

**Innovation
Indicator 2012**
English Extract

Deutsche Telekom Stiftung



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Bundesverband der
Deutschen Industrie e.V.



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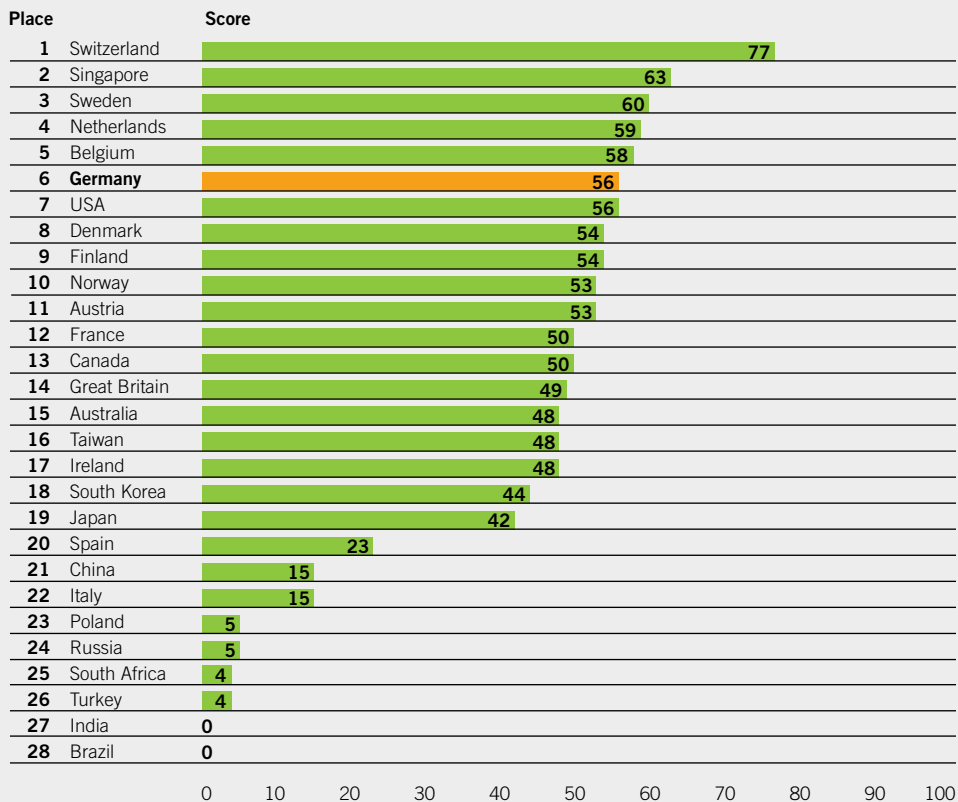
Main Results



- Last year, Germany reached 4th place in the overall indicator. This year it only manages 6th place. It has been overtaken by both the Netherlands (4th place) and Belgium (5th place) because of their increased investments in research and innovation in 2010/2011.
- Switzerland is once again in first position with a clear lead over Singapore and Sweden in second and third place. This is primarily due to the strongly innovation-oriented economy and first-class science in the Swiss confederation.
- There has been recent growth again in the USA thanks to the US government's economic stimulus package. The companies which cut their R&D spending during the crisis of 2008/2009 have raised this again. It remains to be seen how sustainable this development is.
- The BRICS countries show high economic growth. However, so far, their innovative capacity has not been able to match western industrial nations. With the exception of China and Brazil there have only been low and not very dynamic investments in education, science and research.
- The latest economic dynamics in Poland and Turkey is founded less on innovation, and more on cost advantages or high domestic demand and their favourable economic-geographic location.
- The innovation indicator places Baden-Wuerttemberg in second position directly behind Switzerland if it is included in the country comparison in an extra evaluation. The economy in this region is up with the leaders, especially in research and development, patents, productivity and finally also GDP per capita. The science system here is also convincing. Ten years ago, however, this German state was in first place.
- The biggest German state, North Rhine-Westphalia, has to be satisfied with 13th place because the subsystems of industry and science are not able to keep up internationally. The education system (9th place), on the other hand, is one of its relative strengths.
- Innovations in German industry are top-notch in an international comparison. It is now in 4th place having moved up two places.
- Another strength of the German innovation system is the networking of science and industry in research and development.

- **The education system remains the biggest weak point** (17th place) and is the main reason why Germany is not even higher up in the innovation ranking. This result is – as was already the case in the past – particularly discouraging.
- **Germany also falls behind** (15th place) in the state framework conditions for innovations. Granted, the government has recently upped its investments in science and research, but state aid is still modest compared to other countries. To make the best possible use of higher expenditure, reforms are necessary in the education and science systems.
- **The German innovation system is extremely efficient**, even if the system's productivity has fallen slightly in recent years in an international comparison. Despite the deficits, it still manages a higher overall ranking due to its clever use of the input. As things look now, Germany will continue to improve its innovation output up to 2016 and will gradually close the gap to the front-runner, Switzerland.
- **The variety of actors in the innovation process** (diversity) contributes to a better innovation performance. Germany, however, remains in the midfield regarding the use of diversity. In view of demographic change and new challenges in the wake of globalised innovation processes, it is necessary for women, immigrants and older employees to participate more in science and industry.

Overall result of the Innovation Indicator, 2011



- **Countries with a strong dual system of education** and vocational training like Germany tend to perform better under the innovation indicator. Skilled workers make up an important part of the innovation personnel in these countries and help to quickly implement innovative ideas. However, even a good dual system is not able to replace an academic education because new technologies and innovative leaps have to be produced by engineers and natural scientists with an education based on the latest state of research.
- **The vocational training activities of companies in Germany** lag behind in an international comparison. Many companies rely on the good basic education of their workers. The rapid changes in markets, technologies and customer requirements, however, demand a continuous adaptation of employees' knowledge.
- **Eurozone countries with major financial problems** have a much poorer innovation capability. The high current account deficits due to the lack of competitiveness are a major factor contributing to the present precarious position. For the euro area to stick together in the long term, there needs to be an alignment of the countries' performance within it. It is absolutely essential to improve the innovation capacity of the southern euro countries, but this will take a long time. The example of Ireland shows that it can be done.

Rankings in the Innovation Indicator, 1995–2011

Place	1995	2000	2005	2010	2011
1	Switzerland	Switzerland	Switzerland	Switzerland	Switzerland
2	USA	Sweden	Sweden	Singapore	Singapore
3	Netherlands	USA	USA	Sweden	Sweden
4	Sweden	Finland	Finland	Germany	Netherlands
5	Belgium	Belgium	Singapore	Finland	Belgium
6	Canada	Singapore	Netherlands	Netherlands	Germany
7	Germany	Canada	Canada	Norway	USA
8	Finland	France	Denmark	Austria	Denmark
9	France	Germany	Belgium	USA	Finland
10	Denmark	Netherlands	Germany	Belgium	Norway
11	Singapore	Denmark	Norway	Canada	Austria
12	Great Britain	Great Britain	Great Britain	Taiwan	France
13	Japan	Norway	Austria	Denmark	Canada
14	Norway	Japan	France	France	Great Britain
15	Australia	Australia	Australia	Great Britain	Australia
16	Austria	Austria	Ireland	Australia	Taiwan
17	Ireland	Ireland	Japan	Ireland	Ireland
18	South Korea	South Korea	South Korea	South Korea	South Korea
19	Taiwan	Taiwan	Taiwan	Japan	Japan
20	Russia	Russia	Spain	Spain	Spain
21	Poland	Spain	India	China	China
22	India	India	Italy	Italy	Italy
23	Spain	Italy	China	India	Poland
24	Italy	Poland	Russia	Russia	Russia
25	Turkey	China	Poland	Poland	South Africa
26	China	Brazil	South Africa	South Africa	Turkey
27	Brazil	Turkey	Brazil	Turkey	India
28	South Africa	South Africa	Turkey	Brazil	Brazil

Areas of activity

■ Education: invest more, achieve higher quality and enable close cooperation between central government and the German federal states

The education system's performance remains the biggest weak point in the German innovation system despite the latest reforms. Far too many young people are leaving school without adequate qualifications. The number of students starting and leaving university was able to be increased by shortening the length of a grammar school education and the Bologna Reform process, but this has often been at the expense of quality. And while companies are investing heavily in vocational education within the framework of the dual system, corporate further education efforts remain modest.

Germany's spending on education is still clearly below the OECD average. The government's aim to increase spending on education, research and science to 10% of the gross domestic product by 2015, which is equivalent to 25 to 30 billion euro per year, must not be allowed to remain simply a declaration of intent. These funds are urgently needed:

- The foundations for a good education are laid early. More nursery and kindergarten places are therefore just as important as a better quality of early childhood education. This is ultimately only achievable with well qualified and highly trained personnel who then have to be paid a worthy wage.
- The federal states should jointly adopt the positive experiences made by other countries with compulsory preschool programmes to give children from immigrant families equal education opportunities.
- Schoolchildren with poor learning results in their school-leaving certificate have to be given additional help in good time in order to ensure they have the qualifications required for vocational training. New models of cooperation are needed here between schools, youth welfare services, labour market promotion and industrial organisations.
- Reform measures in schools have to be tested to see whether they really contribute to improving the teaching. Urgent reforms are needed in Germany in education, further education and teacher training.
- Additional positions have to be set up at universities to improve the mentoring relationship between lecturers and students. Otherwise the increase in the number of students will continue to be at the expense of quality. It makes sense to vary teaching obligations temporarily - teaching courses at university must not be perceived as a burden by the researchers there.
- It is clear that corporate further training activities have to be expanded. Both employers and employees should be more active. Small companies can be supported by regional cooperations and further education networks. The government should extend their further training grants. Universities and research institutions are called upon to offer structured further education which matches the specific needs of employees and companies.
- Reforming the federalist education system must create the conditions needed to significantly improve the system. Overturning the cooperation ban for science and schools, which is long overdue, would remove one financing ban. The new financing option, however, will only lead to improvements if the central government, the federal states and the local authorities jointly assume the overall responsibility for education. This requires mandatory cooperation on the basis of clearly regulated responsibilities. Education has to become a joint task.

■ Diversity: finding the answer to demographic change

At present, Germany is not making enough use of the diversity of its people and their ideas. The involvement of women, immigrants and older employees in research and innovation as well as in companies and science is still too low.

More diversity is vital as the answer to demographic developments and the future shortage of skilled workers. This means not only improving flexible working hour models and the compatibility of family life and working life. It also requires a general cultural shift in the economy and society as a whole. The government has to follow up its demographic strategy, which addresses many aspects of such a shift, with action.

Diversity can help to meet new challenges in innovation competition. Internationality, interdisciplinarity and a variety of perspectives are the main components of holistic innovation processes. For diversity is the foundation of creativity.

Germany has to spread its innovation base over a broader area, building on its strengths in technology and science. Cultural modernisation is urgently required here as well and has to be promoted by the state.

■ Industry and science: increase investments and efficiency

Many countries have once again upped their investments in the innovation system following the crisis of 2008/2009. For Germany to retain its position in innovation competition and be able to improve on this again in the medium term, higher investments and a more efficient use of funds are necessary. It must not lose sight of the target of boosting its spending on research and development to three percent of the gross domestic product. Innovations take place in companies. The state has to create the right kind of framework conditions for this to happen. This includes introducing tax benefits for research and development.

The German science system has received much more funding over the last few years as part of the Excellence Initiative, the Higher Education Pact and the Pact for Research and Innovation. However, efficient use of these funds is being hindered by structures in need of reform. The reforms of recent years which reintroduced performance incentives to the system were important and right. But further steps still have to be taken. Unfavourable job prospects are making a career as a scientist less attractive to young people and fostering the "brain drain". A tenure track system with career paths which can be planned in the long term could rectify this.

More flexible employment models for all university employees should be considered; this would also open up greater financial and organisational scope for universities. To promote creativity at universities, the traditional system of professors with chairs should be successively replaced by departmental structures like those common abroad. Other countries like Sweden or Denmark have already introduced such reforms and reported first successes.

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