2013

Innovation Indicator

Deutsche Telekom Stiftung

BDI Bundesverband der Deutschen Industrie e.V.

Fraunhofer ISI

United Nations University UNU-MERIT

ZEW Zentrum für Europäische Wirtschaftsforschung GmbH

Get the app!

The Innovation Indicator 2013 is available as an English-language app for tablet PCs. It offers real added value: for example information about the sub-indicators and their impact or video statements. The app also can be used to compare individual countries and topics of the study with each other.

iOS

Android

Introduction

The Innovation Indicator 2013 published by the Deutsche Telekom Stiftung and the Federation of German Industry assesses the current status of innovation in Germany compared with its most significant competitors in the international markets. It covers all essential factors in the areas of education, science, the economy, politics and society which determine an economy's innovative capacity. The country ranking shows how well or how badly individual countries are equipped to meet the future economic challenges and where action is needed.

Innovation is a multi-layered phenomenon which is influenced by many factors. A comprehensive comparative analysis of the innovation performance of countries can therefore rapidly become very complex. In order to reduce this complexity, the Innovation Indicator presents an overall index which allows us to assess countries according to their innovation performance. For the innovation policy debate, however, it is equally important to identify the priority areas where special efforts are required. This is the task performed by the five sub-systems in the Innovation Indicator. The present position and potential development of the individual countries in these sub-systems indicate important trends.

The Innovation Indicator compares the innovation performance of 28 countries based on 38 single indicators. These individual indicators are derived from an economic model which ensures that only those indicators are taken into account which are relevant for explaining the innovation performance of countries.

Central to the analysis of the Innovation Indicator is industry, for ultimately it is the companies that transform and market ideas and new technologies into competitive products, services and processes. In order to innovate successfully, industry must interact with other sub-systems. Science for instance conducts basic research on which new technologies are based. The education system imparts the basics required for innovative performance – the knowledge and skills to deal with technologies and to produce innovations. The state and society create significant framework conditions for innovations.

Central Results

- Switzerland in 2013 again leads in the overall ranking of the Innovation Indicator. However, the gap to second-placed Singapore is clearly shrinking.

- The USA, still the world's biggest economy, achieved the 10th place this time. The downward trend in the USA, which has already been going on for 15 years, continues. The slight recovery in the past year therefore turned out to be a flash in the pan due to the economic stimulus package. In the sub-indicator Industry the US is placed fourth, just slightly behind Germany. This therefore is not the main reason for the decline, but rather the too low public investment in research and science.

- With the exception of China, the BRICS countries show a low innovation dynamic. Compared internationally, Russia loses especially drastically. Among the non-BRICS developing countries, Turkey`s development is particularly positive.

- In the analysis of the innovation performance of 28 economies, Germany managed to improve its results in the Innovation Indicator and therefore consolidate its sixth place. The distance to Sweden, which was still significantly ahead of Germany two years ago, was lower. Belgium and the Netherlands however managed to position themselves in front of Germany for the second consecutive year.

- German businesses rank even better this year than last year. It is the third most innovative economy in the world. The science system also made progress. However, although these two sub-systems are the backbone of every innovation system, these individual improvements have so far not yet resulted in a better position for Germany in the overall indicator.

- In the field of education, Germany shows a few small first signs of progress. However, with its 15th place Germany still ranks at the back of the mid-field. Efforts therefore cannot be lessened.

- Clear regional differences in the innovation performance are found in the USA and Japan, just as in Germany. California as one of the most innovative regions in the USA lead the international comparison until the year 2000, but has since then clearly fallen behind and is currently even ranked behind Baden-Württemberg and Hamburg, for example. The Tokyo region significantly lagged behind in 2012 and scores only slightly above the Japanese average.

Pressure to innovate increases at the top

Innovativeness of 28 countries in comparison

The top spot in the Innovation Indicator for 2013 goes, just as in the previous years, to Switzerland. Competitive pressure among the top countries is increasing, Germany however is able to maintain and defend its sixth place. The euro crisis which again has an effect on the economic performance of the countries caused some wild swings.

Switzerland in first place loses considerable ground and falls back from 77 to 75 points. Runner-up Singapore however was able to gain ten points and is currently lagging behind by only two points. This supports prognoses from the 2012 Innovation Indicator which hinted at increased competition, especially among the top contenders. The front-runner who stood alone for so long now is getting company. This development is mainly due to a change in the sub-indicator Industry. While Singapore managed to improve its position here, Switzerland lost out (see page 21). This certainly can also be traced back to the euro crisis. As a result of the crisis, demand from many important Swiss trading partners, especially Italy and France, has diminished. But these demand effects play a very significant role in promoting a strong innovation performance in the business sector. For Singapore, however, the dampening effects of the euro crisis were of little importance, since most of its commercial relationships are focused on the (south) east-Asian countries China (including Hong Kong), Malaysia and Indonesia. Despite the global turbulences, the economic situation here was still rosy.

In spite of the euro crisis, however, several European states still managed to close in on Switzerland. Worth mentioning are especially Belgium (third place, + 4 points), the Netherlands (fourth place, + 2 points) and Germany (sixth place, + 3 points). Sweden, which did not manage to improve its position, had to concede its fourth place and is now ranked fifth. This is still a good result for the Scandinavians. But there are signs that the local innovation will continue to stagnate in the coming years. The Swedish economy is characterized by many multinational companies that have in recent years not only moved parts of their production, but also their research departments from Sweden to other countries.

Greater gaps among the pursuers

As in previous years, the ranking of the Innovation Indicator is characterized by a wide range of pursuers, ranging from Belgium to Japan at number 19. However, this group is increasingly drifting wider apart. While third-rated Belgium has moved closer to leader Switzerland, Japan is losing more and more ground. The gap between it and the countries ranking exactly in front of it, Ireland and South Korea, is already seven points. Crisis-affected Spain follows at a remarkable distance of ten points behind Japan. However, Spain has managed to catch up, compared to 2011. Back then the gap was 19 points. This can be explained partly due to a continuous erosion of Japan's position, partly through a better Spanish performance. This improvement brings with it the first rays of hope for Spain in the long-term, crucial issue of innovation. The Innovation Indicator 2012 had already referred to the significance of innovation for sustainable solutions to the euro crisis, which in many southern European countries is also a crisis stemming from the lack of competitiveness.

That the gaps within the midfield have increased can be seen not only on the periphery of the pursuing field, but also in the shifts in the midfield. While some countries like the USA, France and Ireland are stagnating, other countries have improved their positions during the last few years. Among the top rankers, these include Belgium and the Netherlands, but also Denmark. While the Scandinavian country only scored 50 points in the Innovation Indicator 2011 it meanwhile has 57. In the lower middle field there are two countries, Taiwan and South Korea, that have become steadily stronger over the years. These developments imply a massive increase in the innovation competition, especially within the top 10 of the innovation leaders.

Learn more!

In recent years, Belgium caught up abundantly and has reached the third rank in the Innovation Indicator by now. Read more about the success story of the little kingdom.

www.innovationsindikator.de/belgium

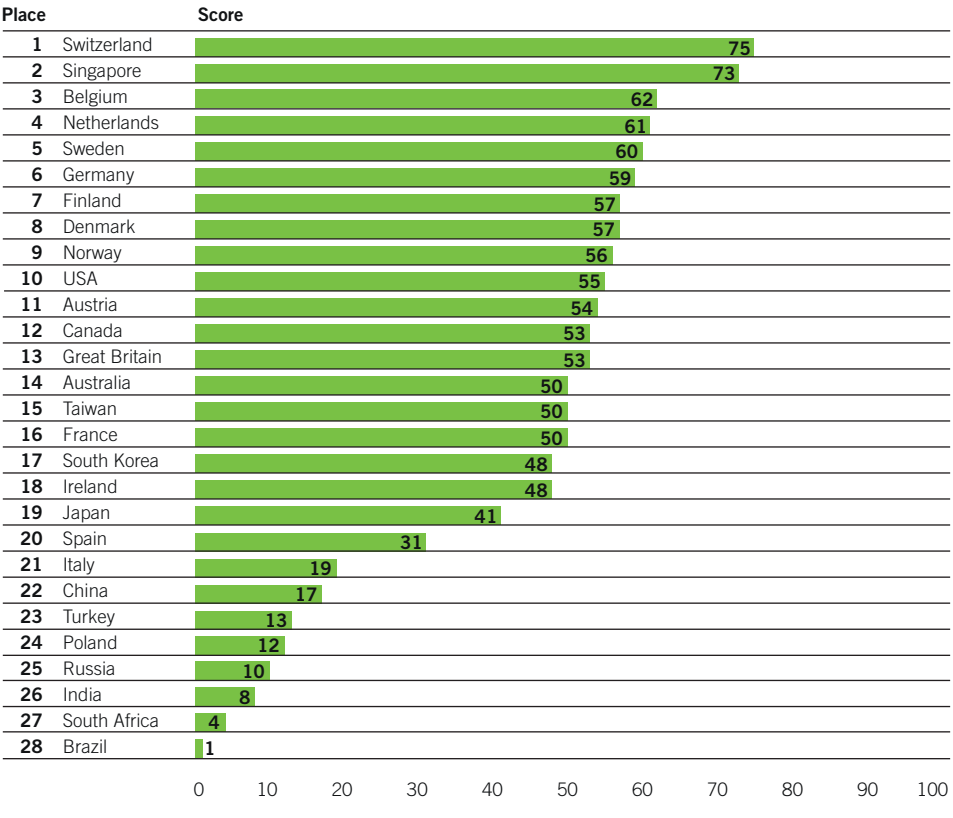
The long way to the top

Innovation potentials and performance are among the economic characteristics of countries that have been relatively stable over a longer period of time. These economies and their enterprises can build on accumulated knowledge and earlier technological investments. If countries want to improve in this area, they must therefore make continuous efforts over a long period.

The long-term aspect of structural changes is also reflected in the results of the Innovation Indicator 2013. With regard to the development of the rankings between 1995 and 2012, the table on this page shows that, apart from a few exceptions, the positions of the countries have remained very stable. This applies also to countries such as China which has achieved considerable success since the 1990s at the economic level and has developed into a serious competitor for the established economies in some areas of business. Deliberate attempts to harness the economic strength for the innovation competition have however not yet been crowned with similar successes. In the Innovation Indicator 2013 China is in place number 22 out of a total of 28, a decline of one place compared to last year. The current ranking however signifies an improvement of four places compared to 1995. The Chinese pathway to the top of the ranking will inevitably take decades. The first signs in this direction are already becoming apparent in China, since for the first time the People's Republic has managed to increase the output indicator into the positive side (+ 4 points). These might be improvements on an extremely low level, but it proves that China is progressing and is meanwhile improving its situation not only through higher investments, but also via an increased output. Looking at the growing competition from China, one definitely has to warn against excessive panic as well as an excessive lack of concern.

Not all BRICS countries fulfill the expectations
BRICS is an abbreviation for the countries Brazil, Russia, India, China and South Africa. Linked to these five countries was the expectation that, as newly industrialized nations, they would become especially tough competitors for the established economies. The euphoria which had surrounded this concept in the 2000s has mostly vanished and many investors meanwhile have turned their backs on these countries. With the exception of China, the results of the Innovation Indicator have been implying for years that there has been little measurable improvement in the BRICS countries.

Overall result of the Innovation Indicator, 2012



Learn more!
Detroit, the capital of cars, allegorizes the fall of the classic production in the United States. However, the self-healing of the economy is already in process.
www.innovationsindikator.de/unitedstates

Neither South Africa, Brazil, nor India managed to develop any notably dynamic catching-up process as far as innovation is concerned in the last two decades, apart from a few individual firms and business areas. Particularly striking is the case of Russia, which has steadily lost ground against the original expectations and has slipped down to place 25 in the ranking. Russia's economic successes are due mostly to increased prices for raw materials rather than modernized production technologies. From an innovation perspective, only China of all the BRICS countries can be expected to develop real momentum in the foreseeable future.

In the context of the emerging countries, Turkey, which has made significant progress, deserves special attention. Although it occupied the last place out of the 28 economies studied in 2005, it has meanwhile advanced to the 23rd place in the current Innovation Indicator. Though the level of innovation is still low, compared to other countries, potentials for development can be seen. Whether these can be utilized will depend not only on the economic development, which was supported in recent years by the increasing indebtedness of private households. It will also depend on the political orientation of the country. Entrepreneurial innovation activities need clear perspectives and a stable environment. Should Turkey jeopardize this stability, the growth of the economy will not be able to continue at this level.

Rankings in the Innovation Indicator, 1995–2012

Place	1995	2000	2005	2010	2011	2012
1	Switzerland	Switzerland	Switzerland	Switzerland	Switzerland	Switzerland
2	USA	Sweden	Sweden	Singapore	Singapore	Singapore
3	Netherlands	USA	USA	Sweden	Sweden	Belgium
4	Sweden	Finland	Finland	Germany	Netherlands	Netherlands
5	Belgium	Belgium	Singapore	Finland	Belgium	Sweden
6	Canada	Singapore	Netherlands	Netherlands	Germany	Germany
7	Germany	Canada	Canada	Norway	USA	Finland
8	Finland	France	Denmark	Austria	Denmark	Denmark
9	France	Germany	Belgium	USA	Finland	Norway
10	Denmark	Netherlands	Germany	Belgium	Norway	USA
11	Singapore	Denmark	Norway	Canada	Austria	Austria
12	Great Britain	Great Britain	Great Britain	Taiwan	France	Canada
13	Japan	Norway	Austria	Denmark	Canada	Great Britain
14	Norway	Japan	France	France	Great Britain	Australia
15	Australia	Australia	Australia	Great Britain	Australia	Taiwan
16	Austria	Austria	Ireland	Australia	Taiwan	France
17	Ireland	Ireland	Japan	Ireland	Ireland	South Korea
18	South Korea	South Korea	South Korea	South Korea	South Korea	Ireland
19	Taiwan	Taiwan	Taiwan	Japan	Japan	Japan
20	Russia	Russia	Spain	Spain	Spain	Spain
21	Poland	Spain	India	China	China	Italy
22	India	India	Italy	Italy	Italy	China
23	Spain	Italy	China	India	Poland	Turkey
24	Italy	Poland	Russia	Russia	Russia	Poland
25	Turkey	China	Poland	Poland	South Africa	Russia
26	China	Brazil	South Africa	South Africa	Turkey	India
27	Brazil	Turkey	Brazil	Turkey	India	South Africa
28	South Africa	South Africa	Turkey	Brazil	Brazil	Brazil

Euro crisis and the consequences

While the euro crisis has indeed eased somewhat in the financial markets, there is still a fear it could flame up again at any time. For in many countries the underlying problems, especially the lack of competitiveness of businesses, have not yet been solved. In the Innovation Indicator 2012, it was proposed to consider innovation as a long-term solution to the euro crisis, because apart from a radical reduction of costs the only way to restore the competitiveness of firms is to increase productivity. So how did the countries affected by the euro crisis perform in the ranking?

The results differ widely: the two biggest crisis countries Spain and Italy were able to increase their innovation output significantly. While Italy at the same time decreased its innovation input, Spain also increased its efforts on the input side of the equation. This positive development is astonishing at first glance due to the severe economic crisis. However, it makes sense when looked at more closely. In the case of Spain, for example, it is remarkable that the value added per hour worked has increased. In times of crisis the first employees to be made redundant are the least productive, so this can be explained. In Italy the percentage of people with a doctoral degree has increased. This too is a typical phenomenon of a crisis. Because in times of tight labor markets many potential applicants choose to study or remain in the universities after studying for some time, as the chances of finding a job are bad anyway. The shifts in output which are mainly caused

by the crisis should however not distract from a central difference between Spain and Italy: Spain also improved as far as the input factors are concerned, while Italy here suffered a decline. Thus Italy is undermining the basis of its industrial and innovative capacity in the long run. In contrast, Spain's active strategy in dealing with the crisis bears fruits, also in the area of innovation. Spain has advanced far further than Italy.

The USA is falling behind in the innovation area again

In hardly any other country of the world is the belief in market forces as deeply seated as in the USA. Government intervention in economic affairs is considered with significantly more suspicion here than in most European countries. This entrepreneurial climate has ensured the economic success of the USA for many decades. The innovation process however is characterized by a variety of market-related imperfections which necessitate an active innovation policy on the part of the state. This intervention, for example, the financing of universities and the project-oriented innovation policy, has been severely limited in the United States over the past decades.

The USA finds it difficult to take the increased importance of innovation for economic growth in their science and economic policies into account. This deficit shows up very clearly in the development of the USA in the Innovation Indicator over time. In the 1990s and early 2000s the USA was one of the leading innovative countries, now it has slipped down to tenth place. The distance to the top rankers has meanwhile grown large. However, the national innovation policy under President Obama has produced some structural renovations which are anticipated to lead to long-term effects, especially in the government research.

The theme of innovation is higher on the political agenda. In its highly visible report on innovation, the Scientific Advisory Board of the President (President's Council of Advisors on Science and Technology, PCAST) highlighted the erosion of key competences and the lack of adjustment to the structural changes in the world economy and the innovation activities of other countries. More clearly than usual in the USA, the blame for the current innovation deficits is sought in the mistaken national policies of the past. At the same time, proposals for the future are made which essentially focus on the stability and therefore predictability of the research budgets of public institutions.

That the USA are compelled to act is also evident in the results of the Innovation Indicator. It is for example worrying that, despite the improving economic situation, the USA are losing ground in the area of R&D expenditures of firms. The firms' internal R&D expenditure only reaches a value of 60. This is still a good result. However, it must be remembered that in the 1990s the USA at times still managed more than 90. The erosion continues in the academic system too. As far as the share of top scientific publications are concerned, the USA only reach 57. In the 1990s the number here was also over 90. Switzerland as the leading nation continuously manages 100 points and thereby sets the global benchmark. The public image of the USA as a leading science and innovation nation is formed mostly by a few singular "lighthouses". Of course companies like Google, Apple and Facebook are great successes of innovation-oriented entrepreneurship, just as Berkeley, Princeton, MIT and Harvard are excellent universities. But there are distinct downsides: in the academic sector it is the large number of universities whose capabilities are rather below-average, in the business sector it is for example the car industry which was for a time close to ruin, a fact which can be exemplified by the decline of the former car metropolis Detroit.

The belief in the infallibility of market forces proves to be problematic in the innovation context. Innovation capability requires foresight, strategy development and coordination. An entrepreneurial spirit is necessary for this. But also the government which directs public resources in the appropriate direction can and should play a role in strategy development. A policy which sets the right incentives for the players is crucial in this context.

Get more information about the Innovation Indicator on www.innovationsindikator.de/english

Learn more!
Regional differences: How the innovation performance of California (USA) and Tokyo (Japan) differs from the national average.
www.innovationsindikator.de/regions

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