Planning, tracking, and assessing scientific knowledge production

Scientific knowledge production rapidly increases, and coherent methodologies, workflows and tools are needed to carefully plan research activity, track its impact and contribution, and assess its compliance with the FAIR principles to ensure a maximised gain from previous efforts.

Data Management Plans (DMPs) have become essential companions to the research practice to ensure adequate planning and anticipate and overcome hurdles linked, for example, to the production and storage of data. However, DMPs are heterogeneous and limited efforts have taken place to promote their machine-actionability or to automatise their evaluation.

Science Knowledge Graphs (SKGs) are essential and flexible tools to monitor and track events of science linked to provenance, publishing, citation, data processing, data and software usage, service consumption. SKGs provide an underlying interconnected graph of science events that DMPs can link to, but their application goes far beyond this, and related impact services can allow SKGs to visualise the research activity, through open science indicators, bibliometrics, quality, performance, impact, popularity, etc.

Evolving practices on the assessment of research give increasing value to open science contributions, to the diversity of research activities and outputs beyond publications and data, and to their potential impact. A wide range of digital objects beyond publications and data, including preprints, software, code, workflows, and processes, such as open peer-reviews, require an enhanced traceability. In addition, coherent and comprehensive metrics are required to assess and improve the FAIRness of a wide range of digital objects.
Proposals should address all the following activities, aimed at improving:

- **Planning of research activities**
  - Contribute to the standardisation and homogenisation of domain-agnostic elements in DMPs, building on previous efforts (e.g. Science Europe guidelines, HE DMP template, etc.), develop guidance on how DMPs can be made FAIR (including through deposition, publication, etc.) and seek integration in pertinent automated workflows;
  - Ensure the pervasive and comprehensive use of PIDs for preprints, publications, open peer-reviews, data, software, workflows, storage, organisations, projects, funders, services, researchers, facilities, companies, patents, etc., and their interconnection with DMP standards;
  - Develop use cases and proof of concept instances of machine-actionability of DMPs, in alignment with developments of Scientific Knowledge Graphs (SKGs) to maximise the interconnection between the different elements in the research ecosystem;
  - Automate, to the extent possible, the evaluation of DMPs (assessing their completeness and adequacy) through, e.g. semantic web technologies, building on new and existing DMP evaluation metrics (e.g. Science Europe evaluation rubric);

- **Tracking research contributions and their impact**
  - Promote the adoption of interoperable SKGs at international, national, regional, cross-border, cross-discipline level. Foster the interoperability across SKGs by supporting common models including agreed metadata formats, protocols to enhance the traceability of digital objects and enable the use of SKGs for research assessment metrics;

- **Assessing compliance with the FAIR principles**
  - Extend FAIR metrics guidance, tools, and models, (e.g. FAIR Data Maturity Model) to meet the needs of thematic domains, and to cover a wide range of digital research objects;
  - Define a trusted governance to measure successful compliance with metrics/tests and identify mechanisms by which adherence to trusted community-specific standards (e.g. minimal information requirements, representation schemas, terminologies, etc.) can be objectively and transparently measured. Encourage community endorsement of the mechanisms by which FAIRness of digital objects is measured;
  - Define minimum levels of FAIRness for a wide spectrum of digital objects;
  - Explore the relevant boundary conditions, mechanisms, and requirements through which services, processes and activities can be FAIR-inducing, and lead to FAIR-by-design digital objects and investigate their impact in mainstreaming FAIR across the research practice.

Proposals should acknowledge, build upon, and, where relevant, collaborate with, Working and Interest Groups (WG, IG) of the Research Data Alliance (e.g. FAIR Data Maturity Model IG, Data Management Plan WG, etc.).

Concerning the activities on "Tracking research contributions and their impact", proposals should establish strong links and effective collaboration with projects funded under the topic HORIZON-INFRA-2021-EOSC-01-04, that will develop a framework for interlinking and managing community-based SKGs and related services.
Additionally, complementarities should be sought with the resulting project from the topic HORIZON-INFRA-2021-EOSC-01-05, and with the ESFRI clusters, especially concerning the implementation of metrics to measure the FAIRness of digital objects. Synergies should be exploited with the resulting projects from the topic HORIZON-INFRA-2022-EOSC-01-01 in what regards the development of SKGs, which should build on the information provided through the services and tools that will gather and monitor information and data on the use and uptake of research outputs, and of open science practices across borders and disciplines. Synergies and collaboration should also be developed with the resulting projects from topics HORIZON-WIDERERA-2021-ERA-01-45 and HORIZON-WIDERERA-2023-ERA-01-11 that are expected to pilot and implement new metrics for rewarding open science practices and for the broader research assessment.

To ensure complementarity of outcomes, proposals are expected to cooperate and align with activities of the EOSC Partnership and to coordinate with relevant initiatives and projects contributing to the development of EOSC.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

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