EOSC as part of the European Union's strategy for Open Science

National EOSC tripartite event in The Netherlands

Utrecht, 11 April 2023

Dr. Javier Lopez Albacete
Open Science
DG R&I, European Commission

Science is in transition

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The **Open Science (OS) paradigm** affects the whole research cycle and all its stakeholders
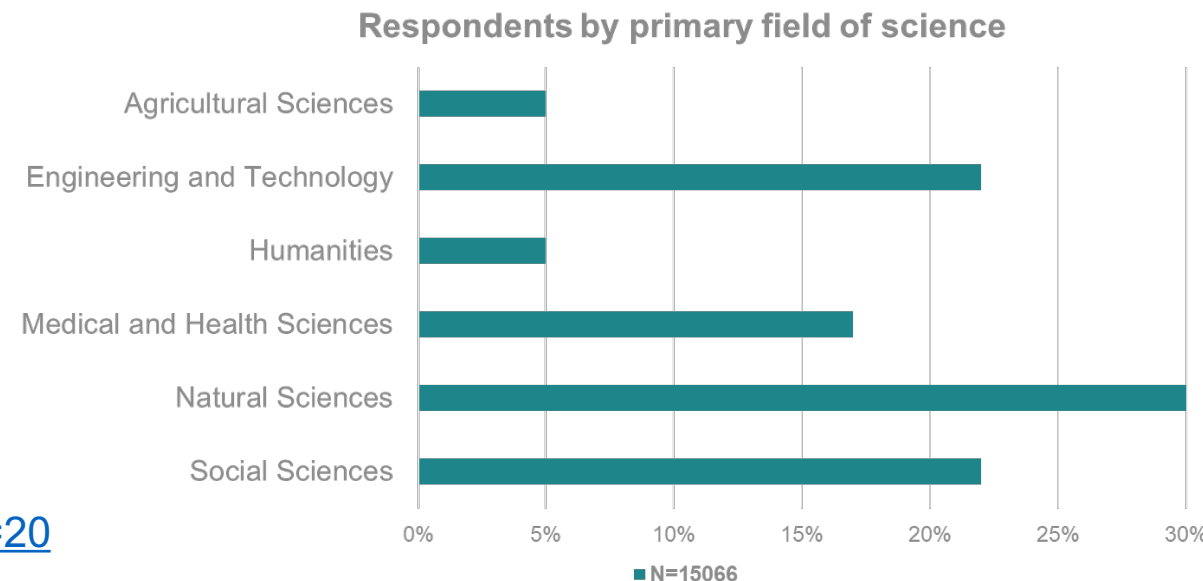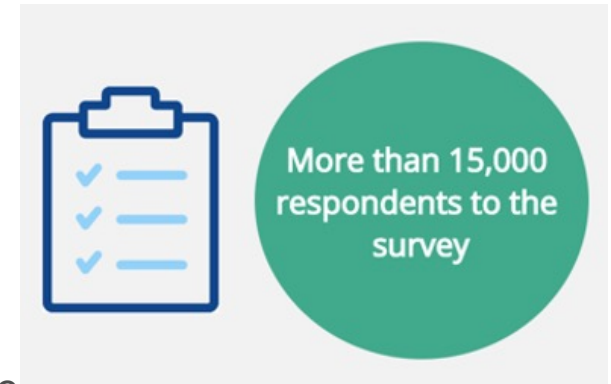
It implies sharing knowledge and tools:

- "as early as possible" in the research process;
- "as openly as possible";
- "as FAIR as possible";

not only within a discipline but also between disciplines and society at large.
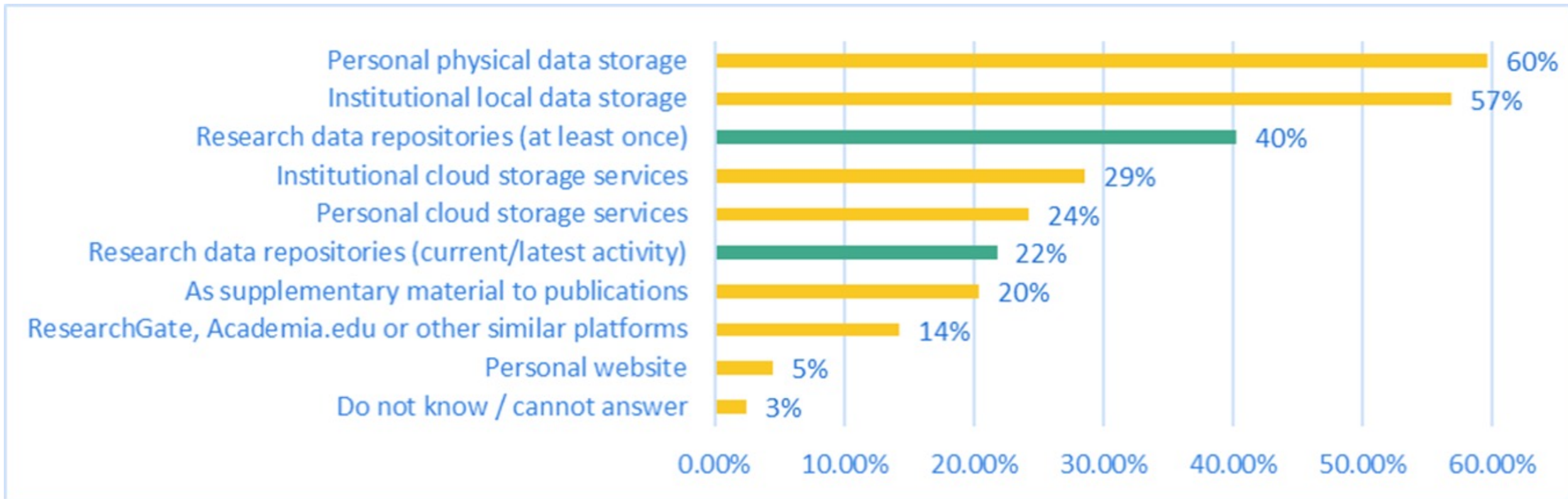
What do we know about the European Research Data Landscape?

- **'European Research Data Landscape' study** commissioned by the EC and implemented from June 2021 to July 2022 by:
  - Visionary Analytics (LT)
  - Data Archiving and Networked Services (NL)
  - Digital Curation Centre (UK)
  - The European Future Innovation System (EFIS) Centre (BE)

- To characterize (amongst other objectives):
  - Research data production, deposition and consumption by multiple scientific disciplines
  - Levels of maturity with respect to FAIR data practices
  - Role of data repositories to support data FAIRification

- Scope of the study:
  - Geographically covering EU Member States, Horizon 2020 Associated Countries, and the UK
  - All fields of science

- Final report and supplementary material:
  - https://data.europa.eu/doi/10.2777/3648
  - https://zenodo.org/communities/erdl21/?page=1&size=20

More than 15,000 respondents to the survey

Respondents by primary field of science

Agricultural Sciences

Engineering and Technology

Humanities

Medical and Health Sciences

Natural Sciences

Social Sciences

0%   5%   10%   15%   20%   25%   30%

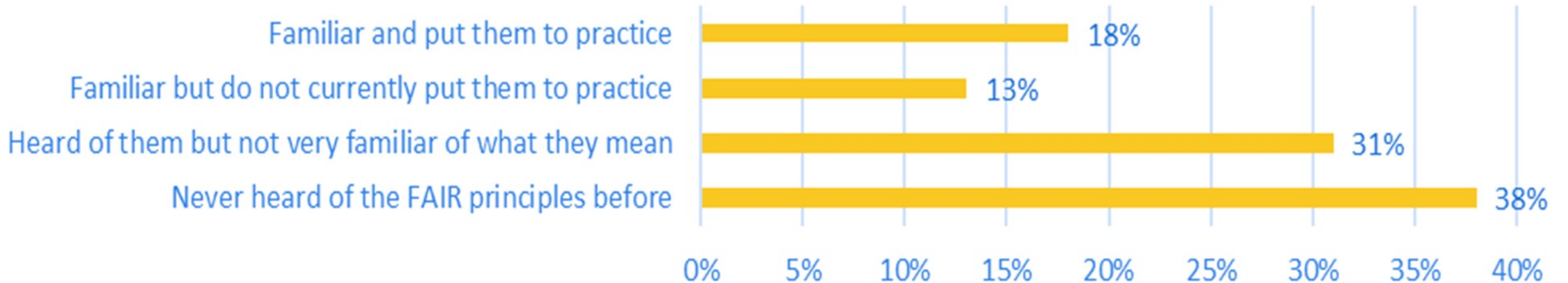N=15066

Research data depositing

- **60%** stored data in **personal** physical data storage or institutional **local** data storage.

- **40%** of researchers occasionally stored data in **research data repositories**.

Awareness of FAIR

- More than **1/3** of the respondents have **never heard** of the FAIR principles.

Familiar and put them to practice — 18%
Familiar but do not currently put them to practice — 13%
Heard of them but not very familiar of what they mean — 31%
Never heard of the FAIR principles before — 38%

FAIR aligned practices

- Around **75%** of the respondents develop **DMPs;** other FAIR-aligned practices are less common.

- Allocating PIDs to data or software/code are the least common practices.
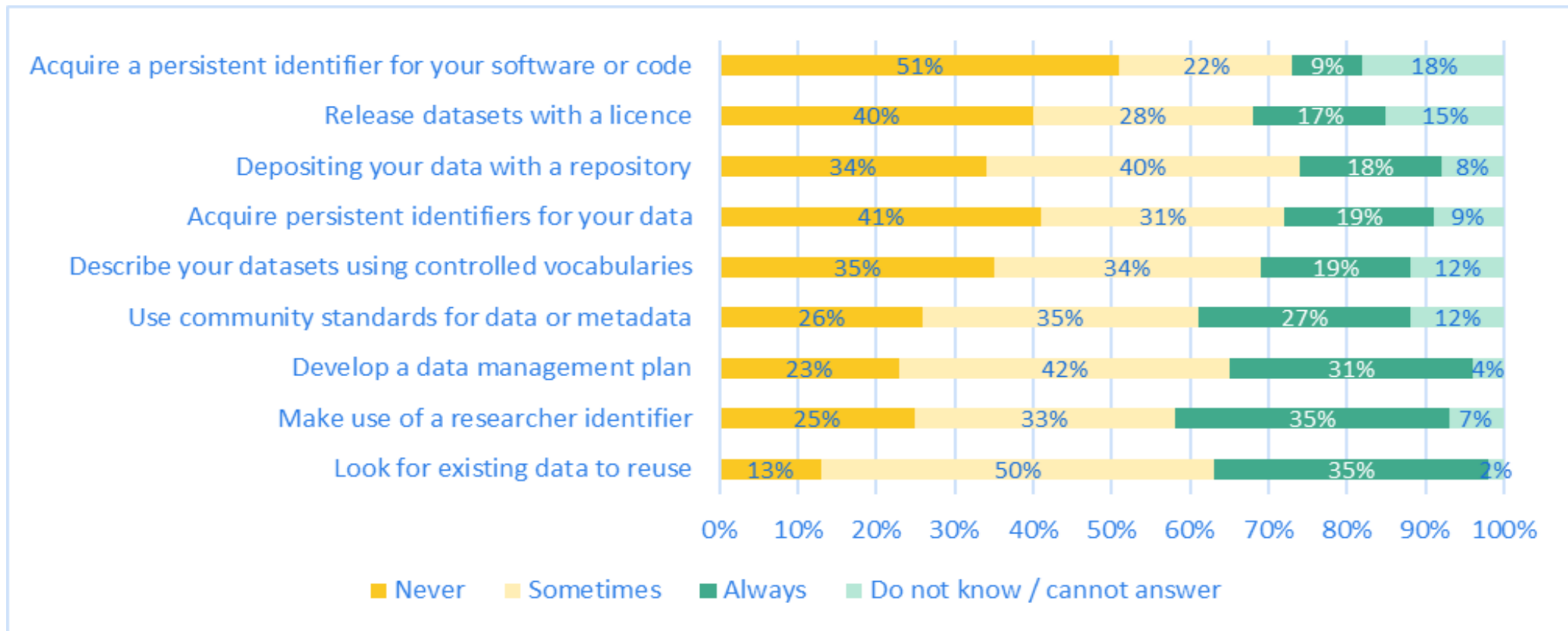
Practice	Never	Sometimes	Always	Do not know / cannot answer
Acquire a persistent identifier for your software or code	51%	22%	9%	18%
Release datasets with a licence	40%	28%	17%	15%
Depositing your data with a repository	34%	40%	18%	8%
Acquire persistent identifiers for your data	41%	31%	19%	9%
Describe your datasets using controlled vocabularies	35%	34%	19%	12%
Use community standards for data or metadata	26%	35%	27%	12%
Develop a data management plan	23%	42%	31%	4%
Make use of a researcher identifier	25%	33%	35%	7%
Look for existing data to reuse	13%	50%	35%	2%

Barriers

- **Time, effort & financial costs** required for Research data sharing are seen as a challenge

- **Data protection and legal restrictions** are also seen as big obstacles

- **Lack of recognition** also seen as a major barrier
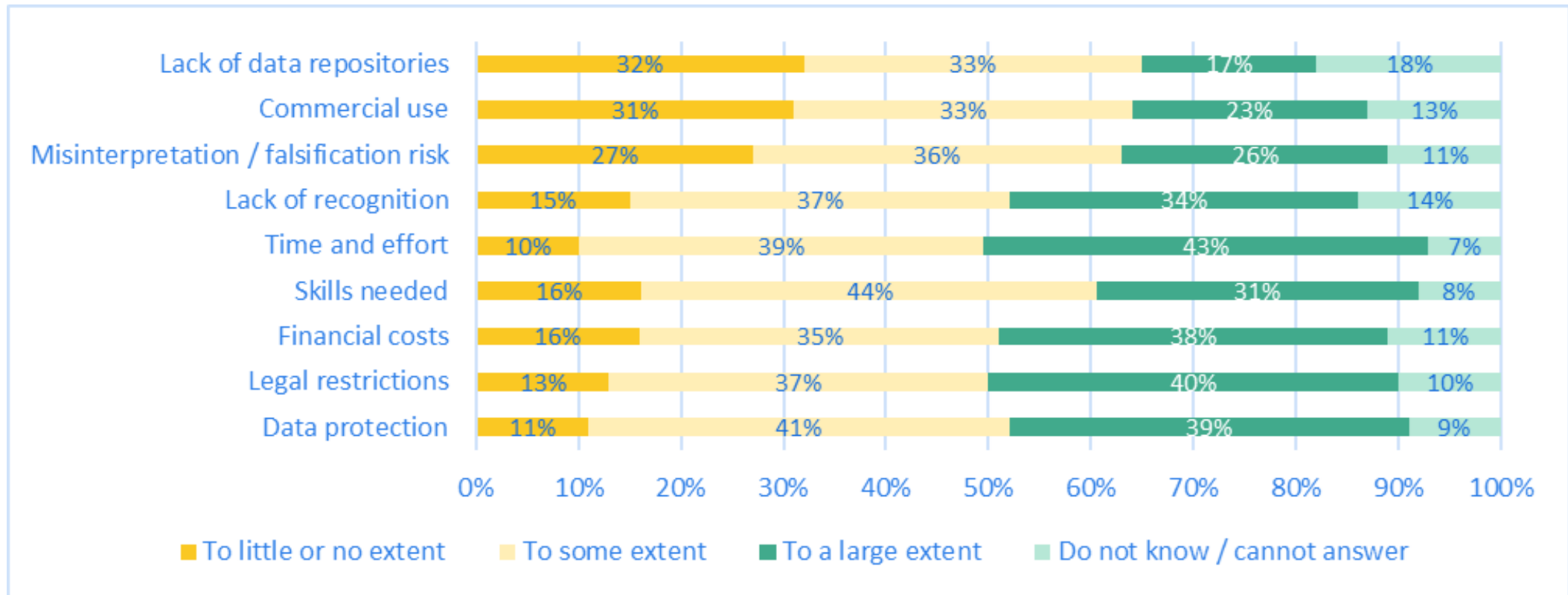
Open science: a political priority of the EU

- 2016 Council Conclusions on the Transition Towards an Open Science System

- 2018 EC Recommendation on Access to and Preservation of Scientific Information

- 2020 EC Communication on the New European Research Area (ERA)

- 2021 Council Recommendation on a Pact for Research & Innovation in Europe

- 2021 Council Conclusions on the Future Governance of the ERA
  (including the ERA Policy Agenda 2022-2024)

- 2022 Council Conclusions on Research Assessment and Implementation of Open Science

European Commission

European Commission's commitment to open science

Embrace open science as the modus operandi for researchers

Improve *the practice* of R&I

- **Providing open access** to scientific publications, research data, models, algorithms, software, protocols, notebooks, workflows and other research outputs

- **Research output management** - publications, data, and other outputs - in line with **FAIR principles**

- **Early and open sharing** of research, e.g. preregistration, registered reports, pre-prints

- Measures to ensure verifiability and **reproducibility** of research outputs

- **Open collaboration** within science and with other knowledge producers/users, incl. citizens, civil society and end users

Develop proper *enablers*

- **Incentives and rewards** to adopt open science practices, e.g. initiative for **Reforming Research Assessment a**s driven by the Coalition for Advancing Research Assessment **CoARA**.

- **Open research infrastructures** e.g.
  - **European Open Science Cloud (EOSC)**
  - **Open Research Europe (ORE)** open access publishing service

- **A legislative framework for copyright and data** fit for research and innovation

- **Support for skills and education** for practicing open science and data-intensive research

- **Horizon Europe provisions** on Open Access and Open Science practices

EOSC: where do we plan to be by 2027?

Objective 1 - Open Science is increasingly becoming the 'normal' at European, national and institutional levels

- OS policies and investments are better aligned at European and national levels with demonstrated impact
- Open Science best practices and use cases are catalogued and disseminated;
- A common Open Science monitoring mechanism is deployed, operated and feeds into the ERA Monitoring Mechanism; baselines and trends on investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC are available

Objective 2 - EOSC enables a 'Web of FAIR data and services for science'

- Policies are in place which require FAIR to be implemented including through Data Management Plans; DMPs are standardized across disciplines and can link to interconnected graph of science events
- 'FAIRification' toolkits and quality description frameworks are available for further uptake by the research community
- A network of EOSC-federated, trustworthy FAIR-enabling repositories is available

EOSC: where do we plan to be by 2027?

Objective 3 – Deployment and operation of a secured cloud-based <u>EOSC EU infrastructure node</u> including core services to enable the EOSC federation (EOSC Core) and a service marketplace (EOSC Exchange).

- Known basic elements to be deployed and operated include:
  - ✓ EOSC Rules of Participation
  - ✓ EOSC Authentication and Authorization Infrastructure
  - ✓ EOSC Policy on Persistent Identifiers and its compliance framework,
  - ✓ EOSC Interoperability Frameworks
  - ✓ EOSC Common search and access engine for FAIR research objects,
  - ✓ EOSC Monitoring and accounting modules
  - ✓ EOSC Security Coordination

- EC procurement for "Managed Services for the EOSC Platform" offering high quality professional services and superior user experience for a large number of users with functionalities available 24/7
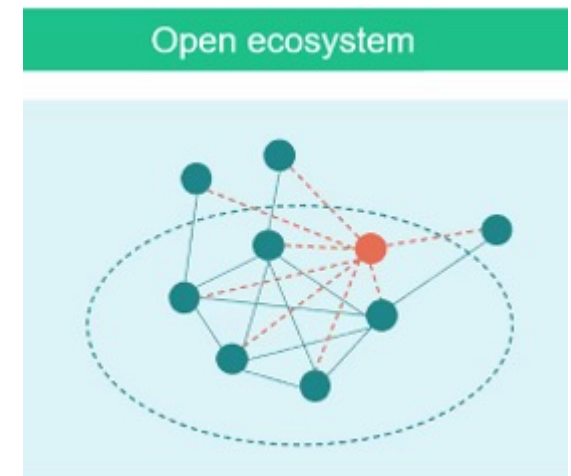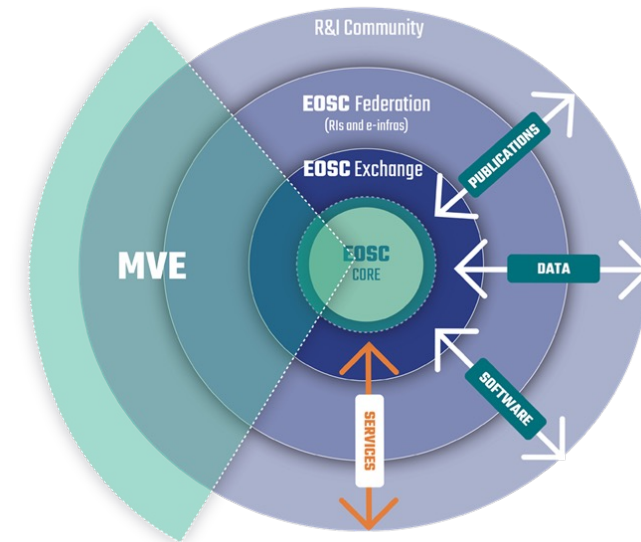
The <u>EOSC federation</u> of existing research infrastructures <u>expands</u> and is progressively connected to the wider public sector and the commercial sector

Open ecosystem

Implementing EOSC



Courtesy of the EOSC Association

- **A community-driven process**

- Gradual implementation based on mutual alignment and pooling of resources at European, national and institutional levels

eosc

European Commission on behalf of the EU

EOSC Association representing the research community

EOSC Tripartite Governance

Member States & Associated Countries Involved in the EOSC Steering Board

➤ **EOSC European co-programmed Partnership** to pool commitments and resources along priorities set in the EOSC Strategic Research and Innovation Agenda

➤ **EOSC tripartite governance** to ensure dialogue and strategic coordination between the European Commission, the Member States and Associated Countries and the EOSC Association

Strategic Research and Innovation Agenda (SRIA) of the European Open Science Cloud (EOSC)

Version 1.0
21 June 2021
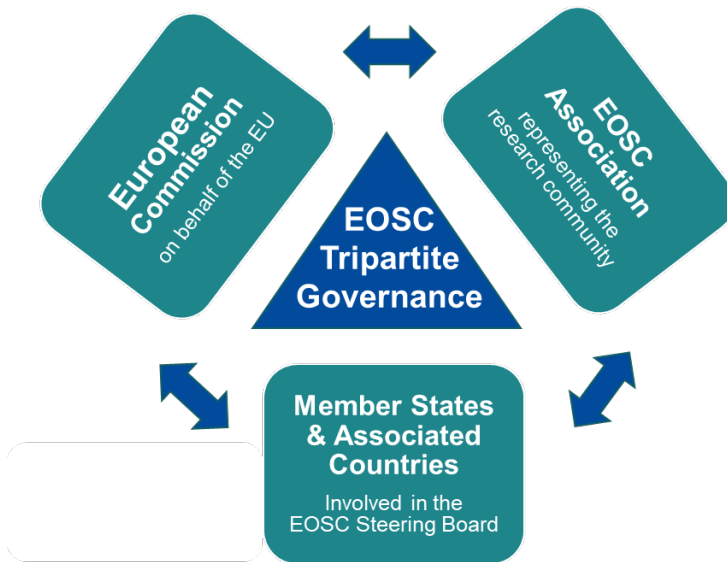
Implementing EOSC (continued)

- **EOSC is part of the European Research Area Policy Agenda**:
  It contributes to ERA Action 1 to enable sharing of research knowledge, data and tools across the ERA
  - ➤ Deploy Open Science principles and identify Open Science best practices
  - ➤ Deploy the core components and services of EOSC
    Federate existing data infrastructures in Europe
    Improve findability, accessibility, interoperability and reusability of research data
  - ➤ Establish a monitoring mechanism to collect data and benchmark investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC

- **EOSC is an element of the European strategy for data**:
  It represents the European data space for science, research and innovation

- **EOSC is as part of the global push for open science:**
  It is Europe's contribution towards a "global open science commons"
  - ➤ EOSC interoperability options inspired from community practices or validated with the international research community including through the Research Data Alliance
 - ➤ Synergies to open science initiatives in the UN, CODATA-WDS and G7 contexts

EOSC national coordination structures & events

Important means to intensify EOSC outreach and coordination

- Benefits for the countries:

  - Disseminating EOSC at national level
    Ensuring equal access to EOSC information and opportunities
  - Engaging stakeholders at national level into EOSC
    Facilitating national networking and international opportunities
  - Coordinating EOSC activities at national level
    Connecting national stakeholders to the EOSC governance
  - Supporting national priorities and investments
  - Increasing uptake of Open Science in the country

- Benefits for the overall EOSC implementation

  - Boosting EOSC awareness and stakeholder engagement across Europe
  - Overcoming language and cultural barriers
  - Strengthening involvement of national policy makers and
    enforcing EOSC-compliant policies at national level
  - Providing expertise to support EOSC implementation and EOSC monitoring activities
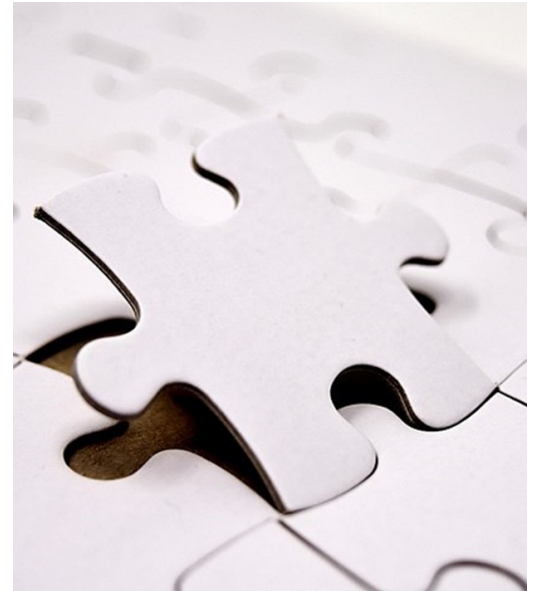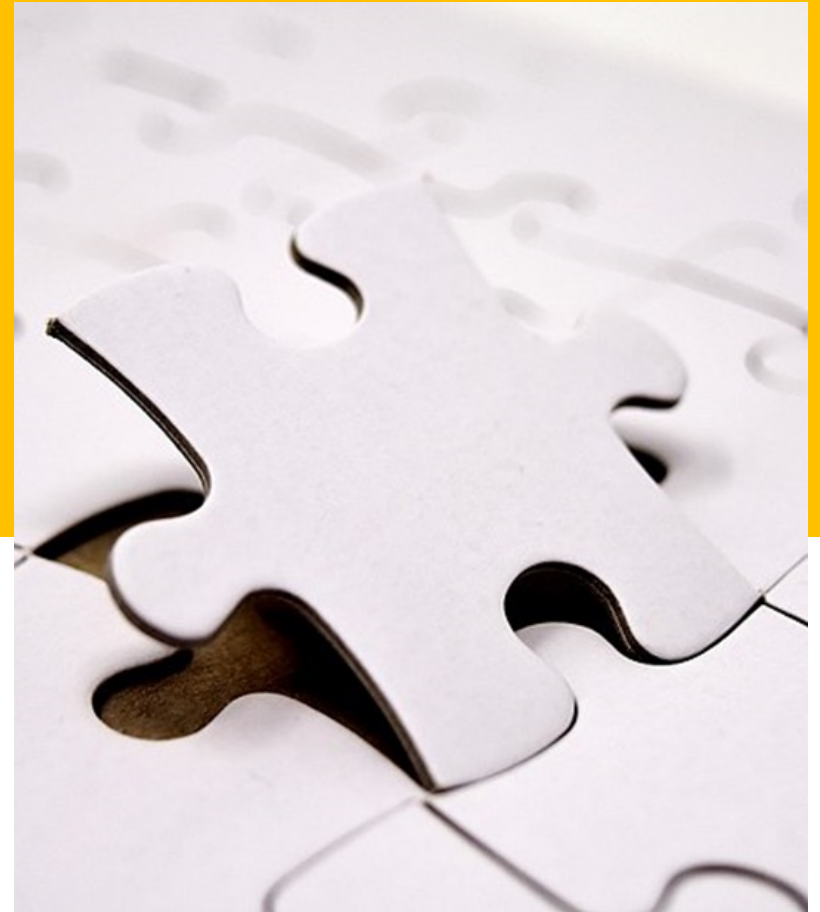
Monitoring Open Science policies and practices

- The following Open Science and **EOSC-relevant policies and targets** are recommended to be deployed **by 2024 by each Member State and Associated Country** at national and institutional levels.

  Source: Opinion paper (2022) on Monitoring Open Science by the EOSC Steering Board expert group (https://doi.org/10.2777/382490)

Indicators and implementation target by 2024	Implementation target on national or sub-national[12] level	Institutional level		Share of countries having best practice use cases on Open Science
		Share of the country's RFOs[13]	Share of the country's RPOs[14]	
Policy on Open Access to publications - on mandatory OA to publications - on immediate OA to publications	100% of MS/AC >75% of MS/AC >50% of MS/AC	100% 75% 50%	100% 75% 50%	100% 75% >30%
Policy on open data	100% of MS/AC	100%	50%	>30%
Policy on data management	100% of MS/AC	100%	75%	100%
Policy on FAIR data	100% of MS/AC	100%	100%	>30%
Policy on open source software	100% of MS/AC	50%	25%	100%
Policy on offering services through EOSC	25 % of MS/AC	25%	25%	25%
Policy on connecting repositories to EOSC	100% of MS/AC	50 %	25%	100%
Policy on data stewardship	>50% of MS/AC	50%	25%	>30%
Policy on long-term data preservation	Tbd	Tbd	Tbd	tbd
Policy on skills and training for Open Science	100% of MS/AC	50%	50%	100%
Policy on incentives and rewards for Open Science	100% of MS/AC	75%	50%	100%
Policy on Citizen Science	100% of MS/AC	50 %	25%	100%

Thank you

European Commission