EUROPEAN RESEARCH AREA

Progress Report 2018

Country Profile

GERMANY
### COUNTRY SNAPSHOT

**Country profile: Germany**

#### Adjusted Research Excellence Indicator (AREI) 2016

<table>
<thead>
<tr>
<th>Reference year</th>
<th>Score</th>
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<th>Lead/Gap (Δ %)</th>
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#### GBARD as share of GDP

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**Note:** (:) = missing data, more notes and flags can be found in the "Annex: Methodological notes". (R) = rolling averages (e.g. average scores across 2007–2010, 2008–2011... 2014–2017) have been used to measure performance and growth due to pronounced short-term fluctuations. Refer to the "Annex: Guide to reading the quantitative results tables (country snapshots)" for guidance in interpreting the data presented above. Further information on the presented indicators is available in the 2018 ERA Monitoring Handbook.
COUNTRY NARRATIVE

Summary

Germany continues to have a strong overall performance towards achieving the European Research Area (ERA). In each priority, the performance of Germany is analysed based on three indicators: one headline figure (bold lines in the country snapshot) and two complementary indicators.

Looking broadly across indicators, Germany’s strongest performance was in Priority 2b (Make optimal use of public investments in research infrastructures), Priority 5a (Knowledge transfer), Priority 1 (More effective national research systems) and Priority 6 (International collaboration). In these priorities, Germany’s performance across indicators included scores just above (Cluster 2) and well above (Cluster 1) the ERA average. In the 2016 ERA monitoring exercise, Germany’s performance in these areas was also found to be strong.

By contrast, Germany’s performance in Priority 4 (Gender equality and gender mainstreaming in research) was somewhat weaker, falling just below (Cluster 3) the ERA benchmark on all three indicators. Germany nevertheless improved its scores at a greater speed than the EU-28 for two of these indicators. Thus, although there still appears to be room for improvement on this priority, Germany did progress since the 2016 ERA Progress Report.

For the remaining priorities—Priority 2a (Transnational cooperation), Priority 3 (An open labour market for researchers) and Priority 5b (Open access)—Germany’s performance was more mixed. Within each priority, Germany had scores just below the ERA level for some indicator(s) and scores just above it for other indicator(s). For Priority 2a and Priority 3, Germany progressed faster than the EU-28 for some indicators. Due to changes in indicator definitions, progress is difficult to assess for Priority 5b.

Across all priorities, Germany never fell well below the ERA average (Cluster 4).

To the extent that data was available, below the country profile also analyses progress with the implementation of the ERA National Action Plan. Most of the top actions and objectives proposed on Germany’s NAP were formulated in general and broad terms. The lack of concrete indicators or targets and absence of information makes it difficult to assess concrete progress in some areas and results achieved so far. Furthermore, the plan was slightly self-fulfilling, as some of the planned actions were already being implemented at the time of planning.

1. More effective national research systems

Since the last ERA monitoring exercise, Germany’s scores on indicators related to the efficiency of its national research system increased modestly or remained stable. AREI now reaches a figure of 50.3 (up from 46.5 in 2013), GBARD as a share of GDP was stable at around 0.89 %, while the Summary Innovation Index (SII) was also stable at around 0.60.

While Germany’s performance in this priority is strong—falling in Cluster 1 for GBARD as a share of GDP and in Cluster 2 for AREI (the Headline figure) and SII—its rate of recent growth (i.e. since the latest available year in the 2016 ERA Progress Report) did not keep pace with that of EU-28 for the two indicators in which it falls in Cluster 2. Since the last ERA monitoring exercise, Germany’s CAGR was 2.6 % on the AREI, compared to 3.2 % for EU-28. The German SII score remained roughly stable (CAGR of 0.6 %), while the EU-28 score grew at an average annual rate of 1.9 %. Being stable on GBARD as a share of GDP (CAGR of 0.2%), Germany slightly gained ground relative to EU-28 for which the CAGR was negative (-1.7 %).

Germany is among the ERA countries with a long tradition of international experts in review panels making the principles of international peer review firmly anchored in the German research system.

Germany’s implementation of smart specialisation policies appears to require further consistency in its execution across regions. To date there is no explicit smart specialisation strategy policy at federal level. Nonetheless each Land has developed its own smart specialisation strategy (Sofka & Sprutacze, 2017). Smart specialisation strategies appear to be successfully incorporated in the regional innovation strategies of the Länder (Sofka, Shehu & Hristov, 2018). Despite heterogeneous implementation, several specialisation fields are common in most Land, for
example manufacturing industries, digital and information technologies, energy and environment and health industries (Sofka, Shehu & Hristov, 2018).

One of the actions proposed on Germany’s NAP was the expansion of opportunities for cooperation between the Federal Government and the Länder by amending Article 91b of the Basic Law (GG) to strengthen the performance of higher education institutions in the long term. Progress was achieved as in 2015 the article was amended. Another accomplishment was the expansion of Germany’s collaboration with the EU13 MS through the “ERA Fellowships programme”. The Fellowship was set up and it supports capacity building in the field of science management in the EU13 and strengthens networking with Research Performing Organisations (RPOs) in Germany. Some actions under priority 1 were formulated in general and vague manner, being very difficult to assess and measure progress in an objective way. However, progress in general can be observed in almost all the actions/objectives proposed: High-tech Strategy was developed further, there was a continuation/further development of the Pact for Research and Innovation, and excellence initiative was evaluated.

2. Optimal transnational co-operation and competition

   a. Transnational cooperation

   With respect to GBARD allocated to transnationally coordinated research, the Headline figure of Priority 2a, Germany has increased its score since the 2016 monitoring exercise, maintaining its position in the group of second highest performing countries (Cluster 2). In fact, it recently experienced slightly stronger growth than the EU-28 on this dimension (CAGR of 6.3 % compared to 3.9 %). For the other two indicators of this priority, Germany did not score as well falling in Cluster 3.

   Germany’s propensity to co-publish with foreign partners within the ERA (i.e. Collab papers w/ERA per 1 000 researchers) has increased at a slower rate than for EU-28 since the last monitoring exercise; its score increased from 61 to 63 with a CAGR of 1.5% compared to 3.3% for EU-28. Thus, Germany’s performance on this dimension is likely to remain just below the ERA average (Cluster 3) in the near future.

   Germany’s count of public-to-public partnerships per FTE researcher has decreased since the 2016 monitoring exercise, although it maintains its position in the group of country performances just below the ERA average (Cluster 3). Germany’s average annual decrease on this indicator is well below the EU-28 reference, but it also represents a sharp turnaround from its previously reported growth in 2016.

   BMBF worked very closely with the German parliament and secured strong political support for its commitment to joint programming. As a consequence other ministries felt motivated to search for opportunities to participate in JPIs. The internationalisation of joint programming as an overarching objective of the German Federal Government is also emphasised in the new ‘internationalisation strategy for education, research and innovation’ (EC, 2017a).

   b. Make optimal use of public investments in research infrastructures

   Germany obtained a place in the group of highest performing countries (Cluster 1) in combined relative ESFRI participation (i.e. as a share of all ESFRI Projects and Landmarks with Germany’s involvement). This performance is supported by strong involvement in Landmarks (65 % participation). The country’s relative participation in Landmarks decreased since 2016 (69 %) due to an increase in the total number of Landmarks (i.e. Projects converted to Landmarks in which it is not involved). On the other hand, its relative participation in Projects increased from 29 % to 39 % at a rate close to the EU-28 level. Note that large countries are generally advantaged on this priority since the indicators are not normalised to account for differences in the size of countries.

   BMBF has divided the evaluation of concepts for research infrastructures into two clearly defined processes: a scientific and an economic evaluation process (BMBF, 2013). The German National Roadmap Process for Research Infrastructures piloted in 2013, still has room for improvement in its alignment with ESFRI (Alexander von Humboldt-Stiftung, 2017).
3. An open labour market for researchers

While Germany remains in the group of country performances situated just below the ERA average as in the 2016 Report, it is worth noting that German higher education institutions have sharply increased use of EURAXESS job ads when hiring (the Headline figure for Priority 3). Indeed, while its score sits at 19 ads per 1,000 researchers compared to 42 for EU-28, its rate of recent growth (CAGR of 85.5%) contrasts with decreased performance at the EU-28 level. This finding would ideally be substantiated with future observations, however, given some fluctuations in recent measurements. Germany places in the second highest performing group of countries regarding hiring processes that are open, transparent and merit-based, according to assessment by its own researchers. Germany also showed higher average annual growth on this indicator than the EU-28 trend.

Since the last monitoring exercise, Germany has seen an increase in the share of its doctoral students coming from other EU countries (at 5.3%, up from 3.8%). Although Germany ranks just below the ERA average for this indicator (Cluster 3), it is worth noting that its average annual growth since the last monitoring exercise was higher than the EU-28 level, implying that progress has occurred.

Qualitative data analysis indicated that German RPOs increased their vacancy advertisements on the EURAXESS job portal and uptake of the Charter and Code. More RPOs in Germany have been awarded the “HRS4R” logo since 2016 and Leibniz institutes have steadily increased the number of job offers published on EURAXESS Jobs portal (from 31.5% in 2014 to nearly 40% in 2017).

The federal government and the Länder have created a programme to improve the predictability and transparency of career paths from 2016 to 2032. The programme establishes tenure-track professorships at German universities and provides additional funding for tenure-track professorships (OECD, 2016).

Germany continues to have a deficit of STEM graduates and demographic change in medium term are expected to negatively affect German economy's potential to innovate (Sofka & Sprutacz, 2017). The federal government is therefore committed to attract and retain the best talent while supporting the mobility of German researchers. Organisations such as the German Alexander von Humboldt Foundation and the German DAAD have initiatives to support mobility conditions and cooperation. For example, the German Alexander von Humboldt Foundation offers incoming and outgoing research fellowships and research awards aiming to promote academic cooperation between German and International researchers. The Alexander von Humboldt Foundation also has Professorship International Award for Research in the intent to recruit foreign excellent researchers who will remain in Germany on a long-term basis. The German DADD programme provides a return scheme for German nationals that have worked abroad for at least 1 year (EC, 2018). The Sino-German Centre for Research Promotion (SGC) is a research funding institution based in Beijing, established as a joint venture by the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) and the National Natural Science Foundation of China (NSFC). SGC has initiatives to support German and Chinese researchers to establish cooperation groups, infrastructure framework for scientific exchange between both countries and provides bilateral early career support.

Progress under priority 3 on German’s NAP was achieved by the improvement of prospects for young scientists in RPOs, further developing innovative approaches for the support of young talent in science organisations and improving mobility conditions for science through the programmes and initiatives described above.

4. Gender equality and gender mainstreaming in research

Germany’s positions relative to the ERA average on gender equality and gender mainstreaming indicators (i.e. Cluster 3) are mostly carried over intact from the 2016 monitoring exercise. Nevertheless, Germany slightly gained ground relative to the EU-28 reference in terms of the share of women among Grade A researchers in the HES (i.e. the Headline figure for this indicator) as well as in terms of the gender dimension in research content (respective lead of 3.1 and 4.2% pts over the EU-28 growth).

Germany’s common rules of procedure of the Federal Ministries establish gender mainstreaming as a duty of all their staff. At regional level, while all Länder have gender equality laws in place,
the adoption of specific gender equality strategies and development of specific gender mainstreaming plans remains uneven across regions. DFG has organised a variety of awareness-raising activities on equal opportunities in research, developed concrete measures to reduce implicit bias and recommendations that will assist discussions with DFG review boards (Science Europe, 2017).

German RPOs are obliged by law to adopt Gender Equality Plans (GEPs) and Research Funding Organisations (RFOs) have implemented measures regarding gender equal opportunities for scientists and/or gender dimension in research content in their evaluation criteria (EIGE, 2016). Data indicates a slow improvement in gender equality in Germany, with a steady increase of female researchers on all career levels, including a higher number and proportion of female researchers submitting proposals to the DFG, the success of such proposals and women's representation on the statutory bodies (DFG, Chancengleichheits-Monitoring 2017). Germany is also among the ERA countries where universities and accreditation agencies have been identified as key actors for mainstreaming gender analysis in curricula (EIGE, 2016).

Germany’s NAP under priority 4 aimed to increase the number of female experts in the evaluation/selection procedures and number of female professors and number of young female researchers. A modest degree of progress was achieved as indeed the proportion of women in such positions increased over the last years. Another aspect referred in the NAP was the improvement of work-life balance. Currently in Germany has no comprehensive childcare for all ages and it is in most cases limited in time. Nonetheless, German research associations such as Leibniz Association and Fraunhofer Society have started to implement family friendly charters. According to the 2018 Leibniz-Gemeinschaft’s report 85% percent of their institutes have received Family friendly certificate so far. GWK’s 2018 report also reveals that the concept of Fraunhofer FamilienLogo certificate was developed in 2017 and its implementation is planned for 2018.

5. Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

a. Knowledge transfer

Germany scored rather highly on knowledge transfer indicators. It placed in the group of highest performing countries (Cluster 1) for the share of public R&D funded privately, and in the groups of second highest performing countries for the two other indicators. While cooperation of firms with universities and other higher education institutions saw a slight annual average decrease (-0.6 %), figures the share of public R&D funded privately saw slight increases that provide the country a slight lead over the EU-28 trend.

Germany continues to be considered an Innovation Leader (EC, 2017c), maintaining strong collaboration between industry and science (OECD, 2016). A funding measure Innovative Hochschule was launched in 2016 by the Federal and Länder governments aiming to boost knowledge transfer and innovation and collaboration among industry and academia (OECD, 2016; Sofka & Sprutacz, 2017).

Public funding for R&D in Germany has two primary components, organisational level funding and project funding (Jonkers & Zacharewicz, 2017). Despite having a very high portion of public research funded by industry, Germany has relatively low public support for business R&D and does not include tax incentives (EC, 2017b; EC, 2017d; OECD, 2016). Recently different proposals to introduce R&D tax incentives have been suggested, however the government is still carefully considering how such incentives would fair against direct support measures (EC, 2017b).

Germany also had recent developments regarding copyright protection. In 2017 a law for copyright protection in the knowledge society (‘Urheberrechts- Wissensgesellschafts-Gesetz,’ UrhWissG) was approved and 15% of copyrighted materials can be used free of charge for educational purposes without specific licences (Sofka, Shehu & Hristov, 2018).

Germany’s NAP aimed to intensify networking and improving exchange between science, industry and society and progress in this area was observed, as new funding mechanisms were introduced. Progress was also observed regarding the activities and initiatives by the German science organizations in the area of knowledge and technology transfer.
b. Open access

Germany showed mid-range performances in terms of Open Access (OA) publishing practices. It placed in the group of countries just under the ERA average for shares of Total OA and Green OA papers, but it placed in the group just above the ERA average for Gold OA and life sciences datasets availability in OA. Compared to EU-28 average instead, the country’s performance tilted further towards the lower end of performance ranges and reached a 18 % gap in performance to the reference level on the Green OA indicator. The country’s performance was slightly above the EU-28 score overall on the last indicator, however.

Germany has a long tradition of support and commitment toward OA. BMBF published an OA strategy in 2016 and a directive on the funding of OA entered into force in June 2017 (BMBF, 2017). Due to Germany’s context and funding research system there is no national OA mandate to date, however some regional governments, RFOs and RPOs have OA strategies and policies in place. As of 2015, 46 RPOs had a published OA policy, the four big research associations¹ have OA policies and DFG has an OA policy and strategy. Recently, DFG demonstrated its support for cOAlition S and the German rector’s Conference (HRK) adopted recommendations on the management of research data.

German RPOs and RFOs are associated in the “Alliance of German Science Organisations”. This Alliance has implemented two large scale projects on a national level to promote OA: (a) Project DEAL² and (b) The National Open Access Contactpoint OA2020.de³. Project DEAL negotiates Open-Access-Transition-Contracts with Springer, Wiley and Elsevier. The National Open Access Contactpoint OA2020.de promotes the Open Access Transition among RPOs and universities, consortia, university libraries and other entities. It also centrally establishes (economic) models for the open access transition, advises institutions and organises data collection and analysis.

Under subpriority 5b of Germany’s NAP, the main achievements observed relate to the development of an OA Strategy by the BMBF and the continuation of activities and initiatives by the science organizations to promote OA.

6. International cooperation

Germany’s performance for international cooperation indicators are more wide-ranging than observed for other priorities. Germany placed within the group of highest performing ERA states (Cluster 1) on the two export indicators (share of medium and high technology product exports; and share of knowledge-intensive service exports), but it positioned just below the ERA average (Cluster 3) in terms of its share of doctoral students coming from countries outside the EU. Nevertheless, on this indicator, Germany has recently experienced average annual growth in scores larger than for EU-28 (lead of 3.5 % pts). Germany is in Cluster 2 (just above the ERA average) for its propensity to co-publish with partners in countries outside the ERA, the Headline figure for this priority. Its recent growth since 2014 lags slightly behind the EU-28 average despite a slight increase (CAGR of 1.2%).

Germany is among the ERA countries that has introduced a separate internationalisation strategy and established innovation and research centres in third countries. These actions allow for a more coherent and sustainable R&I cooperation. In 2016, BMBF redrafted and updated the Federal Government’s Strategy on the ‘Internationalisation of Education, Science and Research’ and has increased its allocated budget for international cooperation. BMBF’s International Strategy is aimed at strengthening Germany as a location for R&I. One of the key objectives of the strategy is working with emerging and developing countries leading to the Federal Government expansion of existing collaboration schemes and creation of new partnerships with these countries.

References


¹ Helmholtz Association, Fraunhofer-Gesellschaft, Leibniz Association and Max Planck Society.
² https://www.projekt-deal.de/about-deal
³ https://oa2020-de.org/en
Country profile: Germany


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### ANNEX: METHODOLOGICAL NOTES

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<td>2014, 2016</td>
<td>2015-16</td>
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<tr>
<td>Share of doctoral students from outside EU</td>
<td>Available</td>
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<tr>
<td>Share med &amp; high tech product export</td>
<td>Available</td>
<td></td>
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<tr>
<td>Share Knowledge intensive service export</td>
<td>Available</td>
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</tbody>
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Additional note: For the indicator *Share of women among Grade A in HES* the definition differs for 2014 and 2016 (reference population = Academic staff).
ANNEX: GUIDE TO READING THE QUANTITATIVE RESULTS TABLES (COUNTRY SNAPSHOTs)

Each profile table shows the given country’s performance score and growth for all indicators used in this study. Given that specific targets were not established for each of the 24 ERA Monitoring Mechanism (EMM) indicators for each country, it is impossible to report on a country’s level of compliance in achieving the ERA priorities, or the ERA policies/actions, that each of these indicators intends to measure (4). Instead, the level of performance in the country snapshots is compared to the EU-28 (lead/gap analysis) and ERA averages (performance clusters). These references might represent unrealistic targets for some countries, especially the smaller ones. However, care was taken to use normalised indicators (except for Priority 2b), usually by incorporating the size of a country’s population or economy in the denominator of an indicator. Additionally, the EU-28 and ERA averages might in some cases be lower than the level of performance which would be optimal towards achieving the ERA; for instance, gender equality might not have been reached in all relevant aspects at the EU- and/or ERA-wide level. That said, the main goal of these comparative analyses is to help situate countries relative to the core of the EU and ERA, so as to inform decisions on the most appropriate targets and on how to achieve them.

In addition to a measurement of performance in 2017 (or the most recent reference year for which sufficient data were available at the time of producing this report (5)), the profile table also reports on recent changes in national performance, computed as a Compound Annual Growth Rate (CAGR). The CAGR aims to assess progress made since the ERA Progress Report 2016. Accordingly, it compares the latest available year in the 2016 report to the latest available year in this report. Growth since the last monitoring exercise is also compared to the EU-28 (lead/gap analysis) to inform individual countries on the extent to which their gap with the EU-28 level of performance is closing or widening. This information is intended to help individual countries better assess the extent to which new actions are required to achieve their respective targets.

The profile table is divided in two parts: performance and growth. For performance, the reference year for each indicator is noted. If the reported year for a given country and indicator is different from the reference year, the performance score in the snapshot is highlighted using a grey font in italics. The specific year which is reported appears in the column “exception to ref. year” of the appendix table at the end of the country profile. The appendix table also lists the years for which a flag is applied to the data. The performance section of the snapshot table also provides the EU-28 scores across indicators upon which the country lead/gap, in percent difference to the EU-28 score, is computed. Furthermore, the performance clusters from the main report have also been presented here; recall that countries more than one standard deviation above the unweighted ERA average (i.e. average across member states and associated countries for which data is available for each indicator) are in Cluster 1, the strongest cluster; those at or above the unweighted ERA average but within one standard deviation are in Cluster 2; those below the unweighted average but within one standard deviation are in Cluster 3; those more than one standard deviation below the ERA unweighted average are in Cluster 4, the weakest cluster.

For growth, the reference period used in computing the Compound Annual Growth Rate (CAGR) is also presented, alongside the actual CAGR. Again, exceptions to the reference period are highlighted by using a grey font in italics to display the actual CAGRs of the corresponding country and EU-28. Information on the specific years used in these cases are again available in the appendix tables. The lead/gap analysis for growth shows the percentage point difference between the country’s CAGR and the CAGR of the EU-28 average. The CAGR measures growth relative to the latest available year in the 2016 ERA Progress Report. Since there were retrospective corrections to the scores of countries on some indicators, growth was computed based on the updated time series. Trend lines over the longest available period for a given indicator are provided to inform on longer-term patterns of progress towards realising the ERA. Empty lines in the trend indicate either that data was missing for that year, or that the country’s score was zero. For one indicator where short-term fluctuations were particularly pronounced (gender dimension in research content in priority 4), rolling averages (e.g. average scores across 2007–2010, 2008–2011... 2014–2017) have been used to measure performance and growth. In such cases, the CAGR measures the year-by-year percent change in the rolling average of an indicator between the starting and ending periods (e.g. between 2011–2014 and 2014–2017). These cases are...
highlighted by the addition of the superscript (R) to the reference year (performance) and period (growth) of the concerned indicators.

The lead/gap analyses, both for performance and for growth, have been colour-coded to help visually elucidate patterns in the findings. The colour scheme for the country profiles ranges from dark blue (weakest scores) to dark orange (strongest scores), as was applied in the main report. There is, however, a key difference to note. In the main report, the colouring compared the results of different countries along a single indicator, in these country profile tables the colouring compares the results of one country along several indicators, to highlight its relative strengths and weaknesses across indicators. More specifically, in each profile, blue always indicates that a country is below the EU–28 average, and orange always indicates that it is above, but the shade of blue and orange (dark or light) is relative to the country’s own performance across indicators, rather than relative to the performance of other countries.

Indicators in bold are the Headline indicators that were selected as being the most relevant in monitoring progress in achieving the ERA by the European Research Area and Innovation Committee (ERAC). Within each priority, the Headline is followed by the two complementary EMM indicators identified by ERAC. Lack of data is identified by using a symbol (:) within the table cells.

Due to changes and discontinuities in data collection, some indicators have been updated, modified or replaced. A first modification was introduced for the complementary EMM indicators of Priority 2b (Make optimal use of public investments in research infrastructures). Here, findings are now provided on a combined indicator that better illustrates how level of engagement in ESFRI developing Projects and Landmarks are connected rather than independent.

For the headline indicator of Priority 5a, the underlying data coming from Eurostat was for the first time aggregated in a manner that made it possible to present a single metric (in terms of performance) merging both of its underlying dimensions (6); that is the share of product and/or process innovative firms cooperating with 1) universities or higher education institutions, or 2) with government, public or private research institutes. For growth, these two dimensions still had to be kept separated in this edition.

The indicators on the share of a country’s peer-reviewed scientific papers that are available in Open Access (i.e. Total, Gold and Green OA) in Priority 5b have all been impacted by a revised definition of what constitute Green Open Access papers (see Section 3.5.5 of the Main Report for a description of this change). The indicator on the inclusion of OA policies in RIO policy repositories was discontinued since the new reporting guidelines for RIO policy reports no longer ask the experts to report on OA specifically. It has been replaced by a qualitative assessment of the NAPs and other information sources. A new indicator was also added to Priority 5b to fill a data gap in the 2016 ERA Progress Report; no data was available in 2016 for the share of research performing organisations (RPOs) making their research data available in OA. The share of research performing organisations (RPOs) making their research data available in OA has been replaced by the share of life sciences papers to which a country contributed and that have at least one open dataset in Figshare.

Due to discontinued data, the indicator on “Licence and patent revenues from abroad as a share of GDP” in Priority 6 has been replaced by two new indicators: knowledge intensive services exports as percentage of total services exports and exports of medium and high technology products as a share of total product exports; this modification coincides with a similar replacement in the 2018 European Innovation Scoreboard (EIS). Changes in the data for some countries also led to changes in EU28 aggregate scores the following two indicators: the share of doctoral candidates with a citizenship of another EU Member State (Priority 3) and non-EU doctorate students as a share of all doctorate students (Priority 6). Additional modifications in the approach used in computing EU-28 aggregate scores (e.g. imputation of missing data) led to some changes in the GBARD (EUR) allocated to Europe-wide transnational, as well as bilateral or multilateral, public R&D programmes per FTE researcher in the public sector (Priority 2a).

Finally, the composite indicators combining findings from headline and complementary indicators within and across ERA priorities have not be computed in the 2018 ERA monitoring exercise. The rationale for these changes is detailed in the 2018 ERA Monitoring Handbook.

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6 The new aggregation provided by Eurostat enabled this change by removing duplicated count of firms falling in both types of partnerships.
How to obtain EU publications

**Free publications:**
- one copy: via EU Bookshop (http://bookshop.europa.eu);
- more than one copy or posters/maps:
  from the European Union’s representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries (http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

**Priced publications:**
The 2018 ERA Progress Report assesses the current state of the European Research Area (ERA) and the progress made on ERA implementation in 2016-2018. It is the second time in a row that progress has been measured at country level using the ERA monitoring mechanism.

Based on the overall evolution of the headline indicators, progress on ERA implementation continues, albeit at a slower pace than before. This trend calls for a renewed commitment to (i) further strengthening shared efforts at all levels; (ii) reforming national research and innovation systems; and (iii) realising a well-functioning ERA. The Commission has anticipated this need by proposing a number of programmes for the next financing period 2021-2027: these include regional funds, a European reform delivery tool, and the EU’s next research and innovation framework programme — Horizon Europe, which includes a dedicated pillar to help strengthen the ERA.

*Research & Innovation policy*