (ongoing)	Since 2006, 22 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.

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
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.
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.
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).
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.

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. Formerly, scientists were not allowed to have higher earnings than federal employees in comparable positions. By offering more attractive salaries, German research institutions are able to recruit highly qualified people from other countries or from the private sector and also prevent a brain drain. 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 new country profile on remuneration of researchers from the MORE2 study (forthcoming, on the EURAXESS website).

Researchers' Statute

Academic freedom is explicitly protected under the German constitution (Basic Law of the Federal Republic of Germany)²⁷. 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 negotiation of the independent institutions, the rights and obligations associated with researcher positions, participation in research and freedom of research, and participation rights²⁸ 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, three science organisations - the German Rectors' Conference (HRK) on behalf of all German HEI, the German Academic Exchange Service (DAAD) and the Alexander von Humboldt Foundation (AvH) - have signed the Charter & Code.

German universities have begun to engage in the HRS4R process with the first institution having recently gained the 'HR Excellence in Research' Logo. The general assembly of the HRK recommended to all its member organisations to join the HRS4R process²⁹. 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'³⁰ or 'Audit familiengerechte Hochschule'³¹ 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

²⁷ The Basic Law of the Federal Republic of Germany, Article 5, Paragraph 3

²⁸ *Länder* Higher Education Laws (*Länderhochschulgesetze*)

²⁹ 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/>

³⁰ Available at: <http://www.total-e-quality.de/> (in German)

³¹ Available at: <http://www.beruf-und-familie.de/index.php?c=22> (in German)

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 law³². 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)	<p>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 institutions must provide co-funding in order to underline their interest in supporting junior professorships.</p> <p>Bayern Mentoring: The <i>Land</i> 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.</p>
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.
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. After the first three years, an evaluation of the researcher is carried out 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 which were established as part of the Excellence Initiative of the Federal Government and the <i>Länder</i> also include career development provisions. Start-up support is available under the DFG's coordinated programmes (Research Training Groups, collaborative research centres, and research

³² *Länder Higher Education Laws (Länderhochschulgesetze)*

Measure	Description
	groups, priority programmes) to help young researchers in the phase immediately following their PhD.
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.
Helmholtz Young Investigator Groups (HGF) (ongoing)	HGF's Initiative and Networking Fund (<i>Impuls- und Vernetzungsfonds</i>) has developed a strategy to promote young researchers. The Helmholtz Young Investigators Groups are a key element in promoting talent. 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 ³³ , 164 Helmholtz young investigators groups (compared to 131 in 2011) have been funded with a total funding volume of more than EUR 108 million (compared to EUR 80 million in 2011).
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 (currently 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.

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.

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.

Grants (scholarships/stipends) offered by the AvH are not considered as earned income and are therefore not subject to social insurance contributions in Germany. Social benefits are provided in the form of ancillary benefits. 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, and 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.

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.

³³ Status November 2012

Grants offered by the 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. Funding is extended beyond the maximum funding period in case of illness. Grants also continue to be paid during maternity leave; any state benefits received are taken into account when calculating the grant payments. Funds offered by the German Academy of Sciences Leopoldina are provided in the form of full personal scholarships covering living expenses in the place of residence. Leopoldina does not provide contributions to (social) insurance.

Unemployment insurance is not provided under scholarship programmes. The AvH aims to balance out the existing social security disadvantages for research fellows by providing a suitable grant enabling recipients to make provisions for the future (particularly in the form of pensions, care insurance and occupational disability insurance).

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 FhG) and the private sector in Germany are closely interlinked, particularly in the field of engineering. For example, Fraunhofer supports application-based research in cooperation with the private sector. Students are offered the possibility of pursuing a PhD in applied research in close collaboration with industry³⁴. The number of PhD degrees supported by Fraunhofer was 1204 in 2007 (compared to 941 in 2005) and nearly doubled by 2011. Since mid-2009, Fraunhofer has been organising PhD camps at different locations in Germany. Organised as workshops, PhD camps offer PhD students information and support on science-based start-ups and careers for PhDs.

In addition, in order to be appointed to a professorship in engineering at a university or a professorship in any subject at a university of applied science, applicants need to have gained³⁵ professional experience outside of academia. A high level of third-party funding raised by universities from the private sector³⁶ is another indicator for a strong link between business and academic research in Germany.

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. The links between universities and the private sector are reinforced by the joint research culture in externally-funded research and the right of university employees to pursue secondary employment. The table below describes measures aimed at encouraging researchers' inter-sectoral mobility.

Table 11: Measures encouraging inter-sectoral mobility

Measure	Description
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.
Fraunhofer Society (FhG)	In accordance with the Fraunhofer's mission, the majority of its staff are integrated in

³⁴ As a general rule PhD degrees are awarded by Universities (and not by science organisations)

³⁵ This applies to universities of applied science but is not (as a general rule) strictly applied at Universities

³⁶ 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 Culture. Monetary higher education statistics) Available at: https://www.destatis.de/DE/Publikationen/Thematisch/BildungForschungKultur/BildungKulturFinanzen/KennzahlenMonetaer2110432107004.pdf?_blob=publicationFile)

Measure	Description
(ongoing)	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).
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.
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, 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.

Source: Deloitte

8. Mobility and international attractiveness

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

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
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.
Recruiting Initiative (HGF) (ongoing)	The Helmholtz Association is using part of its budget increases to create extra positions for top level scientists. 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.
Fraunhofer Attract Programme (FHG) (ongoing)³⁷	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.
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.
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, and German Cancer Aid. GAIN promotes the return of German researchers to attractive positions in Germany as well as cooperation between researchers in Germany and the US. GAIN has more than 3 800 members and has established itself as a network platform and a transatlantic discussion forum for German researchers. GAIN also organises events and issues publications

³⁷ For more information, see table 10 "Measures supporting researchers' career development"

Measure	Description
	aimed at improving the transatlantic flow of information in both directions. The German Scholars Organization e.V. (GSO) promotes the same aims. GAIN and the GSO jointly organise an annual network conference in the USA. Researchers from Germany who currently work in the US and Canada as well as numerous representatives of the German science landscape, politics, research and business are invited to this event. A talent fair 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. It provides internationally competitive general conditions which form a basis for the award holders to build a long-term scientific future in Germany. 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.

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.
Helmholtz Young Investigators Groups Programme (HGF) (ongoing)	The programme aims to encourage German researchers to return to Germany.
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) 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 and doctoral students, junior research group leaders (<i>Sofja Kovalevskaja</i> awards), experienced researchers (Bessel research awards) and top international researchers (Max Planck research award (together with MPG), Humboldt research awards, and <i>Anneliese Maier</i> research awards). German nationals and non-nationals who completed their school education in Germany can also apply for these programmes provided they have spent some time abroad ³⁹ . German post-docs and experienced researchers can apply for AvH fellowships for international research visits. Fellows can receive return fellowships for a period of one to twelve months upon their return to Germany.
International Cooperation (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 for

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

³⁹ 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
	mobility, the AvH also helps research establishments and individuals in putting together promising applications under the People Programme of the 7 th EU Research Framework Programme and the Marie Curie Actions within it.
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-months research stays at German universities for more experienced researchers.
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 84 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 ⁴⁰ .
Re-integration of German Scientists from Abroad (DAAD) (ongoing)	The programme which is funded by the Federal Ministry of Education and Research (BMBWF) 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
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.
Annual and Short-term Scholarships for Doctoral Students (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 well-qualified German researchers in support of their stay abroad. Researchers from all disciplines can apply to receive a fellowship for any target country up to four years after completing their doctorates (as post-docs) or 12 years after completing their doctorates (as experienced researchers). The scientific host has to be a researcher based abroad who has already received funding from the Humboldt Foundation.
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. The DFG provides about 700 research grants enabling post-docs to conduct research abroad. 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 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 regions will be addressed from 2013 by a new programme called Helmholtz International Research Groups.

⁴⁰ Available at: <http://www.leibniz-gemeinschaft.de/karriere/wissenschaftlicher-nachwuchs/leibniz-daad-research-fellowships/>

Measure	Description
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.
Prof.x² Programme (FGH) (ongoing)	The Prof.x ² Programme supports the exchange of research staff for several months with Fraunhofer institutes in North America.
Sabbatical Programme (FHG) (ongoing)	The Fraunhofer Sabbatical Programme supports researchers in spending up to six months teaching and conducting research at institutions abroad.

Source: Deloitte

Promotion of 'dual careers'⁴¹

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
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.
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.

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)	Qualified non-Germans are welcome to apply for a DFG research fellowship.

⁴¹ Researchers face a 'two-body problem' when moving. The challenge is to find positions for both members of a couple.

Measure	Description
(ongoing)	

Source: Deloitte