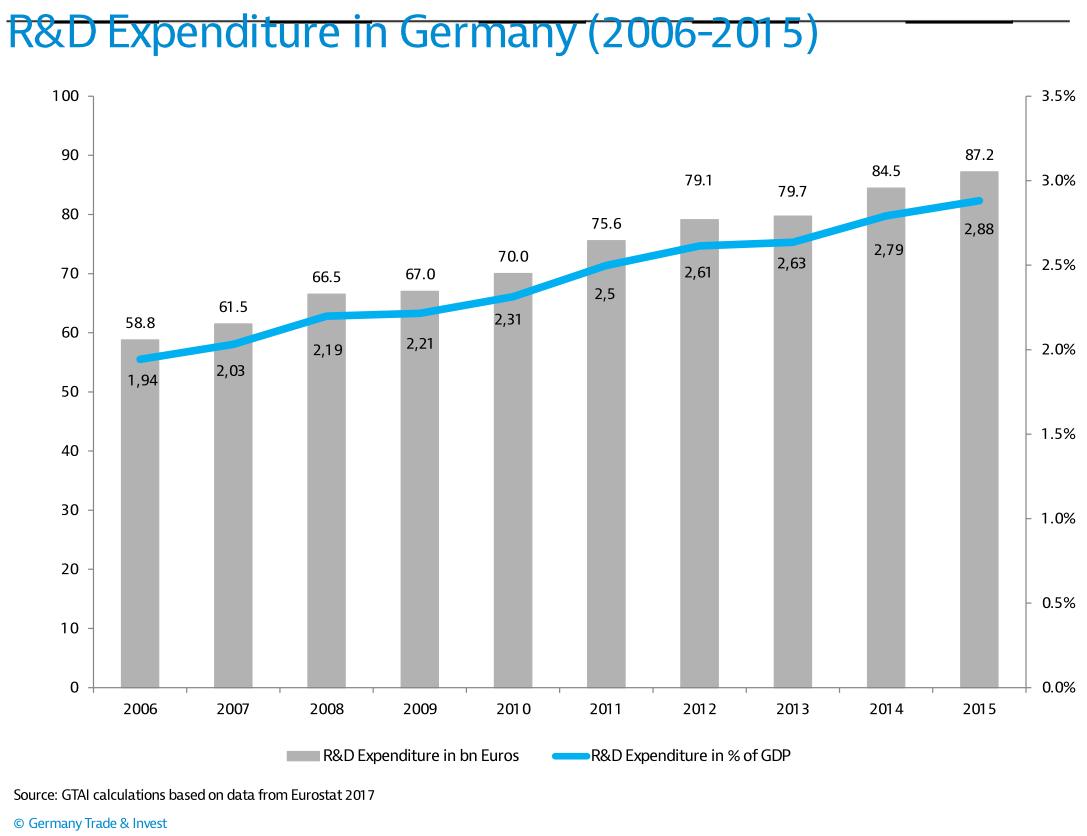
R&D Landscape

Rising R&D Expenditure

In Germany, enormous sums of money are invested in the development of new technologies and innovations. No other country in Europe invests greater amounts in research and development (R&D). For more than a decade, Germany's R&D expenditures have been rising continuously.

In 2015, public and private spending on research projects in Germany amounted to approximately EUR 87 billion – representing 2.5 % of Gross Domestic Product (GDP). This share places Germany fifth in Europe, behind the Scandinavian countries (Finland, Sweden, Denmark) and Austria, but significantly ahead of France and the United Kingdom and above EU-average.

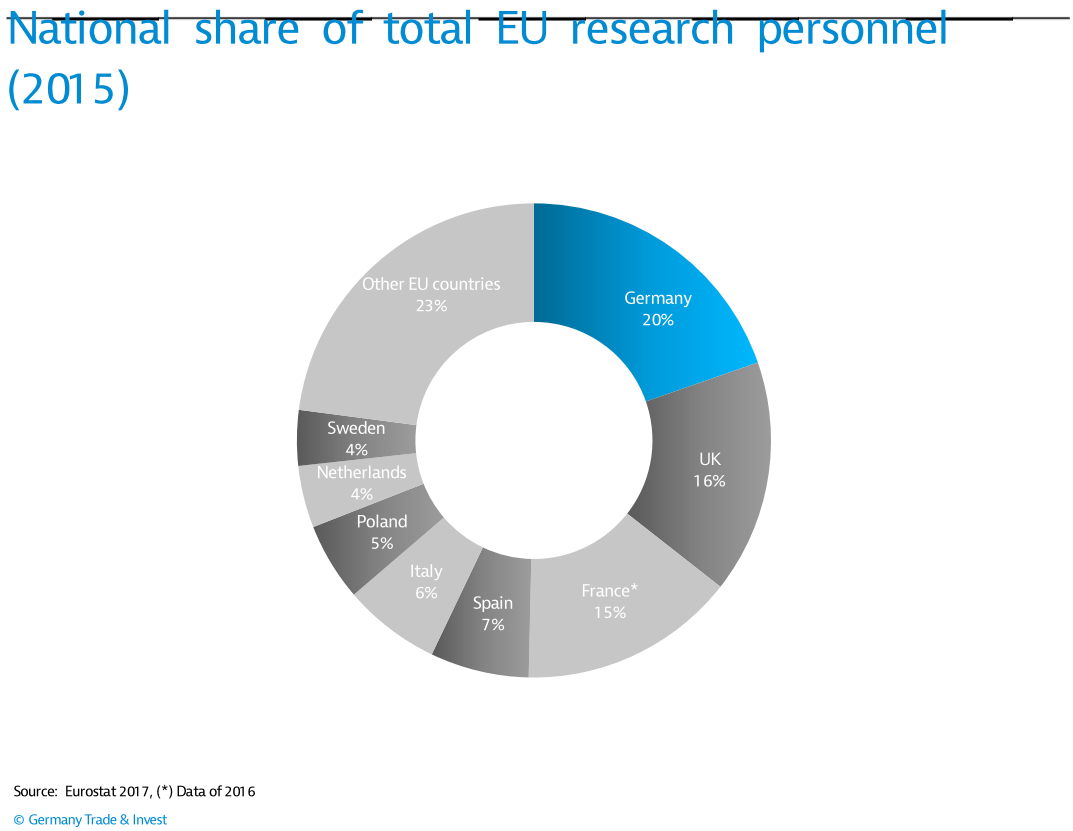
This means that Germany is well on track to achieving the 3 % goal specified by the European Union within the coming years. More than two thirds of the expenditure have been accounted for by research intensive private business.



Bar & Line Graphs: Total R&D Expenditures in Germany | © GTAI calculations based on data from Eurostat 2017

Einstein's Heirs

The strong research location of Germany has always contributed to the emergence of important world-class scientists. Albert Einstein's career started in Germany and culminated in the award of the Nobel Prize in Physics in 1921. However, the continuity of Germany's research quality is not only underlined by Max Planck and Robert Koch, but also by the two last Nobel Prize Winners, Thomas C. Südhof (2013) and Harald zur Hausen (2008): more than 70 scientific Nobel Prizes were awarded to Germans.
Germany is home of the biggest research community in Europe – 20 percent of the scientists in the EU live and work here. Moreover, German researchers cooperate in projects all over the world. For example, the Max-Planck-Gesellschaft currently participates in 2,500 international research projects with about 5,000 partners in more than 110 countries.



Pie Chart: National Share of total EU Researcher Personnel | © Eurostat 2017, Data of 2016

Proven Transfer of Knowledge

Germany's R&D landscape is characterized by a close cooperation between science and economy. It is based on the dense and decentralized network of more than 400 universities and technical colleges. But the availability of highly qualified university graduates all over Germany is not the only thing it ensures.

Also the private industry uses these valuable opportunities for cooperation and the access channels to fundamental and applied research at the universities. The findings of the work performed there are effectively used for industrial implementation. Scientists can easily be integrated into the corporate teams of developers and researchers. In addition, laboratory equipment is increasingly made available by the institutes.

It is, thus, not surprising that international decision makers praise the knowledge transfer between companies and universities in Germany.

Renowned Research Institutes

In a worldwide comparison, Germany holds a unique position thanks to its publicly subsidized research communities outside the universities.

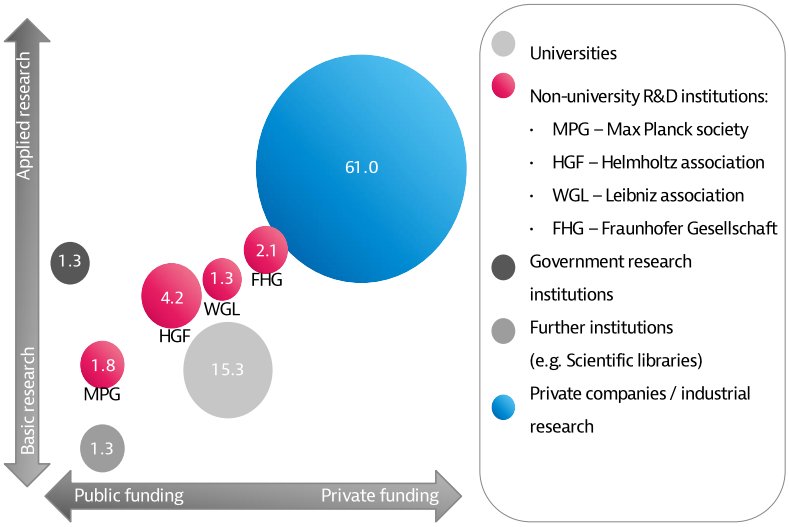
The application-oriented research communities, Fraunhofer-Gesellschaft and Leibniz-Gemeinschaft, provide mainly small and medium-sized companies with access to top research. Fraunhofer-Gesellschaft invests EUR 2.1 billion of research money in its more than 69 facilities and over 24,500 employees. A major part of the funds is generated by contractual research in collaboration with the industry.

Leibniz-Gemeinschaft's network comprises 88institutes and almost 19,000 employees. ‚Renowned institutes for fundamental research are located in Germany as well. Max-Planck-Gesellschaft and Helmholtz-Gemeinschaft enable companies to outsource costly fundamental research, thus reducing the risk associated with the development of new products and decreasing R&D expenditure.

- Maps of Research Institutes ▸

The interaction of universities, research organizations, industrial research and other actors constitutes a division of labor in the creation of value-added new knowledge which is unique in the world. This differentiated performance of tasks by the institutes involved covers the entire range from pre-competitive fundamental research mostly supported by the public sector up to tradeable application research financed by the industry.

R&D Expenditures (in EUR bn, 2015) and Type of Research by Actor



Source: Federal Statistical Office 2017

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Diagramm: R&D Expenditures and Type of Research by Actor | © Federal Statistical Office 2017

Effective Networks of Competency

Germany is characterized by an advanced structure of highly innovative regional networks and clusters providing companies with excellent access to knowledge, technologies and value chains. Interactive research and learning processes ensure a faster diffusion of technology, including a subsequent introduction in the market.

A special quality seal is the membership in the "go-cluster" initiative of the Federal Ministry of Economic Affairs and Energy. This initiative includes already about 100 clusters that meet stringent criteria for membership. Admission depends on the level of cooperation between industry and science. This includes the extent to which a potential member is actively dedicated to innovation. Additionally, the "go-cluster"-membership facilitates access to funds for the development of special cluster services.

- go-cluster ▸

Cooperative community research is also taking place in the research networks of the industry-funded "Arbeitsgemeinschaft industrieller Forschungsvereinigungen (AiF – Work Group of Industrial Research Associations)." More than 50,000 small and medium-sized companies have organized approx. 100 consortiums and perform re-

search projects relevant for specific spheres of technology. It facilitates the search for partners and the access to university networks and helps to overcome structure-based disadvantages of SMEs in the field of R&D.

- AiF - German Federation of Industrial Research Associations ▸

Trend-Setting Reform Initiatives

The Federal Government and the Federal States of Germany set the course for facing the challenges of an intensive, global innovation competition on the path to a knowledge-based economy. Three large reform instruments ensure that the German scientific system is equipped for the future.

The objective of the excellence initiative is to expand innovative top research at the universities. Until 2017, it subsidizes 99 projects, including graduate schools and excellence clusters, to increase their international visibility and competitiveness. Subsequent to the excellence initiative, the Federal Ministry of Education and Research plans to introduce a long-term program for promoting top-level research at universities and strengthen Germany's position as one of the leading research locations worldwide. The federal and state governments will annually provide 533 million Euro for this matter.

Comprehensive financial funds are also provided under the Hochschulpakt 2020 (Higher Education Pact) reform initiative to satisfy the need for highly skilled professionals. By 2023, this program will help to meet the demand of a rising number of applicants by creating 760,000 additional college and university places.

These reform initiatives will be completed by the "Pakt für Forschung und Innovation" (Joint Initiative for Research and Innovation). The program is dedicated to extra-university research institutes to secure their funding of international research projects. In order to achieve this objective, the Federal Government and the Federal States will increase their annual grants by 3 percent in the years from 2016-2020,providing the amount of 3.9 billion EUR of additional research funds.

Another objective of the Federal Government, in addition to the reform of the scientific system, is the development and exploitation of international R&D potentials. The internationalization strategy pronounced in 2008 has initiated a high number of measures, including the establishment of Deutsche Wissenschafts- und Innovationshäuser (German Houses of Science and Innovation) in major metropolitan areas worldwide. These are centralized points of contact and service that offer researchers and companies to obtain information on Germany as a business location for science.

- Excellence Initiative ▸
- Higher Education Pact 2020 ▸
- Joint Initiative for Research and Innovation ▸

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