

Open Science

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Open Science



Open Science represents a **new approach** to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools.

Commissioner Carlos Moedas

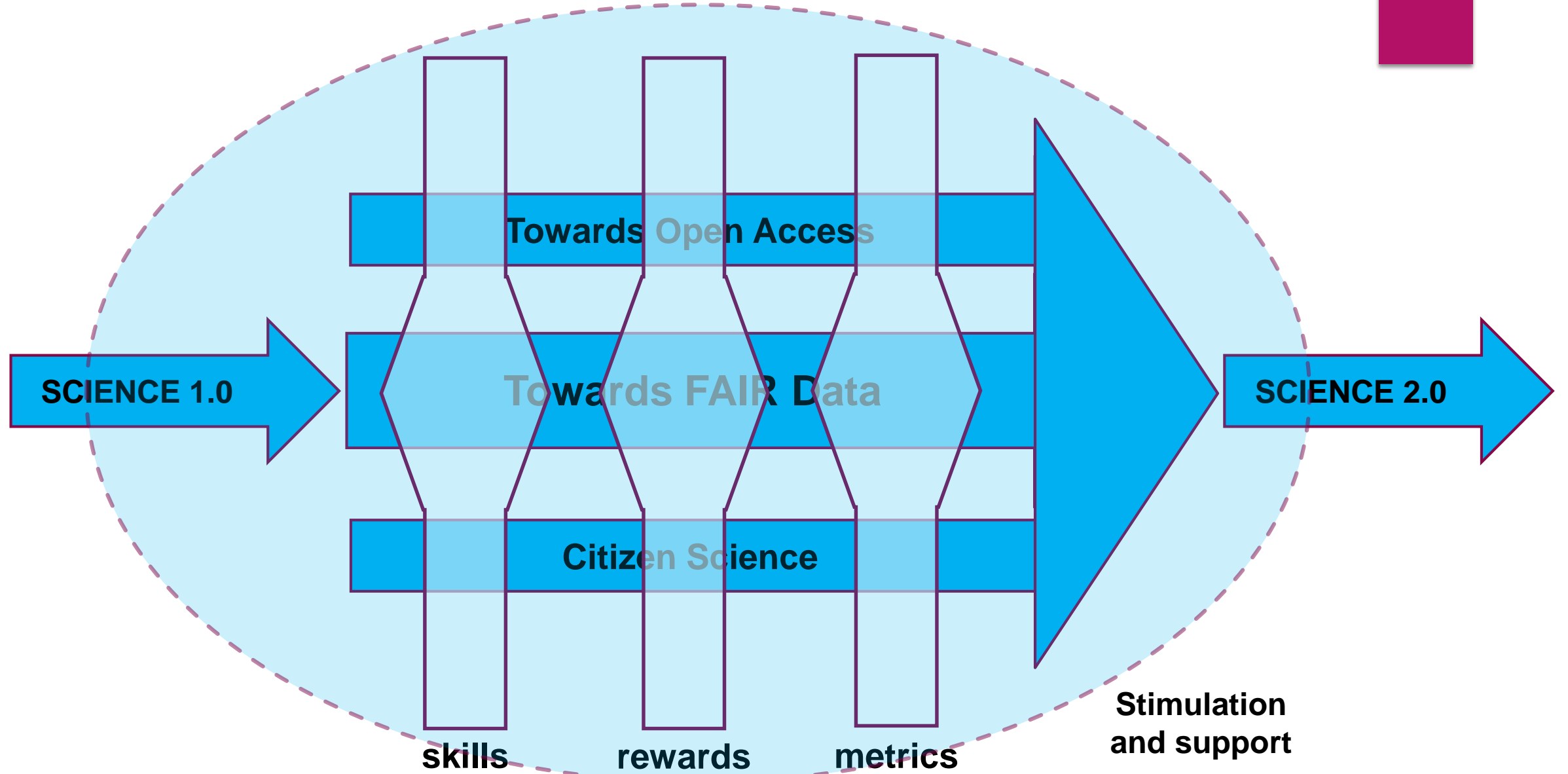
Open Innovation, Open Science,
Open to the World (2015)



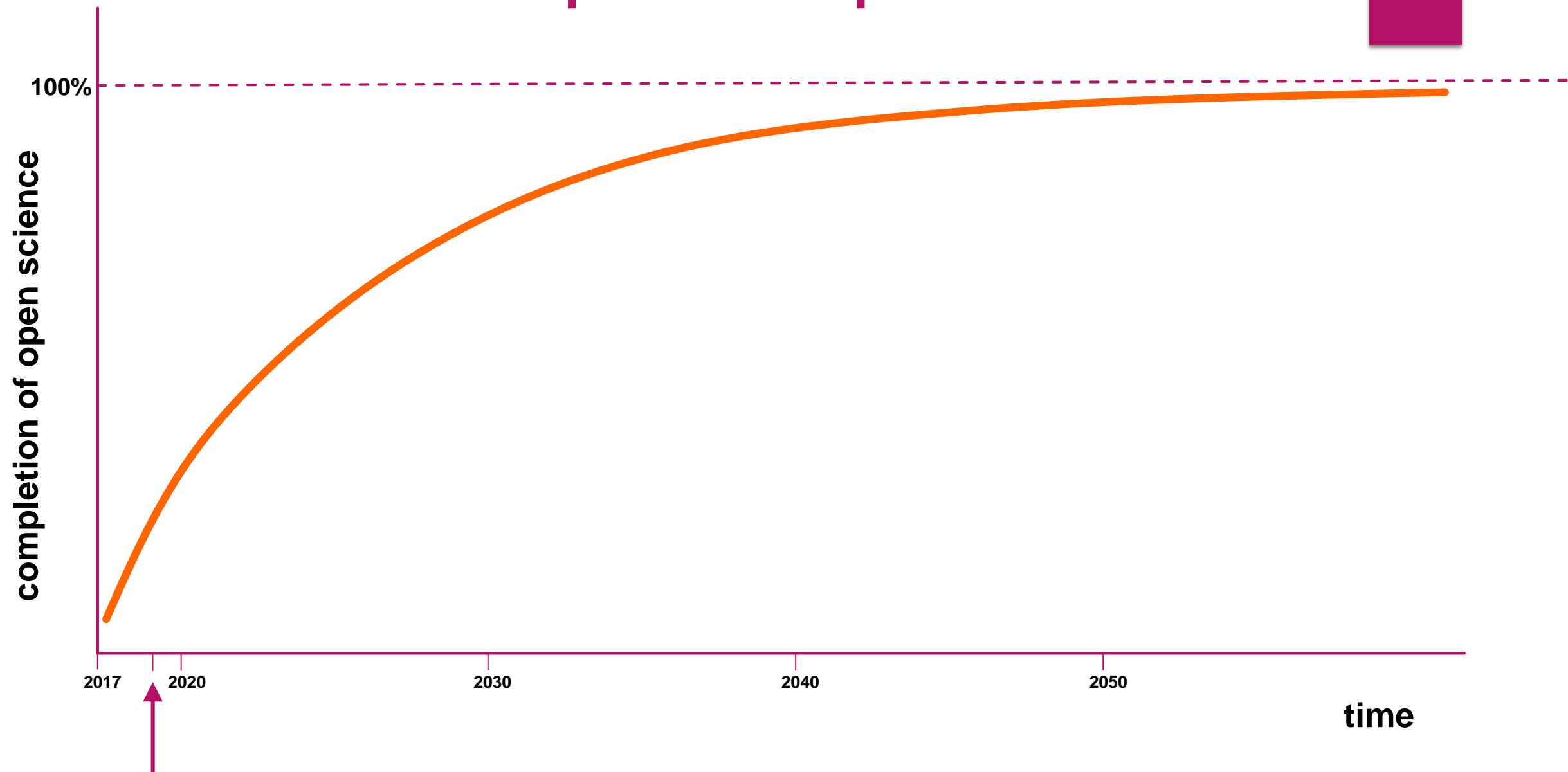
European Open Science Agenda:

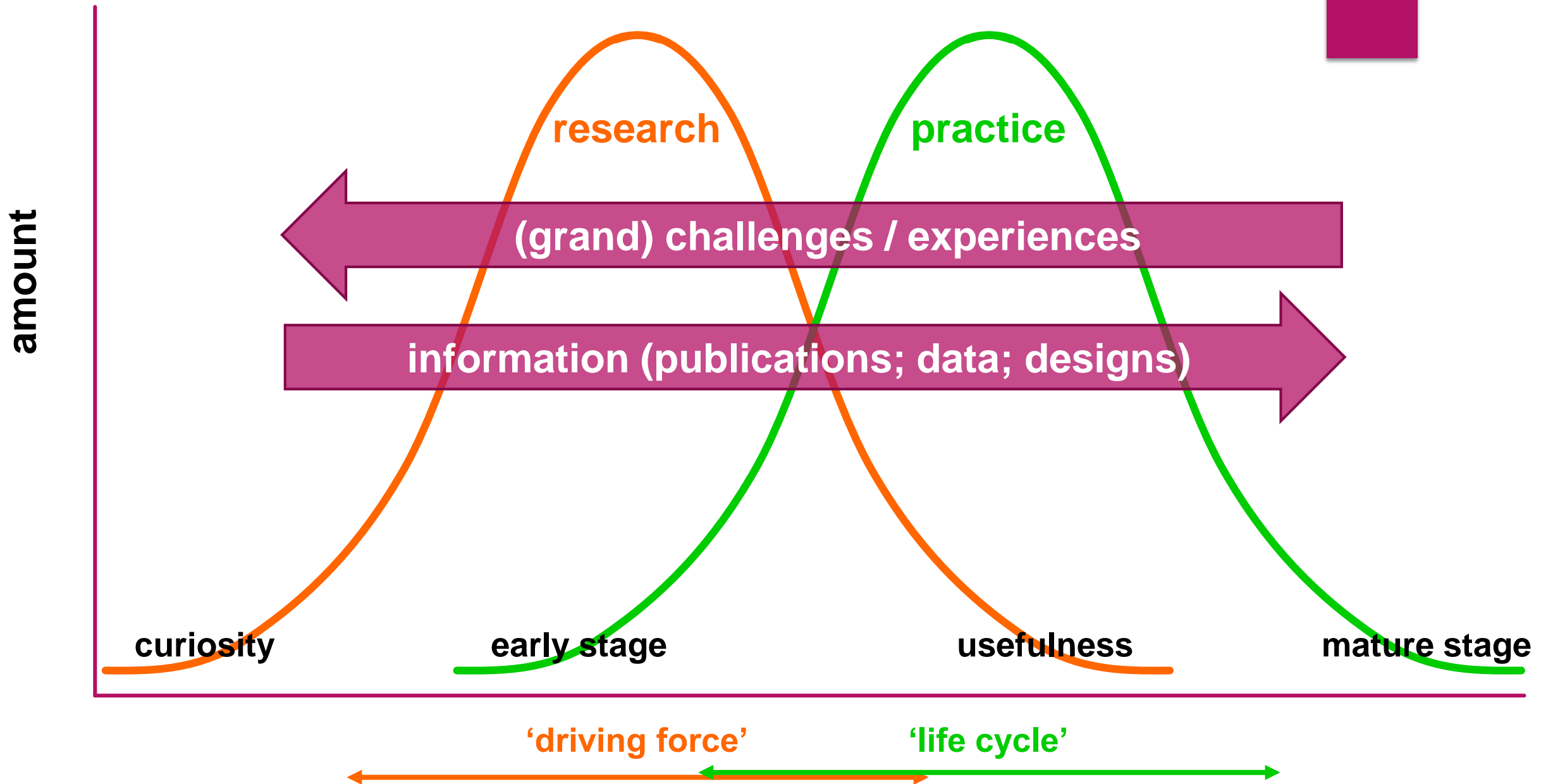
- 1. Rewards and incentives**
- 2. Next-generation-metrics**
- 3. FAIR (open) data**
- 4. European Open Science Cloud**
- 5. Future scholarly communication (Open Access)**
- 6. Citizen Science**
- 7. Research integrity**
- 8. Open science skills**
- 9. Educating data stewards / scientists**
- 10. New models for publishing**

OPEN SCIENCE



Development of Open Science



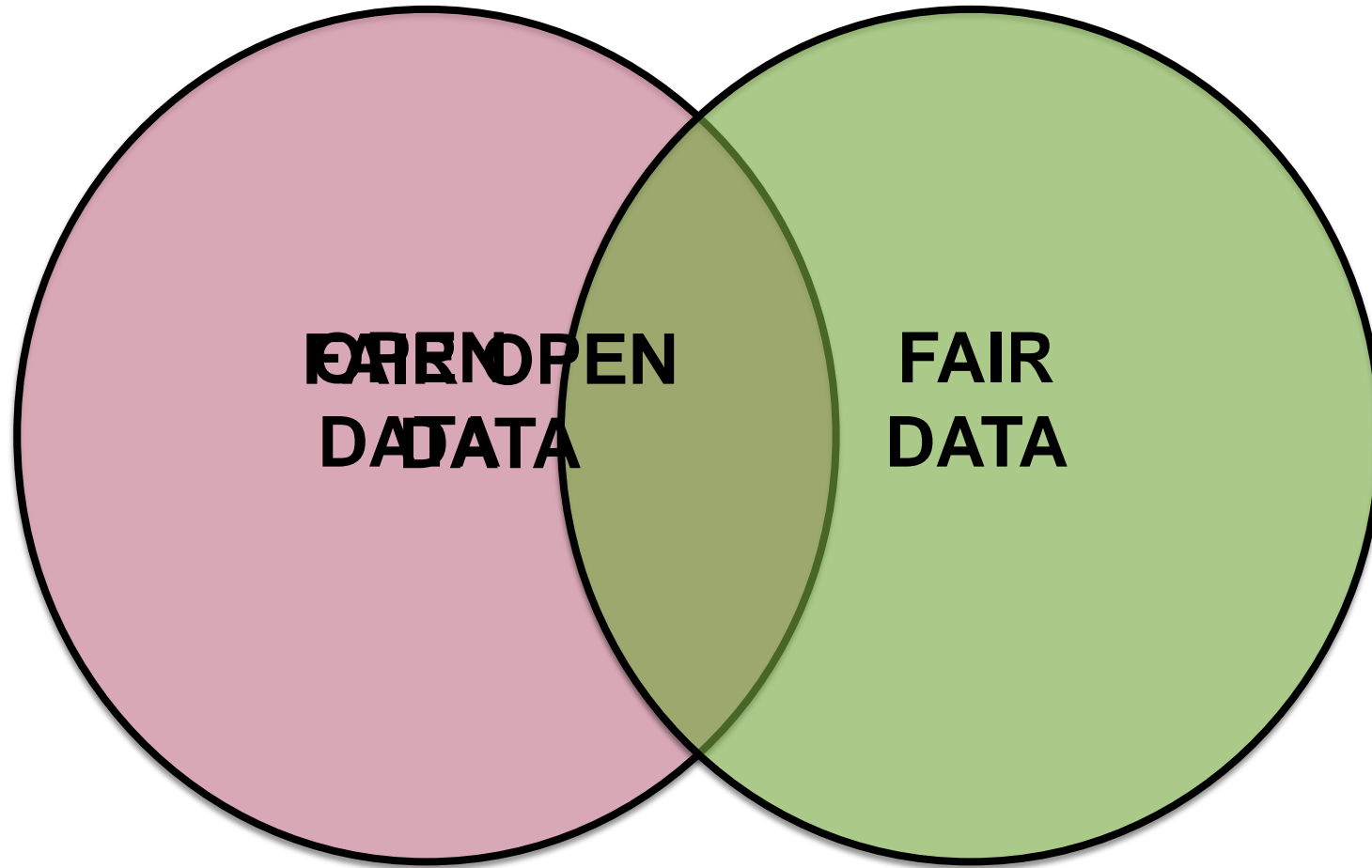




PLAN-S

“After 1 January 2020 scientific publications on the results from research funded by public grants provided by national and European research councils and funding bodies, must be published in compliant Open Access Journals or on compliant Open Access Platforms.”

OPEN DATA OR FAIR DATA



FAIR = Findable; Accessible; Interoperable; Reusable

FAIR DATA PRINCIPLES

To be Findable:

- F1. (meta)data are assigned a globally unique and persistent identifier
- F2. data are described with rich metadata (defined by R1 below)
- F3. metadata clearly and explicitly include the identifier of the data it describes
- F4. (meta)data are registered or indexed in a **searchable** resource

To be Accessible:

- A1. (meta)data are retrievable by their identifier using a **standardized communications protocol**
 - A1.1 the protocol is open, free, and universally implementable
 - A1.2 the protocol allows for an authentication and authorization procedure, where necessary
- A2. metadata are accessible, even when the data are no longer available

To be Interoperable:

- I1. (meta)data use a **formal, accessible, shared**, and broadly applicable language for knowledge representation
- I2. (meta)data use vocabularies that follow FAIR principles
- I3. (meta)data include qualified references to other (meta)data

To be Reusable:

- R1. (meta)data are richly described with a plurality of accurate and relevant attributes
 - R1.1. (meta)data are released with a clear and accessible data usage license
 - R1.2. (meta)data are associated with detailed provenance
 - R1.3. (meta)data meet domain-relevant community standards

What FAIR is not ...

Cloudy, increasingly FAIR; revisiting the FAIR Data guiding principles for the European Open Science Cloud DOI: 10.3233/ISU-170824

FAIR is **not** a standard, it's a guiding principle

FAIR is **not** only 'Semantic Web'

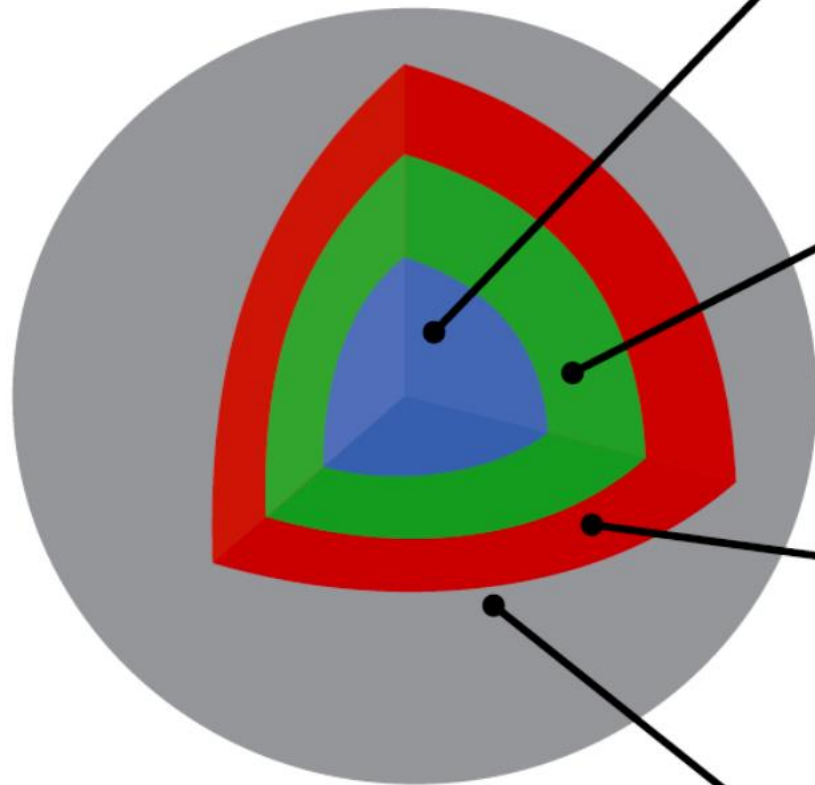
FAIR does **not** mean 'Open' or 'Free'

*Data are often Open but **not** FAIR*

*Data could be **non-Open** yet perfectly FAIR*

*Many data can **never** be Open*

FAIR principles do **not directly** prescribe data quality, trustworthiness, ethics or responsibilities.



DIGITAL OBJECT

Data, code and other research outputs

At its most basic level, data or code is a bitstream or binary sequence. For this to have meaning and to be FAIR, it needs to be represented in standard formats and be accompanied by Persistent Identifiers (PIDs), metadata and documentation. These layers of meaning enrich the object and enable reuse.

IDENTIFIERS

Persistent and unique (PIDs)

Digital Objects should be assigned a unique and persistent identifier such as a DOI or URN. This enables stable links to the object and supports citation and reuse to be tracked. Identifiers should also be applied to other related concepts such as the data authors (ORCIDs), projects (RAIDs), funders and associated research resources (RRIDs).

STANDARDS & CODE

Open, documented formats

Digital Objects should be represented in common and ideally open file formats. This enables others to reuse them as the format is in widespread use and software is available to read the files. Open and well-documented formats are easier to preserve. Data also need to be accompanied by the code used to process and analyse the data.

METADATA

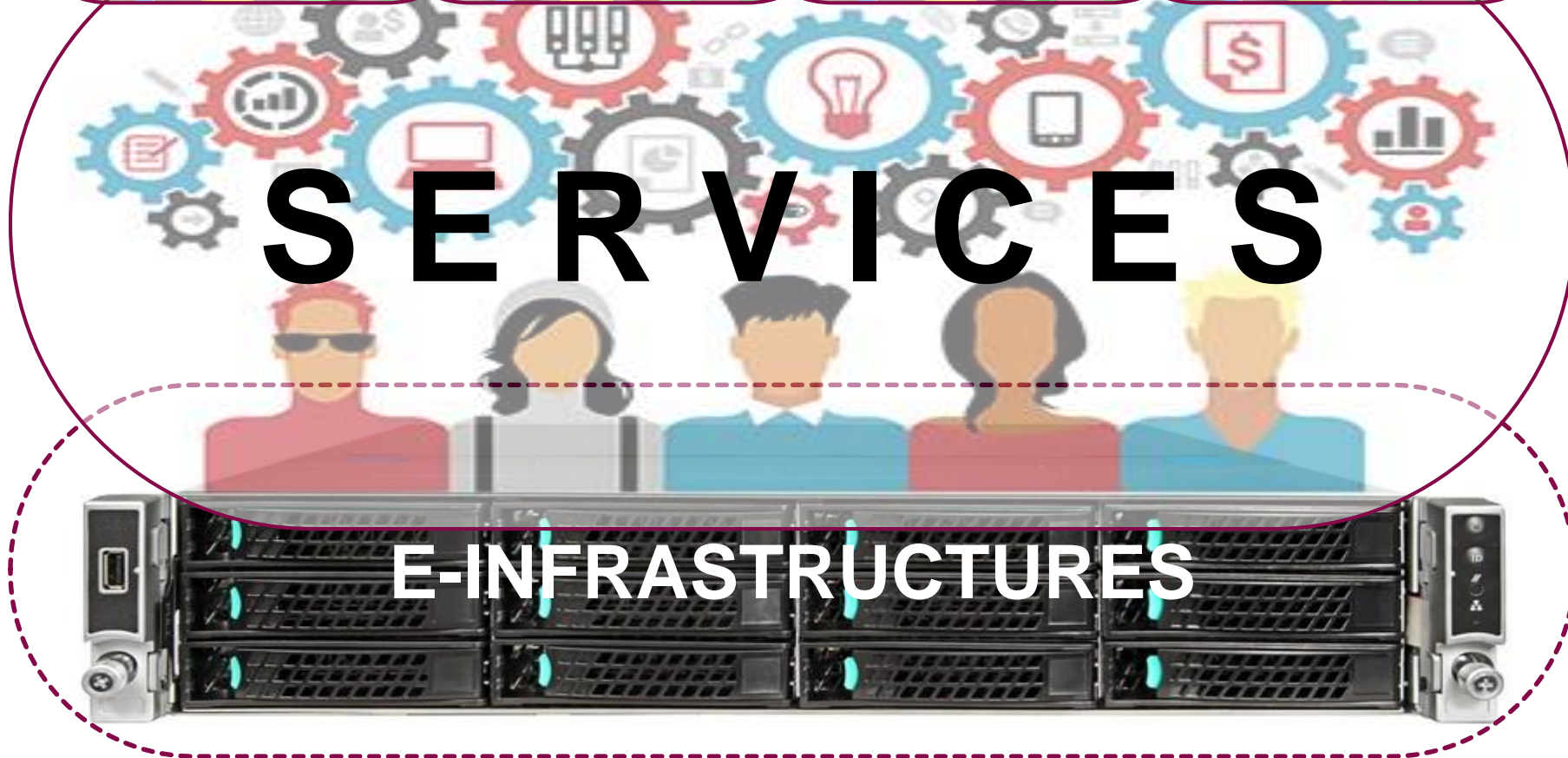
Contextual documentation

In order for Digital Objects to be assessable and reusable, they should be accompanied by sufficient metadata and documentation. Basic metadata will enable data discovery, but much richer information and provenance is required to understand how, why, when and by whom the objects were created. To enable the broadest reuse, they should be accompanied by a plurality of relevant attributes and a clear and accessible usage license.

Dutch aims for the phase till 2020



- **Open Access for basically all publications (including books).**
- **An agreed vision on the 'data-services-infrastructure'.**
- **Clarity if a support structure is wanted/needed for 'Citizen Science'.**
- **Open Science will be explicit in the appraisal of scientific staff (part of HR-policy) in Dutch research performing organisations; in the evaluation of research proposals by funders; and in the evaluation criteria used by research evaluation committees in higher education.**
- **Researchers will be stimulated and supported to work on/with Open Science.**





Landelijk Coördinatiepunt
Research Data Management



NEDERLANDSE FEDERATIE VAN
UNIVERSITAIR MEDISCHE CENTRA

netherlands



FAIR



VSNU

eScience center

DANS

SURF



4TU. CENTRE FOR
RESEARCH DATA

National Data Services Infrastructure

Coordination team ~ 40 'data stewards'

**Countrywide expert network
~ 400 institutional 'data stewards'**

**e-Infrastructure and e-science experts at
SURF, NLeSC, DANS plus institutional
ICT/data centres**



**MS domein
(Health-RI)**

NL Data Services Infrastructuur MS

- Coordinating national Health-RI team
~ 10 'data-stewards' (BBMRI/ELIXIR)
- Network of 'data stewards' in institutes & infrastructures
- Web of (FAIR) health/biomedische data collecties

**e-infrastructure and e-science experts at
SURF, NLeSC, DANS plus institutional
ICT/data centres**



SSH domein

NL Data Services Infrastructuur SSH

- Coordinating national team
~ 10 'data-stewards' (CLARIAH/ODISSEI, ...)
- Network of 'data stewards' in institutes & infrastructures
- Web of (FAIR) data collections in SSH domain

**e-infrastructure and e-science experts at
SURF, NLeSC, DANS plus institutional
ICT/data centres**

The EOSC is projected to become a reality by 2020 and will be Europe's virtual environment for all researchers to store, manage, analyse and re-use data for research, innovation and educational purposes.



Dutch relevant issues

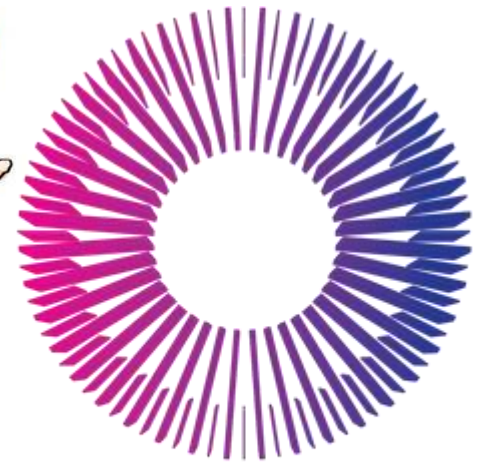
- **Open access support**
- **Data services infrastructure**
- **Data-stewards (curriculum; programmes)**
- **Step-up in effort ('shift gear')**
- **Financing the transition**

Confidence in the future of open science in the Netherlands

“Open science and open access become the norm in scientific research.”

Coalition Agreement

2017 - 2021



nationaal platform
open science



BACK-UP