Annual Internationalisation Report 2015

Germany’s international collaboration in education and research – Priorities for the Federal Ministry of Education and Research and selected science organisations

DLR Project Management Agency
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1. Summary

The paramount importance of European research to German science is borne out by a special section (Section 2.2 "Collaboration within the European Union"). Against the background of the recent strong rise in worldwide interest in the German dual system for vocational training, topics and structures of international vocational cooperation are also addressed in the individual sections. The international activities of the BMBF are described in detail in the Federal Report on Research and Innovation 2014, to which this report refers as appropriate.

The overall aim of the report is not to provide a complete representation of European and international collaboration by German researchers. On the contrary, it is intended to provide an overview of the high points and experience to date and offer a forward view of future developments. The analysis shows a high level of dynamism in three areas: The first is that the German science organisations have been very intensively involved with strategic issues of internationalisation in the past seven years. Important results of this process are the adoption of (organisation-specific) internationalisation strategies and – increasingly – the establishment of internal monitoring systems for indicator-based orientation of the respective internationalisation activities.

The second is that selected, existing funding and cooperation instruments were made available specifically for international collaboration. The third is above all that numerous internationalisation instruments were newly developed and...

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1 See, for example, the "International Collaboration" section of the annual monitoring reports of the Pact for Research and Innovation (relating to DFG, Fraunhofer, HGF, Leibniz and MPG), the "Stellungnahme zur Alexander von Humboldt-Stiftung (AvH), Bonn, und zur Förderung des internationalen wissenschaftlichen Personentransfers in Deutschland" by the German Council of Science and Humanities (Wissenschaftsrat) dated October 2013 and the annual German Academic Exchange Service (DAAD) and German Centre for Higher Education Research and Science Studies (DZHW) publication "Wissenschaft weltoffen" with data and facts on the internationality of study and research in Germany.
1. Summary

tested. These can be divided into five categories:

a. “Analysis and advice”,
b. “Strategic instruments”,
c. “Institutional internationalisation and research infrastructures”,
d. “Project funding” and
e. “Mobility”
(cf. Section 3 “Strategies and instruments for internationalisation”).

First of all, the relevant documentation and secondary literature on Germany’s European and international collaboration in research and education were evaluated for the 2015 report. Secondly, background talks were conducted in autumn 2015 with selected German research and intermediary organisations. They consistently showed great interest in cross-organisational information exchange on the topic of internationalisation and relevant indicators (e.g. “guest scientists”). However, currently there is no uniform reference system.

Since in part the organisation-specific definitions of individual indicators differ significantly from one another, internationalisation data collected in Germany are currently only comparable to a limited extent in the national and international context. This report should ideally serve as a discussion platform for these questions – in particular with a view to implementation of the federal government’s update of its internationalisation strategy planned for 2016 (“Federal Government Strategy for the Internationalisation of Education, Science and Research in 2016”).

2 In alphabetical order: Alexander von Humboldt Foundation (AvH), Federal Institute for Vocational Education and Training (BIBB) and iMOVE initiative, German Academy of Natural Scientists Leopoldina Association – National Academy of Sciences (Leopoldina), German Research Foundation (DFG), German Federal Enterprise for International Cooperation (GIZ), German Academic Exchange Service (DAAD), The Fraunhofer Society (Fraunhofer), Hermann von Helmholtz Association of German Research Centres (HGF), German Rectors’ Conference (HRK), Max Planck Society (MPG), Gottfried Wilhelm Leibniz Research Association (Leibniz).

3 For an example of this see the discussion on current development of the “core research data set” under the leadership of the German Council of Science and Humanities. For further information see http://www.wissenschaftsrat.de/arbeitbereiche-arbeitsprogramm/kerndatensatz_forschung.html.
2. The international dimension of the German research and education system – Particular achievements and progress

2.1 Trends in transnational research collaboration in Europe and globally

International exchange and cross-border collaborations are integral parts of the German research and education system. They are undoubtedly the basis for Germany’s innovative strength and its worldwide attractiveness as a place for study and research. Admittedly there is no uniform assessment scheme for measuring internationalisation of the German – or any other nation’s – research system. Selected key performance indicators and qualitative descriptions can however illustrate the status quo and its development over time. Particular achievements and progress in establishing the international dimension of the German research and education system are assigned below into the categories “Input” and “Output”.5

“Input” in this context describes the framework conditions for internationalisation processes. This includes both resources (personnel, funding, etc.) and the legal framework conditions for international collaborations (legal and financial conditions for foreign academics in Germany; regulations on international knowledge transfer, etc.). German research policy has significantly increased its input since adoption of the internationalisation strategy by the federal government in 2008. Between 2011 and 2015 the BMBF increased by two-thirds the number of contributions towards direct funding of projects that involved international collaboration (from 1,768 to 2,971 contributions).6 The funds associated with these


5 For a detailed analysis of the international dimension of Germany’s research and education system, including consideration of current studies on the effects of the exchange between different internationalisation activities, see “International Cooperation Action Plan” 2014 (Section 2 “Data, Facts and Analysis”) and Strategy of the federal government for the internationalisation of education, science and research of 2016 (in preparation).

6 The details in this section are based on PROFI evaluations by the Project Management Agency within the German Aerospace Centre (DLR-PT) from March 2016. About the selected time frame: the statistical evaluation refers from the point of view of the current year (2016) back over the five previous financial years (2011–2015). The PROFI database only includes budget expenditure beyond five years ago in cumulative form and not for the individual financial year – data beyond the 5-year period are, therefore, only comparable to a limited extent with more up-to-date data. In specifying the number of contributions it must be noted that
projects increased in this period from around 220 million euros to around 260 million euros. The BMBF invested a total of 1,236 billion euros over this period in projects involving international collaboration. In addition, the commitment of the BMBF to participate in international research programmes and R&D infrastructures has significantly increased. The annual contributions for this were always over 425 million euros between 2011 and 2015; total contributions in the last five years amount to 2,208 billion euros. The focus of international activities was on European collaboration – some 65% of all funding (project funding and contributions) was in cooperation with European partners. Asset out in more detail in Section 2.2 “Collaboration within the European Union” Germany is particularly strongly integrated within the European Research Area – as a collaborative partner and shaper of political and institutional framework conditions.

A review of BMBF funding in the period from 2011 to 2015 allows the following main priorities to be identified: far in front are the subject of climate, environment and sustainability (total project funding: around 376 million euros; total number of projects: 1,029), followed by “innovation-related framework conditions and other cross-sectional activities” (approximately 277 million euros; 2,350 projects), information and communication technologies (around 222 million euros, 717 projects), health research and healthcare (around 104 million euros, 528 projects), the bio-economy (around 99 million euros, 446 projects) and humanities, economic and social sciences (around 23 million euro; 62 projects).

The legal framework for international co-operation was also improved, for example, by facilitations in the residence law for researchers and professionals in 2012. So it was that the “blue EU card” was introduced in Germany in August 2012, which grants highly-qualified, skilled workers from third-party countries access to the European labour market. Germany is the top performer in terms of distribution when compared with the rest of Europe: in 2014 alone, 93.6% of all “blue EU cards” granted across Europe were issued by Germany. In light of the current refugee crisis, since autumn 2015 the BMBF and the

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7 See the act on implementation of the highly-qualified directive of the European Union of 1 June 2012 (valid from 1/8/2012), Federal Law Gazette, 2012 Part I No. 24, pp. 1224–1234, Bonn, 08/06/2012.

8 The total number of blue EU cards issued by Germany in 2014 amounted to 11,848. See http://www.bamf.de/DE/Infothek/Statistiken/blaueKarteEU/blaue-karte-eu-node.html.
German research organisations have also planned various measures to promote the integration of refugees. These measures are intended both to improve the educational opportunities especially for young refugees and to allow refugees with an academic background entry into research or research-related employment.\(^9\)

The second indicator category covers the “output” of a research system. Bibliometric data as well as data on cross-border trade with patents demonstrate the close integration of German research into the world-wide research landscape: In the period 2003–2012 over 40% of all publications by German researchers were international co-publications\(^10\) – this is more than twice the EU average.\(^11\) In 2014 even more than every second research publication was written with one or more foreign co-authors.\(^12\) In an OECD-wide comparison for the period 2009–2013, German figures for receipts from the international flows of knowledge assets increased above average: at 9.1% the increase was above the growth of other industrial nations such as the United States and the United Kingdom (6.2% and 3.2%), although significantly below the growth in the


\(^{10}\) OECD (2015): OECD STI Scoreboard 2015, p. 70.


\(^{12}\) Fraunhofer Institute for Systems and Innovation Research ISI (2016): Performance and structures of the German science system, studies on the German innovation system No. 5-2016, published by the Commission of Experts for Research and Innovation (EFI), p. 11.
2.1 Trends in transnational research collaboration in Europe and globally

top performers Luxembourg, South Korea and Switzerland (24.6%, 23.2% and 12.8%). A core element of internationalisation in the German research system is promotion of the transfer of international researchers. **Mobility** as a result of appropriate promotional measures is not admittedly a research output in the narrower sense, but shows the openness and internationality of the German education, research and innovation system. This includes information both about guest residence of expatriate students and researchers in Germany (inward mobility) as well as information on residence abroad of German students and researchers (outward mobility).

Over 40,000 scientific and research staff with foreign citizenship were engaged at German universities in 2014. More than every tenth member of university research staff, therefore, held a foreign passport. The proportion of foreign staff increased by 56% compared to 2008. More than a third of them came from Western Europe, followed by Asia with almost a quarter. The five most important countries of origin in 2014 (shares of between 7% and 5%) were Italy, China, Austria, the United States and Russia.

As in previous semesters, in the winter semester 2014/2015 the number of expatriate students has also grown continuously – to a total of around 320,000. Within this group the proportion of so-called “Bildungsausländer“, i.e. those students who are of foreign nationality, possess a foreign university entrance qualification and come to Germany specifically for study has risen especially strongly: from 2009 to 2015 the increase amounted to more than 30% (year of study 2009: 180,222 “Bildungsausländer”; year of study 2015: 235,858). This increase illustrates

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15 DZHW and DAAD (2016): Wissenschaft weltoffen kompakt 2016, Data and facts about study and research in Germany is available at www.wissenschaft-weltoffen.de, Table 25.  
17 Unless indicated otherwise, the data in this section comes from DZHW and DAAD (2016): Wissenschaft weltoffen kompakt 2016, Tables 1 and 3.  
18 In addition to “Bildungsausländer“, the statistics cover the so-called ”Bildungsinländer“. These are of foreign nationality, but have generally lived a long time in Germany already and have obtained their university entrance qualification here.
the growing attractiveness of Germany as location for study. By far the largest group of foreign students comes from China (2015: 12.8%) followed by India and Russia (both 4.9%) and Austria (4.2%).19 As in previous years, again in the winter semester 2014/2015 the large majority of “Bildungsausländer” (2015: 88.1%) sought to obtain a degree in Germany. The proportion of actual graduates is admittedly well below this objective, but has risen continuously in recent years (in 2008 some 25.7% of the graduates were “Bildungsausländer”, in 2013 it was 32.1%).20

The number of German students pursuing a degree abroad in 2013 ("degree-related international mobility") was around 134,500.21 The five main host countries during the year in question were Austria (19.7%), the Netherlands (17.2%), the United Kingdom (11.7%), Switzerland (11.0%) and the USA (7.6%).22 International mobility also includes temporary study-related residence abroad, for instance as part of the EU Erasmus+ programme (see also Section 3.2.5 “Mobility”). The proportion of German students with Erasmus experience was constant in the last

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19 DZHW and DAAD (2016): Wissenschaft weltoffen kompakt 2016, Table 5.


21 DZHW and DAAD (2016): Wissenschaft weltoffen kompakt 2016, Table 13. This is an extrapolation. Regarding the issue of partial overlap and the collection of data in the field of German students abroad, including recent changes by several states in the recording of mobile students from abroad, compare the detail in the section “German Students Abroad” in DZHW and DAAD (2016): Wissenschaft weltoffen kompakt 2016.

five years at just over 8%.\textsuperscript{23} Germany had the second largest group of Erasmus students behind Spain in the 2013 and 2014 academic years.\textsuperscript{24}

2.2 Collaboration within the European Union

Research collaboration in the context of the European Union is of outstanding significance. A European Research Area (ERA) is being created under the umbrella of the EU treaties, which should enable the free movement of researchers and research findings comparable with the internal market.

Research in the European Union will not end at national borders, but develop transnationally. The aim is to increase competitiveness in Europe. Under this premise, the European Commission and the 28 member states determine the orientation of the EU framework programme for research and innovation – currently Horizon 2020 – started in 2014 with a budget of approximately 80 billion euros for seven years.\textsuperscript{25} In addition to the 28 member states, 13 other European countries have associated themselves with the framework programme\textsuperscript{26} and are, therefore, equal partners in the competition for funds. Although as the world's largest research funding programme, the framework programme is in principle open to partners from all over the world.

Coordination of national research policies is also progressing in the context of the European Research Area. In 2015 the member states agreed on the European Research Area Roadmap (ERA Roadmap) including focal points for implementation and introduction of the ERA by 2020. The EU Council ratified these focal points in May 2015.\textsuperscript{27} The member states are now required to draw up national action plans for implementing the ERA (ERA action plans). As the first EU Member State, Germany submitted the Strategy of the Federal Government for the European Research Area\textsuperscript{28} in 2014 as a national implementation plan aligned to the six ERA priorities. Two of these ERA priorities are particularly relevant to international research and education cooperation: Priority 2: “Optimum transnational collaboration and appropriate competition” and Priority 6: “The international dimension of the ERA”. The following, therefore, presents three areas of collaboration in the EU context, which are directly linked to implementation of these two priorities: (a) the current EU framework programme for research and innovation, (b) coordination of programme planning at nation-state level and (c) European collaboration in research infrastructures.

\textsuperscript{25} For further information on the budget for Horizon 2020, including details on allocation to different funding priorities, please see http://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf.
\textsuperscript{26} Albania, Bosnia and Herzegovina, Faeroe Islands, Iceland, Israel, the Republic of Macedonia, Moldova, Montenegro, Norway, Switzerland (partially associated), Serbia, Turkey and Ukraine.
\textsuperscript{28} Available at https://www.bmbf.de/pub/BMBF_Forschungsstrategie.pdf.
The “Horizon 2020" framework programme for research and innovation

Since they started in 1984, the EU research framework programmes have become established as an essential component in the funding of German research institutions. In the 21 months that the current “Horizon 2020” framework programme for research and innovation has been operating, German institutions have to date been able to attract European grants of around 1.83 billion euros. Due to the tendering procedure and in particular to the progressive development of the budget funds available, it is to be expected that this proportion will increase in the coming years. European research funding contributes significantly to the third-party income of German institutions and thereby also strengthens their position in international competition. As of October 2015 a total of 1,186 German institutions, including 68 publicly funded institutions, were involved in 1,629 projects as part of “Horizon 2020“. The German proportion of all participants in the EU member states is approximately 14.6%, the German funding share of the assigned contributions is 20.2%. In a comparison of the EU-28 by contributions and EU funding, Germany is in first place ahead of the United Kingdom, Spain, France and Italy.

Germany received the largest share of EU funds via the European Research Council (ERC); this equates to 15.8% of the grants received by Germany. ERC funding covers all disciplines, as does mobility funding from the “Marie Skłodowska-Curie actions” (9.2% of the German EU grants). The German share in the case of joint research is highest in the areas of “information and communication technologies” (11.4%) and “transport” (7.8%). The proportion of German project coordination roles is an average of 13% across all programme areas.

Overall, Germany registered a well-balanced involvement in the major groupings: 31% of all German involvement is attributable to the higher education sector, 29% to non-university research institutions and 35% to industry. This distribution is, therefore, similar to the dimensions of the predecessor programme (the “7th EU research framework programme” : 34% higher education, 27% non-university research and 36% industry). The ten most successful participating institutions in Germany are together involved in 625 projects and have to date been awarded 0.74 billion euros from “Horizon 2020“. Altogether the German research organisations (Helmholtz Association, Fraunhofer Society, Max Planck Society and Leibniz Association) were able to obtain around 683 million euros of EU funding.

The involvement of international partners is an important indicator for the visibility and the value of the EU research framework programme above) “Horizon 2020” allows cooperation with institutions from nearly all countries in the world outside Europe, provided the minimum requirements for the respective partner within the project consortia are met. In this form “Horizon 2020” is the world’s largest coherent support programme in the field of research and innovation. The proportion of third country participa-

29 The source for all data referred to in the following section on the EU research framework programme is the ECORDA database. Analysis by the DLR-PT EU Office in January 2016.
30 By comparison with the “7th research framework programme” (2007–2013) the values increased from 300 million euros in 2007 to 1.75 billion euros in 2013.
tion in Horizon 2020 is so far 2% below the level of the precursor “7th research framework programme” (4%). However, it is important to take into account that the institutions in leading emerging countries (the so-called BRICS countries and Mexico) are no longer funded and that Switzerland is only partially associated.

Until now participants from Germany are collaborating in a total of 351 research projects with institutions from 99 countries out of a total of 120 participating countries. Among third-party countries the USA, Canada and Russia are the most common partner countries, followed by China, Australia and South Africa. The focus of German third-country cooperation is in the areas of “information and communication technologies” at 15.7% of all joint projects, “research infrastructures” at 12% and “health, demographic change and well-being” at 11.4%.

**Coordination of programme planning at nation-state level**

Implementation of the second ERA priority (“Optimal transnational cooperation and competition”) is firstly achieved by the coordination of national research activities. For instance, a concept such as the member state-driven “Joint Programming” takes into account that global challenges such as climate change, food security and demographic change can only be addressed by the interaction of several countries and by the pooling of financial and human resources. Ten Joint Programming Initiatives (JPIs) have been launched since 2008 and Germany is involved in nine of these initiatives. The “Strategy of the Federal Government on the European Research Area” in this respect aims to strengthen in particular the structure-forming effect of JPIs. This includes the design and implementation of so-called bivalent programmes: a European component should be co-developed when planning BMBF funding programmes and be oriented towards the strategic research agendas of the JPIs.

“Horizon 2020” also calls for further measures for coordinated programme planning, including EU involvement in the funding programmes of several under § 185 of the Treaty on the Functioning of the European Union (TFEU) and organising joint calls for proposals as part of the ERA-NET COFUND instrument (formerly ERA-NET and ERA-NET Plus). Moreover, “Horizon 2020” promotes collaboration with industry through participation in joint undertakings and Joint Technology Initiatives under § 187 of the TFEU. In

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31 Brazil, Russia, India, China and South Africa.

32 For further information on the 6 ERA priorities and corresponding measures for their implementation see the Federal Government Strategy for the European Research Area, 2014.

33 Neurodegenerative Disease Research (JPND); Agriculture, Food Security and Climate Change (FACCE); A Healthy Diet for a Healthy Life (HDHL); Urban Europe; Connecting Climate Knowledge for Europe (Climate); More Years, Better Lives – The Potential and Challenges of Demographic Change; Antimicrobial Resistance (AMR); Water Challenges for a Changing World (Water); Healthy and Productive Seas and Oceans (OCEANS).


35 Examples of § 185 initiatives: Research and Development Programme aimed at supporting research performed by small and medium-sized enterprises (Eurostars-2), European and Developing Countries Clinical Trials Partnership Programme (EDCTP2), European Metrology Programme for Innovation and Research (EMPIR), Active and Assisted Living Research and Development Programme (AAL), Joint Baltic Sea Research Programme (BONUS).

addition, there are European Innovation Platforms (EIPs) focusing on agenda-setting in certain Horizon 2020 subject areas with the involvement of industry. All transnational initiatives run with variable geometry and are in principle open to the participation of institutions from third countries. Beyond the participation of individual researchers and institutes within the framework programme for research and innovation, third-party countries can in the context of joint calls for proposals participate strategically in invitations to apply in the framework programme or as a partner in ERA-NETs and JPIs (see above) that are oriented geographically beyond the Union. National funding programmes are coordinated, synchronized and as far as possible implemented jointly in transnational cooperation under ERA-NET initiatives. Since the introduction of ERA-NETs in 2006, Germany has become involved in 179 out of 208 of these initiatives (ERA-NET, ERA-NET Plus and ERA-NET COFUND).

European collaboration in research infrastructures

European and international level coordination measures for establishing research infrastructures also lead to implementation of ERA priority 2. Large research infrastructures (RIs) are increasingly only feasible whenever several countries become involved in their funding and operation. Participating EU Member States are bound by obligations regarding the establishment and operation of research infrastructure, in particular the initiatives of the ESFRI Roadmap (ESFRI: European Strategy Forum on Research Infrastructures)\(^\text{38}\), but also the underpinning of other global, national and regional RIs of pan-European interest and taking these into account in the establishment of national RI roadmaps and structural funding programmes. Legal and other barriers to cross-border access to RIs are to be removed. “Horizon 2020” promotes transnational access to research infrastructure as part of targeted calls for proposals. ESFRI has moreover in 2015 on behalf of the Commission produced a “Charter for access to research infrastructures” with common standards and harmonised access rules and conditions for the use of RIs, which have already been accepted by the largest European research infrastructure interest groups.\(^\text{39}\)

The project list for the new ESFRI Roadmap 2016 was decided in the ESFRI Forum meeting in December 2015: it comprises 21 projects and 29 so-called “landmark” projects that have already successfully reached the implementation phase. Germany is involved until now in 22 of a total of 50 ESFRI projects through the signing of a legal form;\(^\text{40}\) it is country of domicile of the four ESFRI projects European XFEL / Hamburg, FAIR / Darm-


2.2 Collaboration within the framework of the European Union

stadt, SHARE-ERIC / Munich and INFRA FRONTIER / Munich. Already in August 2015, the BMBF launched the second national roadmap process for research infrastructures. By 2018 the “National Roadmap for Research Infrastructures” – first published in 2013 – will be updated by the assessment and prioritisation of selected projects.

3. Strategies and instruments for internationalisation

3.1 Strategies for internationalisation

Those involved in the German research system have in the last few years made special efforts to promote collaboration with international partners and to design it in accordance with their interests and constitutional requirements. This concerns both the definition of specific objectives and priorities in the field of international cooperation and the development of new instruments and forms of cooperation. As an orientation framework this report uses the “Strategy for Internationalisation of Science and Research” of the Federal Government from 2008 and the BMBF “International Cooperation Action Plan” (“Aktionsplan Internationale Kooperation”) from 2014.

The 2008 strategy identifies four target areas (“Zielfelder”):

1. Strengthening research cooperation with global leaders,
2. International exploitation of innovation potentials,
3. Intensifying the cooperation with developing countries in education, research and development on a long-term basis,
4. Assuming international responsibility and mastering global challenges.

The 2014 action plan picks up these four target areas and adds a further target area in order to accommodate the growing significance of international cooperation in the area of vocational training and the global interest in the dual system of vocational education and training in Germany:

5. Creating perspectives through education – for people and the economy

Both documents also stress the outstanding significance of the European Research Area (ERA) for the (joint) appearance of Germany and its European partners on the international stage: “The success of the ERA is the best protection for Europe’s innovative strength and its resulting global competitiveness.” In its 2014 “Strategy for the European Research Area”, the Federal Government formulated guidelines for this and concrete steps toward implementation of the six ERA national priorities (the “National Roadmap”). The sixth ERA priority “International Dimension of the European Research Area” aims to strengthen cooperation between EU member states and third countries. This international cooperation and networking is intended to improve European access to world-wide knowledge production and, thus, also to increase Europe’s attractiveness as a location for research and innovation.

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43 For further information on this cooperation in the framework of the EU, see Section 2.
From an overarching perspective the 2008 internationalisation strategy also defines three generic measures: (a) presence abroad, (b) international monitoring and (c) promoting Germany as location for higher education, research and innovation.\textsuperscript{44} The 2014 action plan formulated a number of accompanying measures in each of these three areas, which are intended both to bundle and further develop the existing activities of German researchers and to initiate new initiatives.\textsuperscript{45}

Furthermore, in the past five years many German science organisations, including the German Research Foundation (2012), the Fraunhofer Society (2013), the Helmholtz Association (2010 and 2012), the Max Planck Society (2012 and 2014), the Leibniz Association (2013) and the Federal Institute for Vocational Education and Training (2015) have adopted organisation-specific internationalisation strategies and measures for their implementation.\textsuperscript{46} Common to all is the goal of strengthening research collaboration with the best researchers, experts and institutions worldwide (\textbf{target area 1}). Internationalisation is considered to be a key factor for excellent research. The Max Planck Society (MPG) is especially focused on basic research and sees its international orientation as a necessary prerequisite for competing successfully for the best minds.\textsuperscript{47} In its internationalisation strategy the Fraunhofer Society combines the focus on excellence with a focus on the global commitment of the German economy. Fraunhofer is, therefore, motivated to select international cooperation partners on the basis of their excellence and innovative strength in the relevant specialist area. Fraunhofer only assesses international cooperation as successful if it generates added research value for Fraunhofer and results in direct or indirect benefits for German companies in Germany or in the target country. Of the science organisations investigated for this report, Fraunhofer demonstrated the clearest alignment to \textbf{target area 2} of the Federal Government’s internationalisation strategy: global development of innovation potential is part of its core business. Fraunhofer sees the future markets for German industry as being increasingly in the emerging markets and partly also in developing countries.\textsuperscript{48}

Collaboration with developing countries (see also \textbf{target area 3}) is explicitly defined by the Helmholtz Association and by the Leibniz Association as a strategic goal or as part of their “research policy mandate”.\textsuperscript{49} In its internationalisation strategy of 2013, the Leibniz Association refers to this focus of collaboration of Leibniz institutions with researchers from emerging and developing countries, for example, in the areas of biodiversity research, infection research and agricultural research.\textsuperscript{50} Goals and concrete focal points of


\textsuperscript{46} The German Research Foundation (DFG) plans to update its existing internationalisation strategy in 2016. Interview with the DFG on 28/09/2015, Bonn.


\textsuperscript{49} HGF (2012): The Helmholtz Association in the World. The Basis for an International Commitment, p. 4.

\textsuperscript{50} Cf. Leibniz (2013): The Internationalisation of the Leibniz Association, p. 4.
International cooperation arise in this case from the coincidence of organisation-specific research interests and local circumstances and requirements. International cooperation with developing countries is a core task for the German Society for International Cooperation (GIZ) GmbH. The GIZ corporate objective is promotion of international cooperation for sustainable development and international education work.

German intermediary organizations also pursue organisation-specific objectives in cooperation with developing countries. Thus, the German Academic Exchange Service (DAAD), whose main task is the promotion of international exchange of students and researchers, is engaged in educational collaboration with developing countries. In 2014, for example, it adopted a strategy for academic cooperation with the countries of sub-Saharan Africa for the period 2015–2020. In addition to support of capacity building for graduate training and research at African universities, the DAAD strategy also provides for significantly increased scholarships to African scholars.\(^{51}\) The Alexander von Humboldt Foundation (AvH), has committed to fund top foreign researchers, who it supports to come to Germany for a research stay. Geographical or specialist specifications play no part in the selection of those supported. The AvH sponsorship offer is recognised and used worldwide, so that it results in AvH funding of top researchers from developing countries, even without a specific quota.\(^{52}\)

Selective activities of all the research organisations examined here can be assigned to the broad target area 4 (“Global challenges”). This aim is found at strategic programme level above all at the Helmholtz Association: in the context of six research areas, for example, Helmholtz researchers are investigating issues of energy supply, sustainable use of resources and health research.\(^{53}\)

The German Research Foundation (DFG) with its broad spectrum of funding generally targets support of international cooperation and jointly shaping international research standards.\(^{54}\) Against this background, the DFG is involved inter alia in the “Global Research Council” founded in 2012, an informal worldwide association of presidents and heads of research and research funding organisations.\(^{55}\) The shaping of the framework conditions for international research cooperation, particularly through the exchange of experience and the development of recommendations, is also a core task of the German Academy of Natural Scientists Leopoldina (Deutsche Akademie der Naturforscher Leopoldina) – National Academy of Sciences. It

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\(^{52}\) In 2014 AvH received applications from a total of 83 countries. Among them were 45 countries on the DAC list of developing countries and territories of the OECD. Sources: Alexander von Humboldt Foundation, “Annual Report” 2014, p. 54–57; Federal Ministry for Economic Cooperation and Development: DAC list of developing countries and territories (valid for the reference years 2014–2016), obtained in January 2016.


\(^{54}\) Cf. DFG (2012): The internationalisation strategy of the German Research Foundation, p. 8–9.

\(^{55}\) The DFG is currently leading a team set up in 2015 (the “Executive Support Group”), which supports the executive level of the Global Research Council and is tasked with ensuring continuity of the GRC. This team has a specific duty to support the five regional conferences organised globally each year.
officially represents German research in multinational academic associations such as the global network of science academies (IAP) and the European Academies Science Advisory Council (EASAC) which is the association of the national academies of science of the EU member states. The EASAC office has been located at the Leopoldina headquarters in Halle since 2010.

**Target area 5** newly included in the “International Cooperation” action plan of 2014 (“Creating perspectives through education – for people and the economy”) covers a wide range of international activities based on the German vocational training system. The significant growth in demand in recent years for the German dual system of vocational training has, thus, led to an interdepartmental and cross-organisational extension of bilateral cooperation. Above all this is intended to combat high youth unemployment at European level. This rose substantially in some EU member states as a consequence of the global economic and financial crisis in the years after 2007. At international level, particularly with the BRICS countries China, Russia, India and South Africa, but increasingly also with countries such as South Korea, Thailand, the USA and Mexico, cooperation activities are focused on the development of practice-based, cooperative vocational training systems. Innovation focal points are, for example, the development of national standards, curricula and examination regulations, the training of in-firm trainers and the testing of dual vocational training courses within the context of pilot projects.  

An export-oriented German economy has a strong interest in meeting the growing demand for specialists (also) abroad. International vocational training collaboration, thus, contributes to improving the conditions for foreign involvement of German companies and to strengthening their innovation and competitive potential. A central aim of German policy is also increased internationalisation of the German vocational training system: in 2013 the Bundestag had recommended that by 2020 at least 10% of the trainees in a study year should spend part of their courses abroad (goal in the EU context until the year 2020: 6%).

The “Strategy paper on international vocational education and training cooperation from a single source”, which the Federal Government adopted in **July 2013**, serves as a strategic framework for the above activities. A “round table” was established as a coordination and clearing centre for bilateral international vocational training cooperation, which is attended by representatives of the Federal Ministries concerned. The lead for international vocational training cooperation rests, depending on the context of the partner countries, with the BMBF (cooperation with OECD, BRICS and emerging countries) or with the Federal Ministry for Economic Cooperation and Development (BMZ) (co-operation within the framework of the coop-

56 The abbreviation “IAP” is derived from its former name “Inter-academy Panel on International Issues”, which was amended in the course of a statute change dated 27/02/2013.
59 Document No. 17/14352, 05/07/2013.
eration and development policy). The “round table” meets at regular intervals both at a working and department level and at state secretary level. In addition, the BMBF has established the Federal Institute for Vocational Training (BIBB) as the central point of the Federal Government for international vocational training cooperation – the German Office for International Cooperation in Vocational Education and Training (GOVET), which serves as a point of contact for all German institutions involved in vocational education and training cooperation as well as for interested parties from abroad. GOVET is intended to complement existing advisory services, such as the Society for International Cooperation (GIZ) and the Kreditanstalt für Wiederaufbau (KfW, Reconstruction Credit Institute). In addition to the area of vocational training, Germany has also advanced the definition of objectives and guidelines in other selected areas of international cooperation in education and research. Thus, in April 2013 the “Strategy of Science Ministers of the Federation and the Federal States for the Internationalisation of University-level Institutions in Germany” was adopted. It defines nine areas of activity that should serve the overarching aim of making German universities attractive and competitive internationally and place them in a position to contribute to the solution of global problems. It is aimed at the development of internationalisation strategies within universities, which understand “internationalisation” as a cross-sector task systematically applicable to all university departments – research, teaching, training and management. The Strategy of Science Ministers of the Federation and the Federal States, therefore, creates a direct connection to the internationalisation strategy of the German Rectors’ Conference (HRK), which was adopted in 2008.

German policy also extends to strategic considerations for internationalisation in education and research in country or regional strategy papers. Examples of this are the strategy documents “Germany, Latin America and the Caribbean: Concept of the Federal Government” (2010), the “Africa Policy Guidelines of the Federal Government” (2014), which generally relate to cooperation between Germany and the African States (also on education and research) and – with a special focus on education and research – the “Strategy for Africa 2014–2018” (2014). The BMBF Africa Strategy showcases a catalogue of measures on the seven focal topics of environment, health, bioeconomy, social development, resource management / raw materials, innovation and transformation. Most recently the “China strategy of the BMBF 2015–2020” was adopted.

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60 Cf. Document No. 17/14352, 05/07/2013, p. 5.
61 Further information from the central agency website at http://www.govet.international.
63 Decision at Meeting 18 of the Joint Science Conference (Gemeinsame Wissenschaftskonferenz), Berlin, 12/04/2013.
64 Available at http://www.hrk.de/fileadmin/_migrated/Internationale_Strategie_der_HRK_01.pdf.
66 See http://www.auswaertiges-amt.de/DE/Aussenpolitik/RegionaleSchwerpunkte/Lateinamerika/Lateinamerikapolitik_node.html.
69 See https://www.bmbf.de/pub/china_strategie_bmbf.pdf.
3.2 Instruments for internationalisation

The three priority areas for the Max Planck Society

In an international comparison, the Max Planck Society (MPG) already has a high degree of internationalisation. Against the background of increasing international competition and the need for research cooperation worldwide the primarily promotes the internationalisation of their activities in three priority areas: (1) Strengthening of the European Research Area (relating in particular to strong research partners in Europe and Eastern / South-eastern Europe); (2) Institution-specific internationalisation outside Europe (relating to excellent research partners, e.g. in the USA, Canada, Japan and Israel); (3) Further development of programme-related internationalisation (relating in particular to emerging research countries).  

published in October 2015. This broad “strategic framework for collaboration with China in research, science and education” is primarily dedicated to the possibilities for cooperation in the field of “collaboration in research and innovation” and “collaboration in higher education and vocational education and training”. 

All of the German research organisations place European collaboration in a prominent position. The particular importance of the European Research Area to German research organisations is highlighted by the fact that some of them have adopted independent strategies for research collaboration within the EU and for the shaping of research and innovation funding in the EU. An example of the alignment of a basic internationalisation objective – the strengthening of the principle of excellence – for European conditions is the strategy paper “Teaming for excellence”, drawn up in 2012 by the Max Planck Society jointly with eight other European research institutions and associations. This paper shows the course for developing Europe’s specific regional capacities for excellent research – in the context of strategic partnerships and by using the EU funding programme “Horizon 2020” and the EU Cohesion Fund.

3.2 Instruments for internationalisation

The German research organisations have a wide range of instruments that bolster international networking of individual organisations and of the German research system as a whole. A general distinction can be made between those instruments whose main objective is “internationalisation” and those that internationalise structures and processes in the German research and education landscape as a side effect. Both the development of instruments specifically designed for internationalisation and the availability of established funding instruments to international applicants are criteria by which internationalisation...
Germany’s collaboration in education and research in Europe and globally

The following section presents selected BMBF sources of funding for non-university research and intermediary organisations and, to a lesser extent, for the field of university-level education, which can be viewed as particularly relevant to internationalisation due their innovative character and/or their volume of funding. Five categories serve as an analytical grid for assigning selected sources of funding to specific organisations:

1. Analysis and advice
2. Strategic instruments
3. Institutional internationalisation and research infrastructures
4. Project funding
5. Mobility

3.2.1 Analysis and advice

The high level of political attention paid to internationalisation of education and research in the past years has led to the expansion of appropriately tailored consulting services in the German research system. The specific advice and recommendations vary depending on the provider and target group. The Alexander von Humboldt Foundation, for example, is focused on international cooperation and advises universities and non-university research facilities. Consultation takes place in the context of general information events and individually at the request of research institutions. DAAD offers online country-specific information for scholarship programmes for studies, teaching and research stays. It founded the “International DAAD Academy” in 2006, which offers training courses in internationalisation to staff members in higher education (see info box above).

In 2009 the German Rectors’ Conference (Hochschulrektorenkonferenz – HRK) developed an individual audit procedure entitled “The internationalisation of universities” designed specifically for the target group it represents. This procedure offers universities the opportunity to jointly analyse their international profile with external experts on the basis of a detailed questionnaire and to develop it further. Important topics are for instance the internationalisation of teaching and the university’s institutional language policy, its international research collaboration, the internal management and its processes of internationalisation.

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Further information can be obtained at https://www.daad-akademie.de/de/.
sation, the internationalisation of its administration as well as the setup of representative offices abroad.\textsuperscript{75} The HRK audit involves both quantitative and qualitative data and assessments. By the beginning of 2016, 66 universities had completed the HRK audit and the audit procedure is running in ten others.\textsuperscript{76} Universities already audited can since 2014 participate in a “re-audit” to support the concrete implementation of their internationalisation process. By the beginning of 2016, five universities have passed through the re-audit and 14 more are currently in the re-audit process.\textsuperscript{77}

Comprehensive analysis on the development and current status of internationalisation in the higher education sector is provided in the project initiated in 2006 by DAAD, HRK and AvH to raise the profile of “Internationality at German universities”. This evaluates data on international activities that the research organisations concerned or the Federal Statistical Office have already systematically captured.\textsuperscript{78} The regularly published results help universities, much like the individual HRK audits, to compare and position themselves strategically at national and international level.\textsuperscript{79}

The advice on international co-operation possibilities also belongs by nature to the core business of the diverse international representative offices of German research and intermediary organisations. The presence of the German innovation landscape abroad includes the international representative offices of German universities and research facilities, the Chambers of Commerce abroad, branches of German companies and the German embassies. The GIZ has around 90 locations worldwide – either in joint country offices with Germany’s development cooperation or with its own offices.\textsuperscript{80} In the case of the research organisations, DAAD takes a prominent position due to its traditionally strong presence abroad.\textsuperscript{81} In 2014 or 2015 the international representative offices of the Helmholtz Association in Brussels, Beijing and Moscow celebrated their tenth anniversary. Strongly visible internationally are also joint representations of several organisations, especially in the context of the current five German Houses for Research and Innovation (DWIH) (cf. Section 5). Their task, among other things, is to provide the institutions of the respective organisation – or German research in the case of the DWIH – with advice and networking to facilitate access to the local research community and markets.

\textsuperscript{75} Online survey by DLR-PT, August 2015 and interview with the HRK, Bonn, 25/09/2015.

\textsuperscript{76} Current information on participating universities via http://www.hrk.de/audit/audit/hochschulen/ (last accessed on 22/01/2016).

\textsuperscript{77} Current information on participating universities via http://www.hrk.de/audit/re-audit/hochschulen/ (last accessed on 22/01/2016).

\textsuperscript{78} By the end of 2015, a total of six documents had been published as part of the profile data project. See https://www.hrk.de/themen/internationales/strategische-internationalisierung/profildatenprojekt/. See an example of the latest publication in this DAAD series (2015): “Internationality at German universities – Sixth survey of profile data 2015”, Doc&Mat Volume 80, Bonn.

\textsuperscript{79} In January 2016 the Science Council had presented “Recommendations on specification of the core research data set” (DRS 5066-16). The core data set recommends that universities and non-university research institutions collect a series of selected, comparable key performance indicators. Relevant to an internationalisation perspective is the recommendation to register the nationality of the respective person for the areas “members of staff” and “promotion of young researchers”. See ibid, pp. 37–39.

\textsuperscript{80} For further information see https://www.giz.de/de/ueber_die_giz/99.html.

\textsuperscript{81} The DAAD network currently comprises among other things, 15 branch offices and 56 information centres in 60 countries as well as approximately 470 lecturers and around 150 language assistants abroad. Online survey by DLR-PT, September 2015 and February 2016.
Professional services and advice with respect to the content and structural development of the German science system and to international research cooperation in the broadest sense are also provided by institutions such as the German Science Council and the Leopoldina, mainly in the form of recommendations and position statements. After its nomination to the National Academy of Sciences in 2008 – and alongside its representative duties at international level (cf. Section 3.2.2 “Strategic Instruments”) – the Leopoldina has developed policy consultation as a new field at national and international level. The departments “Science – Politics – Society” and “International Relations” were newly created as part of this extension if its remit.

The German Society for International Cooperation (GIZ), including the merged former German Society for Technical Cooperation (GTZ), plays a special role in the area of “consultation”. After the fusion in 2011 the GIZ is still and increasingly involved in international education and university cooperation. In addition to pure education and university projects, education and higher education are increasingly becoming cross-sectoral issues, in the sense of sustainable capacity development in projects for reform of key sectors. Frequently the GIZ cooperates here with the Federal Institute for Vocational Training (BIBB) and with DAAD (see Section 5). Its development policy expertise and international networking as well as its orientation towards national and regional development plans and the labour market demands of the private sector shape the educational activities of the GIZ. A central instrument for this is firstly the secondment of experts, who implement education projects in situ together with local partners. Secondly the “Centre for International Migration and Development (CIM)”, a joint venture between GIZ and the Central Placement Office of the German Federal Employment Agency, provides specialists and executives to employers in developing and emerging countries. Such “CIM experts” or integrated specialists are also permanently integrated into the legal staff and structures of the partner organisation abroad. The demand for both posted and integrated specialists has increased sharply in recent years.

In addition to these external-facing consultancy and analytical activities of German research organisations, some of those involved are turning their attention to the development of internal monitoring systems for targeted orientation of their international activities. An indicator-based internal monitoring system that systematically tracks current developments in the main research regions and countries and evaluates them from an organisation-specific perspective has, for instance, been under discussion or tested for some time at the Alexander von Humboldt Foundation, the DAAD and the German Research Foundation, whilst the Fraunhofer Society already applies it.

82 Telephone interviews with the Leopoldina, 26/09/2013 and 27/11/2015.
83 The information contained in this paragraph is based on an interview with the GIZ on 11/12/2015 in Eschborn.
84 For further information on CIM international personnel placement see https://www.giz.de/de/jobs/24438.html.
85 Interviews with AvH (Bonn, 06/08/2013 and 22/09/2015), DAAD (by telephone on 19/02/2016), DFG (Bonn, 26/09/2013 and 28/09/2015) and Fraunhofer (Munich, 18/07/2013 and 05/10/2015). Fraunhofer, for example, has developed a “set of indicators for focus countries” in which a selection of the 20 highest-ranked countries in the indicator “Innovation pillar” of the global competitiveness index, in which Fraunhofer has generated foreign income of over 0.5 million euros, is correlated to the indicator “Import” of R&D-intensive products. A precursor of this graphic can be found on p. 3 of the Fraunhofer internationalisa-
The BMBF cooperates bilaterally in vocational education and training with those countries that express an interest in the dual system of vocational training. Bilateral working groups are established once or twice per year on the basis of political memoranda of understanding. These agree the areas of cooperation and the implementation of individual measures for system reform in the target countries. The BMBF is currently running five European and twelve non-European vocational training partnerships. These bilateral BMBF working groups are supported by experts from the German Office for International Cooperation in Vocational Education and Training (GOVET) (see above) that was set up in 2013.

At the same time, the BMBF uses such partnerships to pursue Germany’s vital interest in improving the conditions for foreign involvement by German companies, whilst at the same time meeting their need for well-trained local specialists. Building on the existing foreign involvement of German companies and the German chambers of commerce abroad (Auslandshandelskammern – AHK), business-related, demand-oriented approaches for dual vocational education and training are developed and tested in the partner countries. The “VETnet” strategy project (German Chambers worldwide network (AHK) for cooperative, work-based Vocational Education & Training) at the Association of German Chambers of Industry and Commerce (DIHK) supports structural adjustments in selected European and non-European countries. These are based on the German system of vocational training and aim to meet the demand for skilled labour from both German and local companies. Together with interested companies, the AHKs develop and test dual vocational training programmes and in doing so they establish important dual elements, such as vocational education and training and boards of examiners, the training of trainers and occupational training and examination standards. The activities from the VETnet projects are systematically integrated into the activities portfolio of the respective BMBF bilateral working group to ensure a coherent approach. VETnet began in 2013 and was extended in 2015 at nine of the original eleven locations by a further 3 years. The reform of vocational education and training systems in the partner countries (mainly in Asia and Latin America), which is based on the German dual model style, is also part of the classical consultation offered by the Federal Institute for Vocational Education and Training (BIBB).

The BMBF “iMOVE” initiative – International Marketing of Vocational Education & Training – has advised and supported the education sector in the export of vocational education and training.

Note: Activities in international vocational education partnerships often involve a mix of instruments. Since system support is such an important element of the VETnet project, it is also referred to in this “Analysis and advice” section. Further information on project initiatives in vocational education and training can be found in Section 3.2.4 “Project funding”.

These locations are China, Greece, India, Italy, Latvia, Portugal, Russia, Slovakia and Thailand. For further information see http://www.dihk.de/themenfelder/aus-und-weiterbildung/bildung-international/berufsbildungsexport/vetnet.

See also: Modernisation of vocational education and training – the international consulting approach of the BIBB, Bonn 2016 (forthcoming).
services since 2011. To do this iMOVE produces market studies on important target markets, organises country seminars and promotes German competence in vocational training and further education worldwide under the brand “Training – Made in Germany”. A particular model of advice and support is currently being tested by iMOVE in India: on behalf of the Indian Government iMOVE conducted four invitations to apply in Germany in 2015 for a three-year cooperation with leading Indian vocational education institutions. iMOVE had been integrated as a new field of work within the Federal Institute for Vocational Education and Training (BIBB) in 2013.90

3.2.2 Strategic instruments

In the following, “strategic instruments” are firstly designated as instruments that smooth the path to internationalisation of the German research system from a higher-level perspective. Secondly, (organisation-specific) instruments will be portrayed, which set targeted incentives for increased international cooperation that can be implemented as part of internationally oriented programme and project funding (cf. Section 3.2.3 “Institutional internationalisation” and 3.2.4 “Project funding”). The first set of strategic instruments, for example, includes representation of German research interests at international level, bi- and multilateral agreements to fund research, publicity for Germany as a location for research and innovation and development of the above-mentioned representative offices abroad.

Leopoldina currently represents German science committees within international bodies, such as the InterAcademy Council and in the context of policy consultation through the national science academies of the G7/G8 countries91. In the run-up to the annual summit of Heads of State and Government of the G7/G8, the academies formulate joint recommendations on science-related issues of global reach.92 In 2011 the German Research Foundation contributed as one of the seven original members to the formation of the new scientific organisation Science Europe, based in Brussels. HGF, MPG and Leibniz are further members of this European association of research-funding and research-based organisations.93

The interests of the German universities are represented at European level in particular by the German Rectors’ Conference, which maintains it own office in Brussels and is a member of the European University Association (EUA).94 A current example of the conceptual, strategic work of the HRK at international level is the inaugural meet-

90 For further information see http://www.imove-germany.de.

91 Nota bene: In response to Russian policy during the Crimea crisis in spring 2014, the Heads of State and Government of the seven leading industrial nations decided in March 2014 to return to meeting in the original G7 format (Group of Seven) and to suspend the G8 format that includes Russia.

92 For example, in 2015, with Germany as the host nation, the subjects were antibiotic resistance, tropical diseases and the future of the oceans. For further information on the 2015 G7 Summit in Germany and on policy advice of the G7/8 academies see http://www.leopoldina.org/de/internationales/politikberatung-der-g7-akademien.

93 See the website of Science Europe: http://www.scienceurope.org/about-us/member-organisations. Both the European Science Foundation (ESF) and the European Heads of Research Councils (EUROHORCs) have been amalgamated into Science Europe.

94 For further information on HRK activities in the European context see http://www.hrk.de/themen/internationales/ internationale-zusammenarbeit/europa.
Bi- and multilateral agreements and memoranda of understanding between individual

German research institutions and selected international partners are also a strategic instrument that can pave the way for in-depth research cooperation. Depending on the nature of the agreement, this includes the exchange of data and research results, alternate use of research facilities or the development of transnational processes for application and appraisal of researchers.

Illustrative examples are the eight current bilateral memoranda of understanding between the HGF and facilities in India, Canada, China, Russia and France\(^98\) as well as eleven corresponding cooperation agreements between Leibniz and institutions in France, South Korea, Japan, Taiwan, Poland, India and Mongolia\(^99\). Leopoldina has concluded eight bilateral agreements with partner academies in India, Poland, Russia, Africa (Network of African Science Academies, NASAC), Korea, France, South Africa and Israel.\(^100\) The structured networking between German universities and partners abroad is aided by the DAAD programme “Strategic partnerships and thematic networks” started in 2012, which involves inter alia the establishment and development of joint study courses, doctoral programmes and research related to international networks. This support is fundamentally aimed at deepening existing collaborations in research and teaching. In two funding rounds so far (2013–2016 and 2015–2018) a total of 49 projects were selected for funding.\(^101\)

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95 From the organiser’s point of view, the strategy of restricting the circle of participants to be comparatively small (taking geographical balance into account) proved its value by facilitating in-depth discussions. This format is due to be retained for the follow-up meeting in 2017. Interview with the HRK on 25/09/2015, Bonn.

96 For further information on the “Hamburg Transnational University Leaders Council” and the „Hamburg Protocol” see https://www.htulc.de.

97 For further information see https://www.bibb.de/de/9687.php. See also the BiIB Annual Report 2014, p. 71.

98 In order of their conclusion since 2011. Interview with the HGF on 24/09/2015, Berlin, and e-mail contact in January 2016.

99 In conclusion sequence since 2004. E-mail contact with Leibniz on 01/02/2016.

100 Leopoldina Year Book 2014, p. 257.

101 For further information see https://www.daad.de/hochschulen/programme-weltweit/hochschulpartnerschaften/strategie/de/23489-strategische-partnerschaften-und-thema-
The promotion of Germany as location for higher education, research and innovation represents one of the three generic measures of the federal government’s internationalisation strategy. Since 2006, Germany has presented itself abroad as a location for innovation under the brand name “Research in Germany – Land of Ideas”. Within the framework of two-year topic or country campaigns, the BMBF promotes the internationalisation activities of German R&D networks that usually comprise research institutions, universities and research companies. To date four topic campaigns (most recently on medical technology, 2011–2013) and three country campaigns (most recently Russia, 2012–2014) have been conducted. The topic campaign “City of the Future” starts in 2016. In addition there are bilateral Science Years, which raise the visibility of existing collaborations and encourage further cooperation by means of various event formats in Germany and in the partner country as well as by targeted press and public relations work. Since 2007 a total of six bilateral Science Years have taken place; most recently in 2014 the German-Turkish year of research, education and innovation. The BMBF launched a new “Research Marketing Action Alliance” in 2015. The objective of this action alliance is to network those involved in German research, education and innovation more closely with one another at home and represent them abroad under the umbrella brand “Research in Germany”. The action alliance is sustained by the measures of the research marketing group (cf. Section 5), future campaigns of the BMBF and the services of the German Houses of Research and Innovation.

In the area of higher education marketing, the campaign led by DAAD and operating since 2008 under the brand name “Study in Germany” and the joint DAAD / HRK GATE-Germany consortium for international higher education marketing are important instruments for convincing highly qualified foreign students to undertake a stay at a German university.

The second set of strategic instruments – targeted incentives – includes research awards and support measure prizes for foreign researchers, alumni networks, the internationalisation of appraisals and research personnel and organisation-internal funding instruments for the strategic strengthening of international collaboration.

Among research awards, the Alexander von Humboldt Professorship – assigned since 2008 – is outstanding: Its purpose is to enable scientific activity in all disciplines by the world’s leading scientists from abroad at a German university over a period of five years and, thus,
strengthen the international competitiveness of Germany as a research location. Given its award value of up to five million euros, the AvH Professorship is the most valuable international research award in Germany. Further internationally oriented awards are the AvH Sofja Kovalevskaja Award for young foreign scientists to build a research group in Germany (since 2002), the Helmholtz International Fellow Award for foreign researchers and science managers (since 2012) and the Leibniz Chairs. Leibniz Chairs have been awarded since 2005 by Leibniz institutions for several years or even for life; in the case of foreign and European guest researchers, the honour is intended to further strengthen cooperation between the respective Leibniz Institute and the home institution of the person receiving the award.\(^\text{109}\)

A current example for the **funding of support measures in the area of internationalisation** is the three competitions advertised in 2015, which the Stifterverband für die Deutsche Wissenschaft (Endowment Association for German Research) used to target improvement of the framework conditions for international students. The competition “Practice MINTernational” distinguished six universities for their practical training offers to international MINT students, the competition “MINTernational Digital” recognized eight innovative examples of digital learning and information services at German universities and the competition “Study&Work” featured ten regional networks that supported foreign students in their studies and facilitated the start of their subsequent careers.\(^\text{110}\)

Various research alumni networks have been established and expanded in Germany in recent years. Firstly, these increase the visibility and, thus, the attractive power of the respective organisation, but international alumni also act as overall multipliers for Germany as a research location. Traditionally, for instance, the international alumni work of the AvH has carried a lot of weight; there are currently 122 Humboldt Alumni Associations in 75 countries.\(^\text{111}\) Against the background of this experience, in the last five years the AvH has funded researcher alumni work by means of ideas competitions at universities and research institutions in Germany, with BMBF support as part of its international research marketing and, thus, placed on the agenda the extension of collaboration with the specific research segment among the alumni. Since 2014 there has also been an AvH social network (“Humboldt Life”), which aims to facilitate world-wide cooperation and the maintenance of contacts among Humboldtians.\(^\text{112}\) Under the name “maxNet” the Max Planck Society also offers a worldwide, interdisciplinary network that is available to all research staff and guest researchers staying longer than six months, all diploma students, doctoral candidates, scholarship holders, post-doctoral students and non-research staff.\(^\text{113}\) Worthy of

\(^\text{109}\) Of the six Leibniz Chairs awarded to date, three award winners are from institutes abroad (Universities of Lucerne, San Diego and Warsaw). Telephone interview with Leibniz, 09/05/2014. See also http://www.leibniz-gemeinschaft.de/forschung/hochschulkooperationen/gemeinsame-berufen-gen.

\(^\text{110}\) Online survey by DLR-PT, December 2015. For further information see https://www.stifterverband.org/.

\(^\text{111}\) For further information see http://www.humboldt-foundation.de/web/alumnivereinigungen.html.


\(^\text{113}\) For further information see http://www.mpg.de/alumni-betreuung.
final emphasis is the DAAD “Alumni programme for support and commitment to alumni abroad”, which supports German universities in their international alumni work. The main objective of this programme is to prepare foreign alumni professionally, increase their loyalty to Germany in the long run and promote their networking among each other and with their German partners from research and industry.¹¹⁴

The German research organisations have striven increasingly for some years to achieve internationalisation of its research personnel at all career levels¹¹⁵ and internationalisation of evaluation. In principle, a variety of internationalisation instruments, especially in the area of internationally-oriented youth promotion, smooths the path to lasting employment in the German science system.¹¹⁶ An example of targeted recruitment of researchers from abroad is the HGF recruiting initiative “Winning over the best minds” (“Die Besten gewinnen”) adopted in 2012.¹¹⁷ This initiative, funded by the Pact for Research and Innovation, provides various measures for winning top researchers from around the world to undertake research in Germany with a view towards selected subject areas such as the move towards sustainable energy. The integration of international expertise is also a declared goal in the appraisal of individual applications in the regular scientific advisory councils of the institutes as well as in the commissions for the institutional or programme evaluations. Whereas this overall trend towards a strategic opening-up of the selection procedures of the German research organisations is emerging,¹¹⁸ specific challenges are arising with regard to language barriers and the (time) availability of internationally renowned experts.

Finally, special funding instruments for research and intermediary organisations are required as internal strategic instruments for the start-up of internationalisation activities. One example of this is the Fraunhofer funding instrument “ICON – International cooperation and networking”, which supports strategic collaboration with excellent institutions abroad – usually universities – by means of projects lasting several years.¹¹⁹ The HGF “Impulse and networking fund (Impuls- und Vernetzungsfonds – IVF)” serves as a financial basis for various funding instruments, which are intended to support initiatives for the formation of networks between Helmholtz centres, universities and non-

¹¹⁴ For further information see https://www.daad.de/hochschulen/betreuung/alumni/de.

¹¹⁵ Nota bene: Corresponding data are not collected from all organisations; comparability is also partially limited due to different definitions of personnel categories. In 2012, 52.9% of the “trainees and guest researchers” at MPG were of foreign nationality, in 2014 the proportion was 55.5%. Noticeably high was the proportion of foreigners amongst post-doctoral students: 89% in 2012 and 75.4% in 2014. At Fraunhofer in 2013 and 2014 the proportion of staff members with foreign citizenship was in each case around 9%. E-mail contact with MPG on 22/10/2015 and Fraunhofer on 12/01/2016.

¹¹⁶ Cf. “Institutional internationalisation and research infrastructures”. An overview of the measures for internationalisation of research personnel especially of the organisations in the Pact for Research and Innovation is provided the appropriate subsection in the Pact’s annual monitoring reports (2015: Section 3.33).


¹¹⁸ See the data and references in the subsection “The internationalization of appraisals” in the annual monitoring report of the Pact for Research and Innovation (2015: Section 3.34).

¹¹⁹ The share of Fraunhofer headquarters finance for Fraunhofer Institute ICON projects was almost 2 million euros in 2014. Interview with Fraunhofer, Munich, 05/10/2015, and subsequent e-mail contact. See also “Research in International Competition. Features of Fraunhofer’s Internationalisation Strategy”, Munich 2013.
university partners and thereby cooperation with top international researchers.\textsuperscript{120} Also the “Strategy Fund” of the Leibniz Association amounting to 2 million euros annually is used for start-up financing of European and international cooperation of importance for the whole association.\textsuperscript{121}

The National Agency Education for Europe (NA at BIBB) founded in 2000 is domiciled at the BIBB. It has been responsible for implementation of the Erasmus+ EU funding programme for vocational training and adult education since 2014.\textsuperscript{122}

### 3.2.3 Institutional internationalisation and research infrastructures

The focus of this report is on current developments and trends in the area of internationalisation. Of particular importance to its analysis are, therefore, the instruments for institutional internationalisation, including the development of internationally used research infrastructures. Since these are essentially applied over time, they can also be used to indicate future developments in the internationalisation of the German research landscape.\textsuperscript{123} First and foremost is the permanent establishment of institutes abroad by German research organisations.\textsuperscript{124}

These are designed in such a way that they conduct research without time limit, in accordance with the principles of the relevant parent organisation and in close cooperation with local partners, particularly universities and companies. Examples of this strongest form of institutionalised cooperation are the five Max Planck Institutes abroad\textsuperscript{125} and the 15 Fraunhofer Centres under the umbrella of Fraunhofer subsidiaries abroad. Under certain conditions a Fraunhofer Centre can become an independent institution – a Fraunhofer Institute abroad.\textsuperscript{126} For these various formats, specific questions have to be clarified in advance concerning the autonomy rights of the relevant foreign institute as well as complex issues pertaining to grant law, for example, in relation to the origin of the basic funding and access to public funding in the country concerned.\textsuperscript{127}

\textsuperscript{120} Helmholtz – Creating knowledge for the digital world. Annual Report 2014, p. 11. Annual Report 2015, p. 44.

\textsuperscript{121} The “Impulse and Strategy Fund” was renamed “Strategy Fund” as new concepts were introduced in 2015. It is now primarily applied to start-up promotion for strategic Leibniz projects that are effective in the longer term. Telephone interview with Leibniz, 16/09/2015. See also Leibniz (2014): “Pact for Research and Innovation 2016–2020: The basis for further development of the Leibniz Association as a successful research organisation”, p.2, available at http://www.leibniz-gemeinschaft.de/medien/positionen.

\textsuperscript{122} See also Section 3.2.5 “Mobility”. For further information on the activities of the national agency for education and training in Europe, see http://www.na-bibb.de.

\textsuperscript{123} Nota bene: The definition for the following category “project funding” is not always clear-cut, depending on the weighting of the criteria for analysis (duration of funding; targeted development of cross-project structures; funding of major research groups). Despite sometimes only slight differences in categorisation of the instruments, the distinction between long-term institutional internationalisation on the one hand and short-term international project funding on the other is a decisive topic for this report.

\textsuperscript{124} Note on source assessment: If not otherwise indicated, the information presented in this “Institutional internationalisation and research infrastructures” section comes from the already cited respective publications, such as the monitoring reports of the Pact for Research and Innovation and the Annual Reports of the research and intermediary organisations.

\textsuperscript{125} These five institutes are located in Florence, Florida, Luxembourg, Nijmegen (NL) and Rome, whereby the Max Planck Florida Institute for Neuroscience founded in 2009 and the Max Planck Institute Luxembourg for International, European and Regulatory Procedural Law founded in 2012 feature a particularly high degree of independence. Interview with the MPG, Munich, 18/07/2013, and online survey by DLR-PT, September 2015. For further information see http://www.mpg.de/182559/Max-Planck-Institute_im_Ausland.

\textsuperscript{126} So far there are not any Fraunhofer Institutes abroad. Information about the Fraunhofer Centres, Fraunhofer Institutes and Fraunhofer Project Centres came from: Online survey by DLR-PT, September 2015 and interview with Fraunhofer 05/10/2015, Munich.

\textsuperscript{127} An illustrative example of such a regulation framework is provided by the decision of the Joint Science Conference
The second pillar of institutional internationalisation are cooperation instruments like the international Max Planck Centres (since 2010; currently 16 centres)\(^{128}\) and the Fraunhofer Project Centres (since 2008; currently 9 Project Centres)\(^{129}\).

These have no separate legal personality and are each limited to five years (each with unique extension option) but also contain structure-forming elements such as the joint working group, which in the ideal case extend beyond the funding phase to a **lasting network with the relevant partner abroad**. Cross-project cooperation designation also increases the visibility of the respective German research organisation abroad – in comparison to individual funding without such an institutional framework. Another example of this type are the Helmholtz Alliances, also restricted to a five-year period, in which selected Helmholtz Centres conduct research jointly with other national and international research institutions (universities and non-university partners) on a range of topics such as the environment, energy and health\(^{130}\) Albeit the Helmholtz Alliances, in contrast to the above-mentioned MPG and Fraunhofer instruments, are not intrinsically geared towards international cooperation; in such a thematic cooperation framework, as in the case of the Helmholtz Virtual Institutes or the Leibniz Research Associations,\(^{131}\) internationalisation only occurs as – an important side effect.

The HGF has further funding instruments targeted more explicitly towards international cooperation, such as the Helmholtz International Research Networks conceived in 2013, which support the establishment of joint research projects between the Helmholtz Centres and strategic cooperation partners abroad. The funding period is up to six years; two such networks have been established so far with partners in Israel and in China.\(^{132}\)

The bilateral Helmholtz Russia Joint Research Groups had already been set up in 2007 (final invitation to apply in 2012)\(^{133}\) and the Helmholtz International Research Groups designed according to this model followed in 2012 (2013: 15 groups)\(^{134}\). The single institutional framework of both these instruments is designed to increase the international visibility of the individual initiatives, although the funding period, as in the case of the funding programme established in 2012 between the HGF and the Chinese Academy of Sciences, is only three years. As a result of this...
relatively short period of time, generally speaking fewer structural effects can be expected than, for example, in the case of the Max Planck Centres that endure for up to a maximum of ten years. According to initial MPG experiences, the collaboration between Max Planck Institutes and outstanding overseas partners in future-oriented research areas takes on a new quality due to the Max Planck Centres. This creates platforms within the framework of scientific cooperation programmes on which the participating Max Planck Institutes and their international partners can combine their respective expertise and achieve added research value through this combination of complementary methods and knowledge synergies.

Thirdly research infrastructures generate a special form of institutional, long-term structures that are very significant to the internationalisation of the German research landscape. The Helmholtz Association institutions in particular have world-renowned scientific infrastructures and large units that attract an increasing number of international guest scholars. Many Leibniz institutions are also characterised by partially unique scientific infrastructures and data collections, especially research stations abroad. In order to network this research capital even more closely within Leibniz and make it even more visible externally, in May 2013 Leibniz established an internal research infrastructure group.\footnote{Monitoring Report 2015, HGF Annex, p. 19. Illustrative examples of an internationally significant research infrastructure operated by an HGF Centre are the German Electron Synchrotron “DESY” in Hamburg and Zeuthen, one of the world’s leading centres for research with photons, particles, particle astrophysics and accelerator physics (www.desy.de) or also the research vessel “Polarstern” – Polar Star – operated by the Alfred Wegener Institute at the Helmholtz Centre for Polar and Marine Research (AWI) in Bremerhaven (www.awi.de/expedition/schiffe/polarstern.html). For research infrastructures, see also Section 4.3.}

The establishment of permanent structures is fourthly a feature of the internationally-oriented youth promotion area, notably through the establishment of \textit{international graduate schools}. Examples of this are the International Research Training Groups (“Internationale Graduiertenkollegs”) established as early as 1999, the International Max Planck Research Schools (since 2000) and the International Graduate Schools of the Leibniz Association (since 2006). In the spring of 2016, the DFG supported 37 International Research Training Groups offering a group at a German university and a partner group abroad (February 2016: involving 19 countries) joint doctoral training.\footnote{See Section 2.2 “Collaboration within the European Union”.} The BMBF-funded international research collegia in the field of humanities, often with a special focus on youth promotion, also illustrates the current trend towards lasting institutional internationalisation.\footnote{For current statistics and information on the geographical distribution of DFG international graduate studies programmes, see http://www.dfg.de/foerderung/programme/koordinierte_programme/graduiertenkollegs/internationale_grakos/index.html.}

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\footnote{136 The “Standing Commission for Research Infrastructure Facilities and Research Museums” was set up in November 2015 under the statutes of the Leibniz Association (§11, Point 7). Available at http://www.leibniz-gemeinschaft.de/ueber-uns/organisation/.}

\footnote{137 See Section 2.2 “Collaboration within the European Union”.}

\footnote{138 For current statistics and information on the geographical distribution of DFG international graduate studies programmes, see http://www.dfg.de/foerderung/programme/koordinierte_programme/graduiertenkollegs/internationale_grakos/index.html.}

\footnote{139 For information on the establishment of international humanities collegia in the context of the BMBF framework programme Humanities, Cultural Studies and Social Sciences (2013–2018), see https://www.bmbf.de/de/geistes-und-sozialwissenschaften-weltweit-744.html.}
Fifthly, in the higher education sector there exists a dense network of partnerships with foreign universities and research institutions that are supported by a wide variety of funding measures from the BMBF and the research and intermediary organisations. According to the HRK Higher Education Compass, German universities currently cooperate in the framework of over 30,000 partnerships around the world. In the past few years in particular, the demand for an institutionalised German-foreign collaboration in the higher education sector increased significantly – both with regard to the establishment of individual study programmes and in relation to the establishment of independent universities. In 2001 BMBF funds helped start the DAAD programme “Transnational education – Study opportunities offered by German universities abroad”, which assisted foundation of the German University in Cairo (GUC), for example. The German Jordanian University (GJU) commenced teaching activities in 2005 and the Turkish-German University (TDU) in Istanbul in 2013. In addition, Germany is engaged via GIZ in cooperation with DAAD, funded by the Federal Ministry for Economic Cooperation and Development and by a targeted BMBF contribution, in the establishment of a new pan-African University (PAU) by the African Union. Via AvH and DAAD the BMBF has supported an Endowed Chair at the African Institute of Mathematical Sciences in Senegal (AIMS Senegal) since 2012.

This pilot action is part of the AIMS Next Einstein Initiative (AIMS NEI), the aim of which is to build a network of 15 national mathematical centres of excellence in Africa by 2020.

### 3.2.4 Project funding

The German research organisations provide a variety of instruments for promoting internationally oriented projects for both individuals and large, interdisciplinary research groups. This includes in principle all of the promotion measures designed to involve international partners and the instruments focused on the establishment of (permanent) institutional cooperation structures already described in the previous section. Germany’s transnational research cooperation, with a focus on corresponding BMBF funding measures, are presented separately in Section 4. This section, therefore, concentrates on selected instruments of German organisations in the areas of research and vocational training.

The Leibniz Association funds so-called “Leibniz Groups” where German and international researchers come together to research a common topic. In addition to the funding instrument of the Helmholtz youth promotion groups, in 2012, the HGF advertised for the first time a global call for applications for a Helmholtz postdoctoral programme. The Max Planck partner groups, limited to a maximum period of five years, have already existed since 1999: after a research stay at a Max Planck Institute, guest researchers from abroad can receive support for the creation of a partner group in their homeland.

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140 For further information see https://www.daad.de/hochschulen/hochschulprojekte-landes/hochschule/ausland/.
141 For further information see https://www.bmz.de/themen/bildung/hochschulbildung/Zusammenarbeit-konkret/Aufbau-einer-Panafrikanischen-Universitaet/index.html. The BMBF contribution supports the development of a research agenda for the pan-African University (PAU).
142 For further information see https://www.bmz.de/de/themen/bildung/hochschulbildung/Zusammenarbeit-konkret/Aufbau-einer-Panafrikanischen-Universitaet/index.html.
143 For further information see http://www.nexteinstein.org/index.php.
or at their home university to continue academic exchange with colleagues in Germany.\textsuperscript{144}

The Fraunhofer Institute’s bilateral projects with businesses abroad are worth a brief mention at this point. In 2014 over a quarter (26.4\%) of the income to all German Fraunhofer Institutes came from partners abroad.\textsuperscript{145}

Of paramount importance to all German research organisations is their involvement in European funding measures, especially in the European research framework programmes (cf. Section 2.2). In this context, a leading role in Germany and in Europe is played by the Max Planck and Fraunhofer Institutes: In a comparison of all research organisations participating in the seventh EU research framework programme compiled by the European Commission in 2015, the Fraunhofer Society occupied second place and the Max Planck Society fifth place.\textsuperscript{146} The Helmholtz Association also plays an outstanding role in this: if you add the EU funding obtained by the respective Helmholtz Centres (due to their legal status the Centres are listed individually in the European Commission ranking), the Helmholtz Association is shown to be particularly successful in European and national comparison. Thus, the HGF received, in a national comparison for the period 2008 to 2014, the highest number of new grants (in term of project participation) in the European research framework programme.\textsuperscript{147} With a view to the total sum of EU funding received in the current research framework programme Horizon 2020 (as of: July 2015; Horizon 2020 term: 2014-2020) HGF is in second place in an EU comparison (see Figure 5).

The instrument of project funding is also used in the field of internationalisation of vocational education and training: The “Vocational training export” (“Berufsbildungsexport – BEX”) funding initiative has existed since 2009 and is aimed at German providers of education and training services. The worldwide demand for qualified specialists has increased, and with it the market potential for German vocational education and training service providers. The BMBF uses the BEX funding initiative to support German training providers in accessing cooperation opportunities and developing sustainable international business models. The project consortia consist of partners from research and practice and are designed to provide innovative developments and trials of demand-oriented qualification measures.\textsuperscript{148}

In addition, the BMBF and BMZ fund selected projects with partner countries as part of vocational training partnerships. The BIBB and GIZ are active at this worldwide as a national centre of competence and as an implementation organisation. Current examples of comprehensive collaborations in the non-European countries are the modernization of the Indian vocational education and training system since 2007 and the introduction of a dual system of vocational education in

\textsuperscript{144} Since 1999, a total of 106 partner groups have been established. Monitoring Report 2015, MPG Annex, p. 25.

\textsuperscript{145} Calculated without income from foreign subsidiaries and without foreign license income. E-mail from Fraunhofer, 29/01/2016.


\textsuperscript{147} See Monitoring Report 2015 of the Pact for Research and Innovation, Figure 6, p. 31.

\textsuperscript{148} For further information see https://www.bmbf.de/de/die-foerderinitiative-berufsbildungsexport-325.html.
Germany’s collaboration in education and research in Europe and globally

Mexico since 2013. German vocational trainers undertake the consulting and implementation tasks in both cases.  

3.2.5 Mobility

Transnational transfer of research personnel is a prerequisite for international networking and access to world-class research – and, thus, a key building block for the internationalisation of the German research system. Measures to promote mobility among researchers are, therefore, integral parts of many internationally-aligned funding instruments. These measures range from support for conference travel to the financing of longer guest stays, both in terms of outward mobility (researchers operating in Germany go abroad for a while) and of inward mobility (researchers from abroad come to Germany for a while). Funding programs within international graduate schools, therefore, regularly support presentations and visits to partner institutions abroad, for example.

Naturally, German intermediary organisations have the broadest range of transnational mobility measures at their disposal, above all the AvH and DAAD. Whilst AvH funding is focused on researchers at all stages of their careers after graduation, the DAAD – in addition to “re-

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149 Interviews with BIBB on 02/10/2015 in Bonn and with GIZ on 11/12/2015 in Eschborn. An overview of information on countries involved in vocational education and training is provided in the country portal of the Central Office for International Vocational Education and Training Cooperation (GOVET) at http://www.govet.international/and.
searchers and university lecturers” – targets in particular both students and graduates. The three main programme lines of AvH funding are the Humboldt Research Fellowship (target group: researchers from abroad with a research project in Germany), the Feodor Lynen Research Fellowship (target group: German researchers who are planning a 6–18-month guest stay at a research institute abroad) and the Georg Forster Research Fellowship established in 1998 (target group: researchers from developing and emerging countries whose research project deals with development policy objectives in Germany).151

In addition to grants as part of cross-organisation cooperation programmes (see Section 5) the annual scholarships for research and study are the central DAAD funding instrument. Those who are funded come both from abroad as well as from Germany, whereby the proportion of those funded from abroad is significantly higher: a total of 4,252 people from abroad received a DAAD one-year scholarship in 2015, while 1,420 people from Germany were funded.152 Introduced in 2014 and in great demand, the DAAD mobility programme P.R.I.M.E. (Post-doctoral Researchers International Mobility Experience), co-financed by the European Union Marie Curie Programme, is aimed specifically at post-doctoral researchers. Rather than grants, it provides employments for highly-skilled young researchers of all nationalities and specialities and includes a twelve-month phase abroad and a six-month integration phase at a German university, where those funded are employed over the entire promotional period.153

DAAD also acts as an information and advisory agency on behalf of the BMBF for the EU university programmes (National Agency for EU Higher Education Cooperation), whose specific instruments in the area of mobility are of central importance for academic collaboration in Europe.154 Ever since 1987, DAAD has managed the EU higher education programme ”Erasmus”, which was extended in December 2013 into the comprehensive “Programme Erasmus+ for general and vocational education and training, youth and sport” (2014–2020).155 Erasmus+ should among other things also increase the cross-border mobility of German trainees – this is one of Germany’s declared policy aims (see Section 3.1).

150 The DAAD category “researchers and university lecturers” includes post-doctoral students and refers to “as a rule research or academic staff actively engaged full-time at a university or research institute”. Sources: DAAD Annual Report 2012, p. 94, DAAD-Annual Report 2014, p. 82 plus an interview with DAAD in Bonn, 28/08/2013 and subsequent e-mail exchange.


153 Interview with DAAD on 02/10/2015. For further information see https://www.daad.de/ausland/studieren/stipendium/de/22346-postdoctoral-researchers-international-mobility-experience.

154 For further information see https://eu.daad.de/de.

4. Research collaboration outside the framework of the European Union

As explained earlier, cooperation with European partners and within the European Research Area (ERA) is of significant importance for the German research landscape (see Section 2.2). The following provides brief highlights of three further areas of cooperation outside the EU framework: bilateral and multilateral cooperation with European partners and as part of the European macro-area strategies (Section 4.1), bilateral and multilateral cooperation with partners outside Europe (Section 4.2) and collaboration in the context of international organisations and in the field of research infrastructures (Section 4.3). It is important to note that there is no sharp dividing line to collaboration in the framework of the EU, but on the contrary many bilateral and regional promotional activities in Germany are linked with targeted EU activities as, for example, in the case of the macro-regional EU strategies for the Danube and the Baltic Sea regions. In line with the guidelines of the National ERA Strategy, the federal government is striving to create an intelligent integration of national, bilateral and European research and innovation policy in order to create synergies between these areas.\(^{156}\)

4.1 Bilateral and multilateral cooperation with European partners and as part of the European macro-area strategies

France is Germany’s most important partner at the **bilateral level** in Europe.\(^{157}\) Intergovernmental councils of German and French ministers coordinate the collaboration. A wide range of new collaborations were decided in the years 2012, 2013 and 2014, for example, in the areas of health research, biotechnology, environmental research and social sciences. At the 17th German-French Council of Ministers in March 2015, among other things, the two research ministers signed the articles of association for the German-French Centre Marc Bloch (CMB) in Berlin. Founded in 1992, since January 2016 this interdisciplinary social science centre now has its own legal personality as a registered association.\(^{158}\) Raw materials research is a further area of common strategic interest: Currently, for example, the German-French funding announcement “Sustainable technologies for the production, processing and substitution of strategic raw materials”, supports the two collaborative projects “eco-metals”

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\(^{157}\) For an overview of selected partner countries and regions in Europe and the current focal points of bilateral and multilateral cooperation, see also the Federal Report on Research and Innovation 2016 (https://www.bmbf.de/de/bundesbericht-forschung-und-innovation-735.html).

\(^{158}\) For further information see http://www.ambafrance-de.org/17-Deutsch-Franzosischer.
and “RECVAL-HPM” from 2014 to 2017 with a total of 8 million euros.\textsuperscript{159}

Together with France and other important European partners, such as Poland and Switzerland, the BMBF also regularly hosts bilateral research and innovation forums to promote the networking of research landscapes. Strengthening of bilateral collaboration in particular was most recently achieved with the Czech Republic: in July 2015 the foreign ministers of the two countries agreed a comprehensive strategic dialogue including a package of measures in the field of research and development.\textsuperscript{160}

For multilateral cooperation with European partners since 2010, three major BMBF funding initiatives were of significant importance due to their close connection to the objectives of the EU: Firstly, the initiative “Establishment and development of innovative R&D networks with partners in the Baltic Sea region”\textsuperscript{161} also served to implement the EU Baltic Sea strategy from 2009. Three funding rounds (2010, 2011 and 2013) supported a total of 55 projects dealing with Federal Government High-Tech Strategy topics (climate / energy, health / nutrition, security, mobility, production and communications technologies).\textsuperscript{162}

\textsuperscript{159} For further information see the websites of both projects at http://www.ecometals.org/ and http://www.recval-hpm.de/.

\textsuperscript{160} For further information see http://www.internationales-buero.de/de/tschechische_republik.php.

\textsuperscript{161} The formation of a network requires in addition to at least one German partner the involvement of at least one partner from the group of countries Denmark, Finland, Norway or Sweden and at least one partner from the group of countries Estonia, Latvia, Lithuania or Poland.

\textsuperscript{162} DLR-PT information, March 2016.
With the same thematic orientation followed secondly in 2013 the initiative “Establishment and development of innovative R&D networks with partners in the Danube States”\textsuperscript{163}. The macro-regional framework for this was created by the EU Strategy for the Danube Region in 2011. A total of 31 projects were funded in the course of the first call for proposals in 2013. The overall volume of funding for the second call for proposals from 2015 was 1.25 million euros; the three Danube countries Republic of Moldova, Republic of Serbia and Hungary have guaranteed to co-finance the projects.

Thirdly, the programme “Establishment and Expansion of Joint Research Structures in Europe” was advertised for the first time in 2015.\textsuperscript{164} This funding announcement is aimed at supporting research institutions, universities and (research) companies from Germany to develop knowledge and innovation potential in less research-intensive regions in Europe and to institutionalise their collaboration with partners from the target regions. At the same time, the intention is to promote the partner’s connectivity to the European Research Area – in line with corresponding EU policies like for instance “Teaming for excellence” (see Section 3.1). Target countries of the announcement are the EU Member States Estonia, Latvia, Lithuania Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Romania and Bulgaria as well as the EU candidate countries Albania, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. The total funding value for the period from 2015 to 2018 amounts to 1.5 million euros; a total of 15 projects were selected for funding.\textsuperscript{165}

The strengthening of \textit{multilateral collaboration with European partners and worldwide} is also the objective of the current BMBF funding measure “Internationalisation of Leading-Edge Clusters, Forward-Looking Projects, and Comparable Networks” from 2015 is aimed at the internationalisation of successful consortia (“clusters”) and networks consisting of research institutions, universities, companies and others involved in the field of developing technology and innovation. This supports already established clusters in the development of their internationalisation strategies and then with implementation of the specific research and development projects with international partners. The funding in each case is up to 4 million euros for a project term of up to five years. Eleven projects were selected for funding in the first of three planned rounds of competition. These commenced at the beginning of 2016.

\textsuperscript{163} The formation of a network requires in addition to at least one German partner the involvement of at least one partner from the upper Danube region (Croatia, Austria, Slovakia, Slovenia, Czech Republic, Hungary) as well as at least one partner from the countries of the lower Danube region (Bosnia and Herzegovina, Bulgaria, Moldova, Montenegro, Romania, Serbia and Ukraine).

\textsuperscript{164} For further information see http://www.internationales-buero.de/de/227.php.

\textsuperscript{165} DLR-PT information, March 2016.
measure “Internationalisation of Leading-Edge Clusters, Forward-Looking Projects, and Comparable Networks” (“Internationalisierung von Spitzenclustern, Zukunftsprojekten und vergleichbaren Netzwerken”\textsuperscript{166}. This initiative was started in 2015 and supports both the establishment of international network structures (category “institutional internationalisation”, see Section 3.2.3) as well as cross-border research projects.

4.2 Bi- and multilateral collaboration with partners beyond Europe

Traditionally there has been close research policy cooperation with \textbf{industrialised countries world-wide}. The current Federal Report on Research and Innovation 2016 highlights in particular the thematically wide-ranging cooperation with Israel, Australia, Canada and the USA. Successful bilateral collaborations designed for the longer term can, thus, also be opened up for multilateral collaboration.

A current example of this from the field of health research\textsuperscript{167} is the funding instrument “German – US Collaboration in Computational Neuroscience” set up in 2009, which has also been open to applicants from Israel and France since 2015.

The so-called \textbf{BRICS countries} (Brazil, Russia, India, China and South Africa) have developed a their research and innovation systems in the last decade in a very dynamic way. As a consequence, both the German research policy as a whole and the respective German research organisations have increasingly had to focus their activities on these emerging research nations.\textsuperscript{170} Amongst the BRICS countries, the BMBF invested by far the most resources in cooperation with China in the period from 2011 to 2015 (around 91.4 million euros) followed by Russia with around 43.8 million euros.\textsuperscript{171} The largest growth in

\textsuperscript{166} For further information see https://www.bmbf.de/de/cluster-netzwerke-international-547.html.

\textsuperscript{167} For current focus topics in international cooperation, see also Section 2.

\textsuperscript{168} DLR-PT figures as of: December 2015. For basic information on this funding instrument, see http://www.gesundheitsforschung-bmbf.de/de/2550.


\textsuperscript{171} The information in this section is based on PROFI evaluations by the DLR-PT from March 2016. Nota bene: in each case these are data on bilateral cooperation with individual BRICS countries from which trends in such cooperation
resources is recorded by India: here the resources applied have quintupled since 2008 (from 1.4 million euros to 7.2 million euros in 2015). This is partly due to establishment of the “Indo-German Technology Centre (IGSTC)” in 2010, which promotes cooperation between German and Indian researchers and industry partners, but also to increased activities in the thematic programmes. Investments in German-Brazilian cooperation have also risen sharply in recent times: from around 2.3 million euros in 2011, the allocation of expenditure has almost tripled to around 6.8 million euros in 2015. There was a similar increase, if at a lower level, in investments for cooperation with South Africa (from around 1.1 million euros in 2011 to around 2.9 million euros in 2015). Can be extrapolated. In addition, the BMBF made investments in multilaterally oriented support measures in which (also) BRICS countries were involved; for the years 2011 to 2015, the expenditure for BRICS-related multilateral funding amounted to around 72.5 million euros.

By far the most important subject area in cooperation with the BRICS countries – as well as for BMBF activities overall (see Section 2.1) – are climate, environmental and sustainability issues (at around 140.4 million euros more than half the total expenditure for the years 2011–2015). An increasingly important role is also played by cooperation in the field of vocational education and training.172 An illustrative example of the current strategic orientation towards the BRIC(S) countries is the further development of the Chancellor Fellowship funding instrument. It has funded young executives from abroad since 1990 and is managed by the AvH. Initially limited to the USA, it was extended in recent years to Russia (since

172 See also Section 3.1. For further information on current co-operation activities with individual BRICS countries in vocational education and training, see the Federal Report on Research and Innovation 2016, Section 3.2 “Collaboration with the BRICS countries”.

Figure 7: Cooperation with the BRICS countries 2011–2015 (in millions of euros)

2002), China (since 2006) and more recently also to Brazil and India (since 2013).

As explained in Section 3 collaboration with “developing countries” is identified as a separate objective in the internationalisation strategy (target area 3). There is no uniform definition for the terms “emerging and developing countries”. The majority of these countries, however, display common characteristics, such as a low per capita income, poor healthcare and poor educational opportunities. Whilst as a rule the development cooperation emanates from the requirements of the partner countries, science and research cooperation places the existing potential at the forefront and builds on this in terms of Germany’s interests. This furthers mutually beneficial cooperation; capacity building on the one side and access to resources on the other, for example. One current focus is on collaboration with Africa. In the years 2011 to 2015, in which also the “Federal Government’s Africa policy guidelines” and “The Africa Strategy 2014–2018” of the BMBF were adopted (both documents from 2014, see also Section 3.1), the annual expenditure on project funding in sub-Saharan Africa rose continuously from around 16 million euros to around 41 million euros. A programme like “Welcome to Africa”, under which the DAAD has funded German-African research and university cooperation since 2012, deals comprehensively with this geographical focus.

Besides Africa, developing and emerging countries in Asia and Latin America are increasingly becoming the focus of attention. In May 2013 for the first time a BMBF measure for “Funding research collaboration with developing countries in the Asia Pacific region and of the Latin American and Caribbean region” was launched to extend the internationalisation of German universities and to strengthen the innovation systems of the target countries. A total of 35 target countries were defined for the Asia Pacific region (including 22 Pacific Island States) and Latin America includes all countries with the exception of the focus countries Argentina, Brazil, Chile, Colombia and Mexico, with which long-lasting partnerships are already in place as part of science & technology cooperation and regular bilateral funding measures. Up to 2016, this measure funded 14 projects in the Asia Pacific region and 15 projects with the countries of Latin America and the Caribbean. Whereas the first round of invitations was targeted mainly on mobility measures, the second round of invitations in April 2016 will be extended to include strategic project funding and, therefore, also involve joint research projects.

4.3 International organisations and research infrastructures

Those involved in the German research and education system shape the framework conditions

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175 Bekanntmachung des Bundesministeriums für Bildung und Forschung im Rahmen der Strategie der Bundesregierung zur Internationalisierung von Wissenschaft und Forschung von Richtlinien zur Förderung der Zusammenarbeit mit Entwicklungsländern des Asiatisch-Pazifischen Raums und der Region Lateinamerika und Karibik in der Forschung, 06/05/2013.
176 Current data in this section are based on DLR-PT information (as at: March 2016).
and structures of international cooperation in many ways. This “input”, in particular in the form of resources and legal framework conditions for international cooperation, has already been outlined in Section 2.1 by way of introduction. Germany’s involvement in international organisations and forums is a key building block in this respect. In particular as a contracting country of the United Nations and, therefore, also the United Nations Organisation for Education, Science and Culture (UNESCO) and of the Organisation for Economic Cooperation and Development (OECD) as well as a member of the informal alliance Group of 7 (G7), Germany together with its international partners can be involved in setting the research policy agenda and defining standards for an increasingly global network for research.\footnote{For further information see http://www.kooperation-international.de/detail/info/frascati-manual-2015-oecd-forschungsstatistikhandbuch-aktualisiert.html.} The activities of Leopoldina as the representative of German research at international level, particularly in the context of policy advice to the G7 Academies of Science, and the long-standing cooperation of BIBB with the UNESCO international vocational education and training centre (UNESCO-UNEVOC) serve as illustrative examples of the commitment of German research institutes within international organisations (see Section 3.2.2).

The analysis and consultancy activities of the OECD should be particularly emphasised in the context of the present report. In order to be able to measure, compare and improve the performance of various research and innovation systems, the first step that is necessary is to agree upon common standards for the collection and interpretation of data. This is achieved, for example, by the OECD Frascati Manual, which has stipulated rules for the collection of statistical data on research and development since the 1960s. The latest revision of this manual, with active BMBF participation, was undertaken between 2013 and 2015 in order to adapt international R&D statistics to changes in the international framework conditions.\footnote{For further information see http://www.kooperation-international.de/buf/organisationen/oecd/forschung/ziele.html.} One challenge here is to maintain the basic definitions to the extent that substantial time periods can continue without interruption, thus, allowing long-term trends to be identified. Regular OECD publications in the field of statistics within research to which this report also refers are the Science, Technology and Industry Outlook – STI Outlook (last published in 2014) and the STI Scoreboard (last published in 2015).\footnote{For an overview of OECD activities and publications in the area of research, see http://www.kooperation-international.de/buf/organisationen/oecd/forschung/ziele.html.}

The growing need for transnational and long-term cooperation is also particularly clear in the area of large-scale research infrastructures. Depending on the research area, such infrastructures often only enable top-level research – and because of the necessary resources can only be established and operated together with a number of partner countries. The focus of international cooperation activities in the area of research infrastructures is on third countries with strategic importance for the development, exploitation and management of exceptional research infrastructures. Special focus is on the countries of the so-called “Group of 7+5”, consisting of the G7 (Germany, France, Italy, Japan, Canada, USA and the United Kingdom) and the five largest emerging countries (Brazil, China, India, Mexico and...
South Africa) as well as Australia. Cooperation with these countries in the area of research infrastructures occurs inter alia through participation in the G7 “Group of Senior Officials” (GSO). In addition to the G7 countries, this group currently also includes Australia, Brazil, China, India, Mexico, Russia and South Africa. At the G7 meeting of Science Ministers in 2015, presided for the first time by Germany, the GSO submitted a progress report that also contains a list of national research infrastructures of potential global interest. These proposals were submitted by individual GSO members. Other GSO countries voiced suggestions regarding the proposed research infrastructures on the list. This should result in a series of new international collaborations.

Three ESFRI projects listed on Germany’s “National Roadmap for Research Infrastructures” (see Section 2.2) also include the involvement of international partner countries: South Africa in the Cherenkov Telescope Array (CTA) from the particle astrophysics research area, Russia and India in the “FAIR” accelerator centre (Facility for Anti-proton and Ion Research in Europe) and again Russia in the “XFEL” X-ray laser facility (European X-ray free electron laser facility). Russia and Mexico have also expressed interest in cooperating with the PETRA III storage-ring-based X-ray radiation source (see info box).

The extension of PETRA III within DESY
The Deutsche Elektronen-Synchrotron (DESY – German Electron Synchrotron) is one of the world’s leading centres for research with photons, particles and particle astrophysics as well as accelerator physics. It was established as a foundation in Hamburg on 18 December 1959. On 1 January 1992, DESY was extended by a second location in Zeuthen. Besides the accelerator activities, the main focus of research in Zeuthen is in particle astrophysics. DESY employs more than 2,300 personnel with a current total budget of approximately 320 million euros. On its research campus in Hamburg, DESY operates the x-ray radiation source PETRA III and the x-ray laser FLASH, which as state-of-the-art research facilities are available to more than 2,000 groups of researchers from all over the world. The PETRA III Extension (in construction) will ensure its status as a globally leading synchrotron. DESY offers “special access groups” for international research groups to share PETRA III, via which organisations contribute to the construction and operation of the facility and receive testing time in return. Russia and Mexico have accordingly already expressed interest in cooperation with PETRA III.

179 For further information and the “Group of Senior Officials Progress Report 2015” see https://www.bmbf.de/de/die-deutsche-g7-praesidentschaft-273.html.
5. Inter-organisational cooperation – Success stories

German research and intermediary organisations cooperate in a variety of ways with each other and with science and research organisations worldwide. Section 3 ("Strategies and instruments for internationalisation") has already covered collaboration with research institutes, universities and companies from abroad. This overview will be supplemented below by means of selected examples of inter-organisational cooperation at national level, which have an explicitly international focus.

For instance, the Deutsche Wissenschafts- und Innovationshäuser (DWIH – German Houses of Research and Innovation) established in 2009 are designed to improve the coherent appearance of German research abroad. The five Houses currently in New York, Moscow, New Delhi, Sao Paulo and Tokyo showcase German science and research services and research-based companies. They also serve as platforms for international collaboration.\(^{180}\) The DWIH initiative is run by the Foreign Office in agreement with the BMBF and in collaboration with the Alliance of German Science and Research Organisations\(^{181}\) as well as the German Chamber of Commerce and Industry in Japan and the Association of German Chambers of Industry and Commerce. The German Houses of Research and Innovation are in each case managed in situ by one or two organisations (DAAD; DFG; HRK or the German Chamber of Commerce and Industry in Japan).\(^{182}\)

The AvH, DAAD, DFG and Fraunhofer also form the group “International Research Marketing” funded by BMBF since 2010. This group promotes Germany as a research location both within Germany and abroad\(^{183}\) and is part of the new “Research Marketing Action Alliance” formed in 2015 (cf. Section 3.2.2 “Strategic Instruments”).

Other examples from the range of strategic internationalisation instruments are joint research awards, such as the Max Planck Research Award bestowed by AvH and MPG, which supports cooperation between foreign and German researchers in selected subject areas.\(^{184}\) The strategic orientation towards international cooperation is also served by the project already portrayed in Section 3.2.1 “Profile data on the internationality of German universities” under which AvH, DAAD and HRK gather data on the state of international cooperation at German universities and regularly publish the results of their analy-

\(^{180}\) For further information and links to the DWIH websites, see http://www.bmbf.de/de/16877.php.

\(^{181}\) Represented in the Alliance are AvH, DAAD, DFG, Fraunhofer, HGF, HRK, MPG, Leibniz, Leopoldina and German Science Council.

\(^{182}\) Consideration currently being given at the political level as to whether to transfer leadership in coordination of DWIHs to the DAAD. Interview with DAAD on 02/10/2015, Bonn.


\(^{184}\) Further information at http://www.humboldt-foundation.de/web/max-planck-preis.html.
ses. The “Alumniportal Deutschland” is where AvH, DAAD, the Goethe Institute and GIZ conduct their inter-organisational work. Its website provides networking options, event information and job vacancies for international graduates of all German continuing education providers and universities.\(^\text{185}\)

Examples from the area of project funding are the one-year Leibniz-DAAD Research Fellowships first awarded in 2011. They are directed towards post-doctoral researchers from abroad who would like to conduct research at a Leibniz Institute in Germany; around 15 fellows are selected every year. In 2014 the Leibniz Association and DAAD concluded an unlimited cooperation agreement to continue their joint funding programme indefinitely.\(^\text{186}\)

The GIZ in turn seeks inter-organisational cooperation in the education sector, in particular with the DAAD and BIBB. In 2012 the GIZ concluded fundamental cooperation agreements both with DAAD\(^\text{187}\) and with BIBB.\(^\text{188}\) One example of a GIZ-DAAD cooperation is the GIZ project for the set-up of the German-Mongolian University for Raw Materials and Technology (2013–2016; an extension until 2019 is being sought) on behalf of the BMZ. The DAAD is involved here through the secondment of German lecturers and within the framework of cooperation with German universities.\(^\text{189}\) GIZ, BIBB/GOVET and others involved in German vocational education and training are currently cooperating increasingly in Mexico, to promote further development of the Mexican model of the dual vocational education and training system\(^\text{190}\) (see also Section 3.2.4).

\(^{185}\) Further information at https://www.alumniportal-deutschland.org/startseite.html.


\(^{189}\) For further information see https://www.giz.de/de/weltweit/23147.html.

\(^{190}\) Interview with GIZ on 11/12/2015, Eschborn, plus subsequent e-mail contact.
6. Outlook

The present report aims – as did the first report from 2014 – to accompany the implementation of the Federal Government’s internationalisation strategy adopted in 2008 and of the of the BMBF “International Cooperation Action Plan” from 2014. Therefore, it highlights current priorities for the BMBF and the research and intermediary organisations. Both the conceptual and strategic level have been examined, as well as specific instruments for implementation of the internationalisation objectives. The report’s goal is to provide a summary of previous high points and experiences and offer an outlook with regard to future developments.

The analysis shows a dynamic development in three areas in particular: The first is that German research organisations have been very intensively involved with strategic issues of internationalisation in the past seven years. Important results of this process are the adoption of (organisation-specific) internationalisation strategies and – increasingly – the establishment of internal monitoring systems for indicator-based orientation of the respective internationalisation activities.

The second is that selected, existing funding and cooperation instruments were made available specifically for international collaboration. The third is above all that numerous internationalisation instruments were newly developed and tested. In 2016 many meaningful experiences gained in implementing this newly developed generation of internationalisation instruments will become available – in this context, evaluation processes have been conducted within organisations, in particular since 2015. These practical experiences from the German research organisations together with the forthcoming update of the internationalisation strategy in 2016 (“Federal Government Strategy for the Internationalisation of Education, Science and Research 2016”) will dominate future debate.
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<td>AA</td>
<td>Auswärtiges Amt – Foreign Office</td>
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<tr>
<td>AAL</td>
<td>Active and Assisted Living Research and Development Programme</td>
</tr>
<tr>
<td>ACP</td>
<td>African countries, the Caribbean and the Pacific (ACP countries)</td>
</tr>
<tr>
<td>AIMS-NEI</td>
<td>AIMS-Next Einstein Initiative</td>
</tr>
<tr>
<td>AIMS-Senegal</td>
<td>African Institute of Mathematical Sciences in Senegal</td>
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<tr>
<td>AvH</td>
<td>Alexander von Humboldt Foundation</td>
</tr>
<tr>
<td>AWI</td>
<td>Alfred Wegener Institute at the Helmholtz Centre for Polar and Marine Research</td>
</tr>
<tr>
<td>BBI</td>
<td>Bio-based Industries</td>
</tr>
<tr>
<td>BewGr-MPG</td>
<td>Management principles for institutions funded under the MPG implementation agreement</td>
</tr>
<tr>
<td>BIBB</td>
<td>Bundesinstitut für Berufsbildung – Federal Institute for Vocational Education and Training</td>
</tr>
<tr>
<td>BMBF</td>
<td>Bundesministerium für Bildung und Forschung – Federal Ministry for Education and Research</td>
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<tr>
<td>BMU</td>
<td>Bundesministerium für Umwelt – Federal Ministry for the Environment</td>
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<tr>
<td>BMZ</td>
<td>Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung – Federal Ministry for Economic Cooperation and Development</td>
</tr>
<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China and South Africa (BRICS countries)</td>
</tr>
<tr>
<td>CERN</td>
<td>European Organisation for Nuclear Research (Conseil Européen pour la Recherche Nucléaire)</td>
</tr>
<tr>
<td>DAAD</td>
<td>Deutscher Akademischer Austauschdienst – German Academic Exchange Service</td>
</tr>
<tr>
<td>DAC</td>
<td>Development Assistance Committee (OECD)</td>
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<tr>
<td>DFG</td>
<td>Deutsche Forschungsgemeinschaft – German Research Foundation</td>
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<tr>
<td>DIHK</td>
<td>Deutscher Industrie- und Handelskammertag – German Association of Chambers of Industry and Commerce</td>
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<tr>
<td>DLR</td>
<td>Deutsches Zentrum für Luft- und Raumfahrt – German Aerospace Center</td>
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<tr>
<td>DLR-PT</td>
<td>DLR Projektträger – DLR Project Management Agency</td>
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<tr>
<td>DWIH</td>
<td>Deutsche Wissenschafts- und Innovationshäuser – German Houses of Research and Innovation</td>
</tr>
<tr>
<td>DZWH</td>
<td>Deutsches Zentrum für Hochschul- und Wissenschaftsforschung – German Centre for Higher Education and Scientific Research</td>
</tr>
<tr>
<td>EARTO</td>
<td>European Association of Research and Technology Organisations</td>
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<tr>
<td>EASAC</td>
<td>European Academies Science Advisory Council</td>
</tr>
<tr>
<td>ECORDA</td>
<td>External Common Research Data Warehouse (ECORDA database)</td>
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<tr>
<td>ECSEL</td>
<td>Electronic components and systems</td>
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<tr>
<td>EDCTP2</td>
<td>European and Developing Countries Clinical Trials Partnership Programme</td>
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<th>Abbreviation</th>
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<tr>
<td>EIP</td>
<td>European Innovation Partnerships</td>
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<tr>
<td>EIT</td>
<td>European Institute for Innovation and Technology</td>
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<tr>
<td>EMPIR</td>
<td>European Metrology Programme for Innovation and Research</td>
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<tr>
<td>ERA</td>
<td>European Research Area</td>
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<td>ERC</td>
<td>European Research Council</td>
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<td>ERIC</td>
<td>European Research Infrastructure Consortium</td>
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<td>ESA</td>
<td>European Space Agency</td>
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<tr>
<td>ESFRI</td>
<td>European Strategy Forum for Research Infrastructures</td>
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<td>EUA</td>
<td>European University Association</td>
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<tr>
<td>Eurostars-2</td>
<td>Research and development programme to support European cooperation amongst small and medium-sized enterprises</td>
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<tr>
<td>EUROSTAT</td>
<td>Statistical Office of the European Union</td>
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<td>FCH 2</td>
<td>Fuel Cells and Hydrogen 2</td>
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<tr>
<td>Fraunhofer</td>
<td>Fraunhofer Society</td>
</tr>
<tr>
<td>FIS</td>
<td>Large research infrastructures</td>
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<tr>
<td>FNR</td>
<td>Fonds National de la Recherche</td>
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<tr>
<td>FRP</td>
<td>EU Research Framework Programmes</td>
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<tr>
<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit – German Corporation for International Cooperation</td>
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<tr>
<td>GJU</td>
<td>German-Jordanian University</td>
</tr>
<tr>
<td>GOVET</td>
<td>German Office for International Cooperation in Vocational Education and Training</td>
</tr>
<tr>
<td>GTZ</td>
<td>Deutsche Gesellschaft für Technische Zusammenarbeit – German Corporation for Technical Cooperation</td>
</tr>
<tr>
<td>GUC</td>
<td>German University in Cairo</td>
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<tr>
<td>HGF</td>
<td>Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren – Hermann von Helmholtz Association of German Research Centres</td>
</tr>
<tr>
<td>HIS</td>
<td>Institut für Hochschulforschung – Institute for Research on Higher Education</td>
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<tr>
<td>HRK</td>
<td>Hochschulrektorenkonferenz – German Rectors’ Conference</td>
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<tr>
<td>IAP</td>
<td>InterAcademy Panel on International Issues</td>
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<tr>
<td>ICON</td>
<td>International Cooperation and Networking</td>
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<td>IPC</td>
<td>International Cooperation Partner Countries</td>
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<td>IGSTC</td>
<td>Indo-German Technology Centre</td>
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<tr>
<td>IMI 2</td>
<td>Innovative Medicines Initiative 2</td>
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<tr>
<td>iMOVE</td>
<td>International Marketing of Vocational Education</td>
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<tr>
<td>IVF</td>
<td>Impuls- und Vernetzungsfonds – Initiative and Networking Fund</td>
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<tr>
<td>KIC</td>
<td>Knowledge and Innovation Communities</td>
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<tr>
<td>Leibniz</td>
<td>Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz e. V. – Gottfried Wilhelm Leibniz Scientific Association</td>
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<th>Full Form</th>
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<tr>
<td>Leopoldina</td>
<td>Deutsche Akademie der Naturforscher Leopoldina e. V. – Nationale Akademie der Wissenschaften – National Academy of Sciences</td>
</tr>
<tr>
<td>LERU</td>
<td>League of European Research Universities</td>
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<tr>
<td>MPC</td>
<td>Mediterranean Partner Countries</td>
</tr>
<tr>
<td>MPG</td>
<td>Max Planck Society</td>
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<tr>
<td>NMP</td>
<td>Nanosciences, Nanotechnologies, Materials and new Production Technologies</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PAU</td>
<td>Pan-African University</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<td>SME</td>
<td>Small and medium-sized enterprises</td>
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<tr>
<td>TDU</td>
<td>Türkisch-Deutsche Universität – Turkish-German University Istanbul</td>
</tr>
<tr>
<td>VETnet</td>
<td>German Chambers worldwide network (AHK) for cooperative, work-based Vocational Education &amp; Training</td>
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Germany’s collaboration in education and research in Europe and globally


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http://www.scienceeurope.org
https://www.stifterverband.org
http://www.study-in.de
http://www.wissenschaftsrat.de
Your contact – DLR Project Management Agency

The DLR Project Management Agency is a specialized service provider for the facilitation of research, innovation and education. The agency supports the federal ministries with the implementation of research programmes and additionally works for the European Commission as well as other public institutions and private customers.

The agency provides strategic and programmatic advice on conceptualising and designing funding measures, supervises funding projects on a technical and administrative level and supports bi- and multilateral cooperations worldwide. The covered spectrum of topics ranges from environment, culture, sustainability, health, education and key technologies to innovation and research transfer. With the management of around 8,500 projects as well as over one billion euros of research funds, the DLR Project Management Agency is the largest institution of its kind in Germany.