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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**on the implementation of Decision No 1608/2003/EC of the European Parliament and of
the Council on science and technology statistics**

1. INTRODUCTION

Official statistics on science, technology and innovation in the European Union are based on Decision No 1608/2003/EC of the European Parliament and of the Council of 22 July 2003 concerning the production and development of Community statistics on science and technology¹.

Article 5 of Decision No 1608/2003/EC (hereinafter ‘the Decision’) requires the Commission to present a report to the European Parliament every three years that evaluates the implementation of the Decision. This is the fourth implementation report² submitted by the Commission to the European Parliament and the Council under Article 5. The report evaluates the implementation of the individual statistical actions listed in Article 2 of the Decision. These actions are aimed at establishing a statistical information system on science, technology and innovation to support and monitor EU policies. The report mainly covers developments since the previous report in 2014.

The Commission implements the Decision through regulatory measures and voluntary data collections in the Member States, and through Eurostat’s own production of statistics.

In 2012, the Commission adopted Implementing Regulation (EU) No 995/2012³. The Implementing Regulation lays down the rules for the implementation of the Decision, and focuses in particular on statistics about:

- research and development (R&D);
- government budget allocations for research and development (GBARD);
- innovation;
- other relevant aspects, namely human resources in science and technology; patents; high-technology industries; and knowledge-based services.

By specifying both the statistical units required and uniform reporting standards, the Implementing Regulation also increases the harmonisation of R&D and innovation statistics in the EU, and strengthens the link of the above statistics with European business statistics. The statistics collected have become widely-quoted reference data in EU policy monitoring.

The Decision and the Implementing Regulation have improved statistics on R&D and innovation that will be very helpful in the implementation of the three EU actions below.

- In June 2010, the European Council adopted the Europe 2020 strategy for jobs and smart, sustainable and inclusive growth⁴. One of the five EU headline targets from this strategy is to improve the conditions for innovation and R&D, with the aim of raising combined public and private R&D investment levels to 3 % of GDP by 2020.

¹ Decision No 1608/2003/EC of the European Parliament and of the Council of 22 July 2003 concerning the production and development of Community statistics on science and technology (OJ L 230, 16.9.2003, p. 1).

² The previous reports were COM(2007) 801, adopted on 14 December 2007; COM(2011) 184, adopted on 11 April 2011; and COM(2014) 211, adopted on 7 April 2014.

³ Commission Implementing Regulation (EU) No 995/2012 of 26 October 2012 laying down detailed rules for the implementation of Decision No 1608/2003/EC of the European Parliament and of the Council concerning the production and development of Community statistics on science and technology (OJ L 299, 27.10.2012, p. 18).

⁴ European Council conclusions of 17 June 2010.

- In its Communication of 6 October 2010⁵ on the innovation union flagship initiative, the Commission proposed the creation of additional indicators to measure the intensity of R&D and on fast-growing, innovative companies. It also proposed the creation of an annual innovation union scoreboard⁶ for monitoring overall progress in innovation performance. In 2017, the European innovation scoreboard was improved using insights from the EU's 'Community Innovation Survey'⁷ (CIS).
- The Commission's Proposal for a Multiannual Financial Framework 2021-2027, adopted on 2 May 2018⁸, underlines that research and innovation will remain a priority for EU policy making in the years to come.

The present report takes stock of the implementation of the statistical information system on science, technology and innovation (STI). Chapter 2 of the report focuses on the most important developments in the implementation of measures. Chapter 3 covers data quality, and Chapter 4 looks at costs and statistical burden. Chapter 5 looks ahead to future developments.

2. MOST IMPORTANT DEVELOPMENTS SINCE APRIL 2014

The most important developments in the implementation of measures since April 2014 under Article 2 of the Decision are listed below.

- European statistics on R&D and GBARD are consistent with the guidelines contained in the OECD's 'Frascati Manual – Guidelines for collecting and Reporting on Research and Experimental Development', because this allows for international comparison beyond the EU. In 2015, the OECD released a new version of the Frascati Manual (FM2015). Subsequently, Eurostat, in close cooperation with the Member States, adapted its data collections on R&D and GBARD statistics in order to ensure continued alignment with the guidelines of the FM2015.
- After the release of FM2015, Eurostat developed methodological guidelines for issues where FM2015 leaves choices between different options, or room for interpretation. These methodological guidelines will further increase the comparability of R&D and GBARD statistics across EU Member States. Ten topics were identified in the methodological guidelines:
 1. R&D sectors;
 2. GBARD and data production practices;
 3. description and treatment of general university funds (GUF);
 4. production of statistical data on higher education expenditure on R&D (HERD);
 5. doctoral and masters students as researchers;
 6. 'extramural' R&D costs;
 7. R&D personnel issues;

⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *Europe 2020 Flagship Initiative Innovation Union*, COM(2010) 546.

⁶ Renamed to 'European innovation scoreboard' in 2016.

⁷ A survey sent to businesses across Europe every two years to assess their innovativeness, and obtain insights into what business environments are conducive to innovation.

⁸ COM(2018) 322 final/2.

8. consistency between R&D personnel and expenditure indicators;
 9. distribution of sources of funds for R&D;
 10. R&D product fields and NACE (business enterprise sector).
- Eurostat has improved the transmission of R&D and GBARD data technically since 2014. Data used to be sent via extensive Excel sheets, but is now sent according to the statistical data and metadata exchange (SDMX) format. This has led to significant improvements in data transmission, which will shorten the time needed by Eurostat to validate the data. This also has the potential to improve the timeliness of data release in the future.
 - European statistics on innovation are aligned with the ‘Oslo Manual – Guidelines for collecting and interpreting innovation data’. The Oslo Manual is a co-publication of the OECD and Eurostat. Since 2015, the OECD, European Commission and their Member States have been working together on an update to the Oslo Manual. The fourth edition of the Oslo Manual (OM4) will further clarify concepts used in innovation statistics and cover new topics related to business innovation.
 - To make the most of the new fourth edition of the Oslo Manual, Eurostat, in close co-operation with the EU Member States, has changed the CIS extensively during the years 2016 to 2018. The CIS reports now better about innovation activities and capabilities, knowledge flows, external drivers and enablers, and innovation output. These changes will increase the quality and policy relevance of the results. In addition, Eurostat has re-designed the CIS in order to provide more information on all enterprises, i.e. on both innovative enterprises and non-innovative enterprises. This will help policy makers to better understand what distinguishes strong innovators from weak or non-innovators and design appropriate policies.
 - Better integration across different statistical production systems will improve data quality and efficiency of data production. The CIS has been reviewed to make its definitions fully compliant with general definitions used in business statistics (e.g. in the Statistical Business Register and the Structural Business Survey). This increases the consistency of results, and reduces the burden on respondents by re-using information already available from other sources.
 - CIS data at individual enterprise level (‘microdata’) can now be accessed more quickly via Eurostat’s SAFE centre and via partially anonymised files for external researchers.
 - For European statistics on ‘human resources devoted to science and technology’ and ‘gender-disaggregated statistics on science and technology’, Eurostat has reviewed the statistical production process to ensure full compliance with the data from the EU Labour Force Survey.
 - Apart from the areas mentioned above, the Decision requires the development of new statistical variables in ‘patents statistics’ and ‘high-technology statistics’. Methodological development and data production on ‘high-technology statistics’ continues. For ‘patents and intellectual property rights (IPRs)’, Eurostat consolidated its development work in recent years, and is now aiming to ensure that the concepts can be used consistently in EU statistical reporting.

3. DATA QUALITY

Statistics must be sound and fit for purpose. The data collections on R&D and innovation are undergoing a systematic quality review, which involves the collection of quality reports and regular compliance monitoring.

The European Statistics Code of Practice⁹ sets the standard for developing, producing and disseminating European statistics. It covers 16 main principles, some of which relate to the general institutional conditions (professional independence or adequacy of resources) required of Member State authorities and organisations dealing with statistics. These principles strengthen the overall quality of European statistics. The Code of Practice covers several quality principles relating directly to the STI surveys (such as accuracy, coherence and comparability), and these principles are monitored through regular quality reporting.

Member States' compliance with the mandatory data-provision requirements has been very satisfactory overall. However, some compliance problems remain in isolated cases mainly related to late data delivery. Eurostat has been collecting annually national quality reports on R&D and GBARD statistics since 2007. It has also been collecting national quality reports for each round of the CIS since 2004 (the CIS is released every two years). Eurostat releases a synthesis of the CIS quality reports online, together with the data from the reports. Regulation (EU) No 995/2012 made quality reporting part of mandatory data provision as of 2013. A consultation between data producers and users in 2017 confirmed that the data most relevant for national and EU policy making are covered by that Regulation.

The completeness of data for optional variables or categories¹⁰ is not always given. Member States cite cost and characteristics of their national data production systems as reasons for not delivering data for optional variables or categories. Eurostat continues to encourage Member States to provide data on optional variables and categories. In some areas, the completeness has increased since 2014. As the drive to improve the completeness of optional variables and categories is a long-lasting process, the Commission will continue its policy of providing guidance and support to increase completeness.

For R&D statistics, Eurostat and the Member States continue to work to ensure that data are collected for all organisations engaged in R&D, regardless of their size or the economic sector they are in. Moreover, where Member States provide estimates, Eurostat regularly assesses their quality.

4. COST AND BURDEN

Eurostat has made several attempts in the past to collect data on the cost and burden of STI data collections. Eurostat has requested exact figures to be included in the quality reporting, but consistent data allowing comparison or evaluation of the overall costs have proved difficult to obtain. Many Member States have pointed out that it will not be possible to separate the cost of compiling European statistics about R&D and innovation, neither from the cost for other European business statistics nor from the cost for similar activities that serve mainly national information needs. Where data are available, reporting methodologies

⁹ <http://ec.europa.eu/eurostat/documents/4031688/8971242/KS-02-18-142-EN-N.pdf>. The European Statistics Code of Practice was endorsed by the Statistical Programme Committee on 24 February 2005. It was revised by the European Statistical System Committee (ESSC) on 28 September 2011 and again on 16 November 2017.

¹⁰ Variables, or particular categories within variables, that are part of the European R&D and CIS data collections, but are not covered by Implementing Regulation (EU) No 995/2012.

vary between Member States and between institutions within Member States. These variations preclude meaningful comparison or publication of the individual cost estimates.

However, on various occasions in recent years, national statistical authorities have reported a lack of resources, raising serious concerns about their ability to meet existing or new European data requirements. Priority setting is therefore more crucial than ever, for existing and planned statistical operations alike.

Despite the lack of viable information on the cost of statistical production from the Member States, the overall requirements in the forthcoming new framework regulation integrating business statistics (FRIBS)¹¹ are being kept at the current level. Eurostat has also taken actions to increase cost efficiency and relevance. A sample selection of these actions is included below.

- Eurostat consulted data producers in the Member States, mainly the national statistical offices, extensively in 2017 before proposing to review the catalogue of optional variables on R&D and GBARD statistics as part of the implementation of the reviewed FM2015 (see Chapter 5 ‘Future developments’).
- During the years 2016 to 2018, Eurostat has integrated the CIS data collection better into business statistics and thereby made it possible to re-use information already available from other statistics.
- Eurostat has revised the concepts used in the R&D business survey and in particular in the CIS to correspond to accounting conventions and common practices in business. This makes reporting by enterprises easier and increases data quality.
- Eurostat has promoted more efficiency in a variety of ways. For example, it has set technical transmission standards. It has also set common rules for the validation of data and common procedures for the validation of data. This has made the production of statistics more efficient in both Member States and Eurostat.

5. FUTURE DEVELOPMENTS

A major goal for the future development of EU statistics on science and technology will be to strengthen the link between these statistics and other business statistics further. To achieve this, R&D, GBARD and innovation statistics will be included in the forthcoming FRIBS framework. This will increase the consistency and comparability of data, and help to reduce cost and burden at the same time. Initial steps to begin this process have already been undertaken (see above), and will be continued in the future.

Statistics must keep abreast of changing environments and demands. Some of these demands must be balanced against each other. For example, the user community often asks for new high-quality indicators, but data producers propose to use new, less costly data sources. This requires constant development work, screening and cost/benefit analysis (where possible). In 2016/2017, the Commission consulted extensively with data producers and users on new (optional) variables for R&D and GBARD statistics. Following these consultations, the STI Working Group agreed to launch pilot studies for statistics on:

- the breakdown in the numbers of internal and external R&D personnel;
- the quantification of labour costs for internal R&D personnel;

¹¹ COM(2017) 114.

- the quantification of ‘intramural’ R&D expenditure devoted to the remuneration of external R&D personnel contributing to intramural R&D;
- R&D capital expenditure (‘land and buildings’; ‘machinery and equipment’; ‘capitalised computer software’; ‘other intellectual property products’);
- breakdown of funds received by a unit engaged in R&D by ‘transfer’ or ‘exchange’.

The STI Working Group has also agreed to launch feasibility studies on the gathering of statistics on:

- the number of institutional units engaged in R&D;
- the concentration of R&D expenditure and personnel;
- gross domestic expenditure on R&D (GERD) by type and source of funds (by sector of performance);
- GERD by main activity of R&D performer (by sector of performance);
- GERD by type of institution (by sector of performance).

The Commission aims to better measure the impact of EU policies, in particular the impact of the forthcoming framework programme for research and innovation, and to be ideally able to compare the performance of projects that receive EU funding and projects that do not receive EU funding. To achieve these better measurements will require further clarification of legal aspects (in particular on statistical confidentiality) technical aspects, costs and administrative burden.

Further internationalisation of R&D, innovation, and other enterprise activities pose additional challenges for compiling STI statistics, and will continue to pose challenges in the future. These challenges include both obtaining new statistical data on internationalisation, and mastering business surveys in a more globalised (and therefore more complex) world.

Eurostat and the Member States will work together closely to make better use of the CIS data in the future. This work will not increase the burden on survey respondents. Eurostat and the Member States work on projects that aim:

- to report on different innovation profiles of enterprises (e.g. ‘strategic innovator’, ‘adaptor’, ‘weak or non-innovator’). This would make it possible to show which of these innovation profiles are more common in each country. For example, it could show what percentage of the enterprises in a country are 'strategic innovators', and what percentage of enterprises are 'adaptors'. Moreover, it shall be possible to identify the characteristics of the different profiles. The aim is to provide policy makers with more differentiated insight into what drives or hampers innovation.
- to better measure the outcomes of innovation, by linking CIS data to time-lagged data from the Statistical Business Register and the Structural Business Survey. This activity can improve statistical information about start-ups and on scale-ups¹².

Both projects shall be combined to make the most of synergies.

As was the case with the R&D and GBARD data, EU Member States will transmit CIS data via SDMX in the future. This will increase the efficiency, flexibility and timeliness of data transmission.

¹² Companies that are too old to be classed as start-ups but that experience strong growth.

Eurostat and the EU Member States will improve the provision of metadata and quality reports for R&D and GBARD statistics.

Eurostat and the EU Member States will seek further measures to increase the timeliness of estimates for key indicators from the CIS.

6. CONCLUSION

This report evaluates the implementation of actions listed in Article 2 of Decision No 1608/2003/EC, which is aimed at creating a statistical information system on science, technology and innovation. The two most important developments since 2014 were (i) the adaptation of the data collection on R&D to the 2015 edition of the Frascati Manual, and (ii) the review of the CIS to increase the quality and policy relevance of the survey's results and adapt the CIS to align it with the reviewed Oslo Manual. Constant monitoring of compliance and quality of the R&D and CIS statistics required by EU legislation shows that the quality of the data it produces is good. However, the data that Member States send to Eurostat on a voluntary basis is not always complete. This is mainly due to resource restrictions in the Member States. Precise estimates of the cost and burden related to the production of these statistics are hard to obtain from Member States. However, Eurostat, in co-operation with the Member States, is taking several measures to increase cost efficiency and reduce the administrative burden of producing these statistics, and to increase their completeness