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COMMISSION RECOMMENDATION

of 25.4.2018

on access to and preservation of scientific information

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 thereof,

Whereas:

(1) The European Commission adopted in July 2012 a scientific information package, consisting of the Communication "Towards better access to scientific information: Boosting the benefits of public investments in research"[1], and of a Recommendation to the Member States on access to and preservation of scientific information[2]. Recommendation 2012/417/EU states that the Commission will review the progress made across the Union to assess whether further action is needed to achieve the objectives laid down.

(2) The Communication "A Digital Single Market Strategy for Europe"[3] highlights the importance of data dissemination as a catalyst for economic growth, innovation and digitisation across all economic sectors, particularly for small and medium-sized enterprises (and start-ups) and for society as a whole. It recognises that big data and high-performance computing are changing the way research is performed and knowledge is shared, as part of a transition towards a more efficient and responsive open science[4]. It announces that the Commission would encourage access to public data to help drive innovation and work towards a research open science cloud as part of the European Cloud Initiative. In its mid-term review of the Digital Single Market Strategy[5], the Commission announces its intention to further improve the "accessibility and re-use of public and publicly funded data".

(3) The Communication on the European Cloud Initiative "Building a competitive data knowledge and economy in Europe"[6] presents the rational and broad plan for developing the European Open Science Cloud (EOSC) as a trusted, open environment for the scientific community for storing, sharing and re-using scientific data and results. It also announces the Commission would review Recommendation 2012/417/EU on access to and preservation of scientific information to encourage scientific data sharing and the creation of incentive schemes, rewards systems and education and training programmes for researchers and businesses to share data. The

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1 COM(2012) 401 final of 17.7.2012

2 Commission Recommendation 2012/417/EU of 17 July 2012 on access to and preservation of scientific information (OJ L 194, 21.7.2012, p. 39).

3 COM(2015) 192 final of 6.5.2015.

4 Open science refers to a new approach to the scientific process based on cooperative work and new ways of disseminating knowledge, improving accessibility to and re-usability of research outputs by using digital technologies and new collaborative tools.

5 COM(2017) 228 final of 10.5.2017.

6 COM(2016) 178 final of 19.4.2016.

Staff Working Document "Implementation Roadmap for the EOSC"[7] presents the results of the exploration with Member States and stakeholders of possible governance and financing mechanisms for the EOSC and further details the action lines for developing the EOSC as a federation of research data infrastructures.

(4) Directive 2003/98/EC of the European Parliament and of the Council[8] establishes the principle that all accessible data held by a public sector body need to also be re-useable for commercial and non-commercial purposes by all interested parties under non-discriminatory conditions for comparable categories of re-use and at the marginal cost linked to the distribution of the data, at maximum.

(5) Open access[9] policies aim to provide researchers and the public at large with access to peer-reviewed scientific publications, research data and other research outputs free of charge in an open and non-discriminatory manner as early as possible in the dissemination process, and enable the use and re-use of scientific research results. Open access helps enhance quality, reduce the need for unnecessary duplication of research, speed up scientific progress, help to combat scientific fraud, and can overall favour economic growth and innovation. Beside open access, data management planning is becoming a standard scientific practice.

(6) Open access is a means of dissemination for researchers who may decide to publish their work, in particular in the context of publicly-funded research. Licensing solutions should aim at facilitating the dissemination and re-use of scientific publications.

(7) Preservation of scientific research results is in the public interest. It has traditionally been under the responsibility of libraries or archives, especially national legal deposit libraries. The volume of research results generated is constantly growing. Mechanisms, infrastructures and software solutions should be in place to enable long-term preservation of research results in digital form. Sustainable funding for preservation is crucial as curation costs for digitised content are still relatively high. Given the importance of preservation for the future use of research results, the establishment or reinforcement of policies in this area should be recommended to Member States.

(8) Technological progress has allowed for the creation of web-based research infrastructures set up by national governments, universities or research organisations. They support the objectives of this Recommendation by helping researchers to manage the results of their research and enabling dissemination. The Communication on the European Cloud Initiative announced that "the European Open Science Cloud will start by federating existing scientific data infrastructures, today scattered across disciplines and Member States." It is appropriate to identify and recommend the measures at national level that should enable proper functioning and use of the EOSC.

(9) Technological progress has over time caused a major shift in the world of science towards increasingly collaborative methods, and has steadily contributed to an increasing volume of scientific material. In a scientific approach that is becoming increasingly collaborative and transparent, it should be ensured that researchers at all stages of their education and career have access to professional development,

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7 SWD(2018) 83 final of 14.3.2018.

8 Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information (OJ L 345, 31.12.2003, p. 90).

9 Open access refers to the possibility to access and re-use digital research outputs with as few restrictions as possible.

including through higher education programmes. They should also have the possibility to develop the appropriate skills to fully engage with open science, as outlined by the 'Digital Education Action Plan'[10].

(10) Incentives and rewards are important aspects in a professional career. Although researchers are encouraged to move across borders, disciplines and sectors, and to participate in the culture of sharing their results, this is often not rewarded or reflected in their professional career development. Transparent and responsible indicators are being developed to support the implementation of open science practices in modern universities. Upgraded rewarding mechanisms that take into account new generation metrics could be used to better measure the quality of European research and provide a valuable incentive for researchers to share the result of their research, and for universities to become more entrepreneurial while fostering competition within the internal market.

(11) Member States should continue to support open science and open access, as stated in the Council Conclusions on "open, data-intensive and networked research as a driver for faster and wider innovation"[11] and on "the transition towards an open science system"[12].

(12) The move towards open access is a worldwide endeavour. Member States have been part of this endeavour and should be supported in enhancing an open, collaborative research environment based on reciprocity at a global level. Open science is a key feature of Member States' policies for responsible research and for open innovation. As new digital technologies become available, research and funding policies should adapt to this new environment.

(13) The Commission has been leading by example to maximize access to and re-use of research results generated in an open science environment, including in the Framework Programmes, and by applying an open data policy to the research data of the Commission's Joint Research Centre.

(14) There have been many advances in the areas dealt with in Recommendation 2012/417/EU and in the other documents listed in the preceding recitals, but not all targets have been met and progress has been uneven among Member States. A greater effort by all Member States is needed in order to make the most of Europe's research and innovation potential.

(15) This Recommendation builds on and replaces Commission Recommendation 2012/417/EU of 17 July 2012 on access to and preservation of scientific information[13],

HAS ADOPTED THIS RECOMMENDATION:

Open access to scientific publications

1. Member States should set and implement clear policies (as detailed in national action plans) for the dissemination of and open access to scientific publications resulting from publicly funded research. Those policies and action plans should provide for:

10 COM(2018) 22 final.
11 Council Conclusions 9360/15 of 29.5.2015.
12 Council Conclusions 9526/16 of 27.5.2016.
13 OJ L 194 of 21.7.2012, p. 39.

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities and appropriate licensing;

- associated financial planning.

Member States should ensure, in compliance with the EU acquis on copyright and related rights, that as a result of these policies or action plans:

- all scientific publications resulting from publicly-funded research are made available in open access as from 2020 at the latest;

- whatever the channel of publication (scientific journal, digital infrastructure, multimedia channels, or any new and experimental methods of scholarly communication), open access to publications resulting from publicly funded research be granted as soon as possible, preferably at the time of publication, and in any case no later than six months after the date of publication (no later than twelve months for social sciences and humanities);

- taking into account technological developments, licensing terms used on the market do not unduly restrict text and data mining of publications resulting from publicly funded research, in accordance with and without prejudice to applicable copyright legislation;

- researchers, when entering into contractual agreements with scientific publishers, retain the necessary intellectual property rights, inter alia, to comply with the open access policy requirements. This concerns in particular self-archiving and re-use (notably through text and data mining);

- information is published about agreements between public institutions or groups of public institutions and publishers on the supply of scientific information, in order to enhance market transparency and fair competition, without prejudice to the protection of know-how and business information (trade secrets). This should include all sorts of agreements covering in particular the so-called 'big deals' (i.e. bundles of print and electronic journal subscriptions offered at discounted prices) and the related 'offsetting deals' aimed at obtaining discounted open access publishing fees for consortia;

- innovative companies, in particular small and medium-sized enterprises, independent researchers (for instance citizen scientists), the public sector, the press and citizens at large have, in a transparent and non-discriminatory manner, the widest possible access to scientific publications of the results of research that receives public funding in view of enabling innovation, empowering the public sector and informing citizens.

2. Member States should ensure that research funding institutions responsible for managing public research funding and academic institutions receiving public funding implement the policies and national action plans referred to in point 1 at national level in a coordinated way by:

- setting institutional policies for the dissemination of and open access to scientific publications, and establishing implementation plans;

- including requirements for open access as a condition to give out grant agreements or to provide other financial support for research, together with mechanisms for monitoring compliance with these requirements and follow up actions to correct cases of non-compliance;

- making the necessary funding available for dissemination (including open access and re-use) in a transparent and non-discriminatory manner allowing for different channels, including digital infrastructures where appropriate, as well as new and experimental methods of scholarly communication;

- providing guidance to researchers on how to comply with open access policies, and supporting them to do so, especially regarding the management of their intellectual property rights to ensure open access to their publications;

- conducting joint negotiations with publishers to obtain transparent and the best possible terms for access to publications, including use and re-use;

- ensuring that publications resulting from public funding are easily identifiable by appropriate technical means, including through metadata attached to electronic versions of the research output and persistent identifiers.

Management of research data, including open access

3. Member States should set and implement clear policies (as detailed in national action plans) for the management of research data resulting from publicly funded research, including open access. Those policies and action plans should provide for:

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities and appropriate licensing;

- associated financial planning.

Member States should ensure that, as a result of these policies or action plans:

- data management planning becomes a standard scientific practice early in the research process when data is generated or collected, including through the requirement of data management plans;

- research data that results from publicly funded research becomes and stays findable, accessible, interoperable and re-usable ("FAIR principles") within a secure and trusted environment, through digital infrastructures (including those federated within the European Open Science Cloud (EOSC), where relevant), unless this is not possible or is incompatible with the further exploitation of the research results ("as open as possible, as closed as necessary"). This could be for reasons, in particular, of privacy, trade secrets, national security, legitimate commercial interests and to intellectual property rights of third parties. Any data, know-how and/or information whatever its form or nature which is held by private parties in a joint public/private partnership prior to the research action should not be affected by these policies or national action plans;

- taking into account technological developments (including of dynamic (real-time) data), licensing terms used on the market do not unduly restrict text and data mining of research data resulting from publicly funded research, in accordance with and without prejudice to the applicable copyright legislation;

- innovative companies, in particular small and medium-sized enterprises, independent researchers (for instance citizen scientists), the public sector, the press and citizens at large have, in a transparent and non-discriminatory manner, the widest possible access to the research data of the results of research that receives public funding in view of enabling innovation, empowering the public sector and informing citizens.

4. Member States should ensure that research funding institutions responsible for managing public research funding and academic institutions receiving public funding implement the policies and national action plans referred to in point 3 at national level in a coordinated way by:

- setting institutional policies for research data management, and establishing implementation plans;

- including requirements for data management plans and open access to research data as a principle ("as open as possible, as closed as necessary") for projects producing research data in grant agreements and other financial support for research, together with mechanisms for monitoring compliance with those requirements and follow up actions to correct cases of non-compliance;

- making the necessary funding for data management available;

- providing guidance to researchers on how to comply with research data management policies, and supporting them to do so, especially regarding the development of sound data management planning skills and digital infrastructures that support access to and preservation of research data;

- ensuring that datasets are easily identifiable through persistent identifiers and can be linked to other datasets and publications through appropriate mechanisms, and that additional information is provided to enable their proper evaluation and use.

Preservation and re-use of scientific information

5. Member States should set and implement clear policies (as detailed in national action plans) for reinforcing the preservation and re-use of scientific information (publications, data sets and other research outputs). Those policies and action plans should provide for:

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities and appropriate licensing;

- associated financial planning.

Member States should ensure that, as a result of those policies or action plans:

- academic institutions receiving public funding develop policies on the preservation of their scientific output;

- an effective system of deposit for electronic scientific information is in place, covering born-digital publications and the related research output;

- scientific information selected for long-term preservation receives appropriate curation, along with hardware and software necessary to allow the re-use of the information;

- unique identification (interlinking of research outputs, researchers, their affiliations and funders, and contributors) is promoted through a wide range of persistent identifiers, in order to enable findability, reproducibility and long-term preservation of the research results;

- machine-readable licensing systems and conditions are in place, compatible with already existing open licenses, which allow the re-use of scientific information resulting from publicly-funded research in accordance with and without prejudice to applicable copyright legislation, in order to enable legal re-use and preservation;

- the conditions for stakeholders to offer value-added services based on the re-use of scientific information are fostered.

Infrastructures for open science

6. Member States should set and implement clear policies (as detailed in national action plans) for further developing infrastructures underpinning the system for access to, preservation, sharing and re-use of scientific information and for promoting their federation within the EOSC. Those policies and action plans should provide for:

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities and appropriate licensing;

- associated financial planning.

Member States should ensure that, as a result of these policies or national action plans:

- resources are earmarked, leveraged and built to be economically efficient and to innovate while fostering competition within the internal market;

- the quality and reliability of the infrastructure are ensured, including through the use of widely recognised certification mechanisms, specifications and standards;

- researchers have an increased access, in a transparent and non-discriminatory manner, to research resources and services for storing, managing, analysing, sharing, and re-using scientific information, including through the EOSC, when available;

- through the use of additional indicators and metrics, infrastructures are fit to collect information that underpins the monitoring and assessment of openness and open science as well as of research and career evaluation.

7. Member States should ensure synergies among national infrastructures, with the EOSC and other global initiatives by:

- engaging into the definition of standards for data and services to be accessed through the EOSC, as well as indicators and metrics to measure research impact in the context of the EOSC;

- guaranteeing the interoperability of newly developed or upgraded infrastructures so that they take account of the development of the EOSC and, thus, prevent the emergence of silos, contributing to the reduction of fragmentation and promotion of scientific discovery and collaboration across disciplines and countries;

- preparing the ground for the use of services and the sharing of scientific information through the EOSC.

Skills and competences

8. Member States should set and implement clear policies (as detailed in national action plans) for the necessary skills and competences of researchers and personnel of academic institutions regarding scientific information. Those policies and action plans should provide for:

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities;

- associated financial planning.

Member States should ensure that, as a result of those policies or action plans:

- the necessary training and education are provided about open access, data research management, data stewardship, data preservation, data curation and open science, as part of the higher education and training system, at all career stages, and they reach on-the-job best practice in the industry;

- the promotion or implementation, or both, of advanced-degree programmes of new professional profiles in the area of data handling technologies are provided;

- the development and training of data-intensive computational science experts are supported, including for data specialists, technicians and data managers.

Incentives and rewards

9. Member States should set and implement clear policies (as detailed in national action plans) for adjusting, with regards to scientific information, the recruitment and career evaluation system for researchers, the evaluation system for awarding research grants to researchers, and the evaluation systems for research performing institutions. Those policies and action plans should provide for:

- concrete objectives and indicators to measure progress;

- implementation plans, including the allocation of responsibilities;

- associated financial planning.

Member States should ensure that, as a result of those policies or action plans:

- the academic career system supports and rewards researchers who participate in a culture of sharing the results of their research, in particular by ensuring early sharing and open access to their publications and other research outputs;

- institutions responsible for managing public research funding and academic institutions that are publicly funded assist in implementing national policy by putting in place mechanisms enabling, measuring and rewarding the sharing of scientific information;

- research and career evaluation systems are enriched through the introduction of additional indicators and metrics that can inform assessment on openness, including but not only on the broader social impact of research and at the individual level of a researcher ('new generation metrics').

Multi-stakeholder dialogue on open science at national, European and international level

10. Member States should participate in multi-stakeholder dialogues on the transition towards open science at national, European and international level on each of the issues addressed in points 1 to 9.

Member States should ensure that:

- those dialogues strengthen a linked open science technological environment that covers all research outputs from all phases of the research life cycle (data, publications, software, methods, protocols, etc.);

- a systemic change towards open science is gradually achieved and includes, beyond the technological change and efficiency, the principle of reciprocity, cultural change among researchers, as well as institutional change in research within academic institutions and funders towards open science, including where applicable issues such as research integrity and ethics.

Structured coordination of Member States at Union level and follow-up to this Recommendation

11. Member States should have a national point of reference the tasks of which would be:

- coordinating the measures listed in this Recommendation;

- acting as an interlocutor with the Commission on questions pertaining to access to and preservation of scientific information, in particular better definitions of common principles and standards, implementation measures and new ways of disseminating and sharing research results in the European Research Area;

- reporting on the follow-up to this Recommendation.

12. Member States should inform the Commission 18 months from the publication of this Recommendation in the *Official Journal of the European Union*, and every two years thereafter, of action taken in response to the elements of this Recommendation. On that basis, the Commission should review the progress made across the Union to assess whether further action is needed to achieve the objectives proposed in this Recommendation.

Done at Brussels, 25.4.2018

For the Commission

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