# DING DIGITAL
# RKFORCE CAPACITY
# LS FOR DATA-INTEN
# NCE

Dr Michelle Barker
OECD Global Science Forum Expert Group Cha
Director, Research Software Alliance

OECD
BETTER POLICIES FOR BETTER LIVES

# Building Digital Workforce Capacity

Goal: Make recommendations to policy makers on how to facilitate the digital workforce capacity needed for data-intensive science, based on analysis of best practice

Contents:

1. What is known about the digital workforce needs for data-intensive science?
2. Five focus areas
3. Recommendations for actors incl. universities

# Digital workforce capacity & COVID19

- Importance of digital skills highlighted
- Shared access to open data, software and code is critical to COVID-19 responses
- But not yet commonplace enough to respond to emergencies
- Not enough digital skills in research sector to have created and maintain this
- Need long-term support for this area to be ready for next emergency

# Need for a digitally skilled workforce

European Union: cost of not having FAIR research data is **EUR 10.2 billion a year** in Europe alone


How much upskilling is needed?

- 1 digital support professional: 20 researchers?

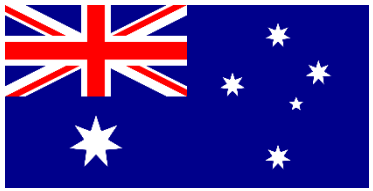
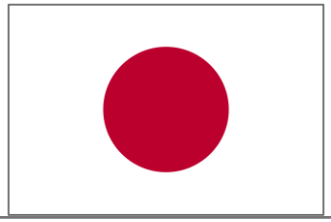
What exists:

US R1 universities: 2 data librarians per university

Australian universities:

  - 1 research data management advisor: 65 researchers
  - 1 software engineering advisor: 100 researchers

# The need for a digital skilled workforce for science

| | |
|---|---|
|  | • More than 90% of researchers acknowledged software as being important for their own research.<br>• 70% of researchers said that their research would not be possible without software. |
|  | • More than 60% of researchers “Greatest need was additional training.” |
|  | • 41% of staff in research libraries were not familiar with data management planning. |

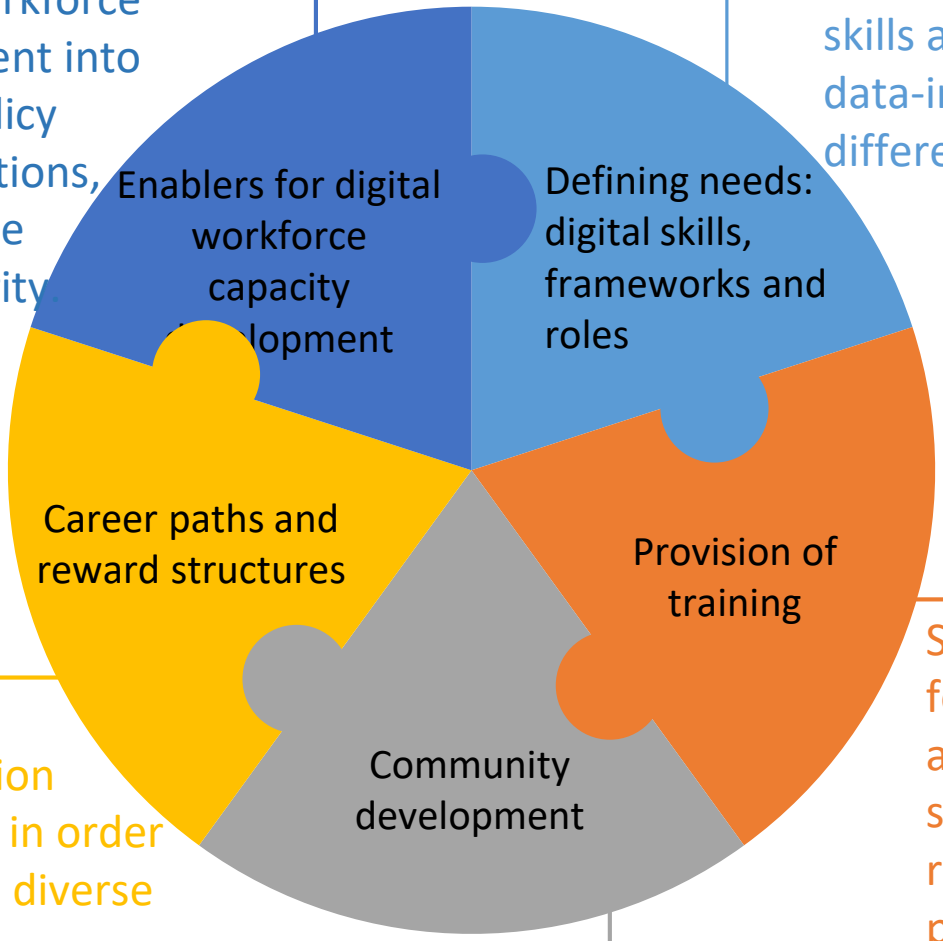
# In-depth case studies

| | | | | |
|---|---|---|---|---|
| National | The Alan Turing Institute | CIFAR CANADIAN INSTITUTE FOR ADVANCED RESEARCH | JPCOAR オープンアクセスリポジトリ推進協会 | |
| | ARDC Australian Research Data Commons | | Software Sustainability Institute | |
| International | THE CARPENTRIES | RDA RESEARCH DATA ALLIANCE | elixir | RSE RESEARCH SOFTWARE ENGINEERS ASSOCIATION |
| University /multi-university | Academic Data Science Alliance | TU Delft Delft University of Technology | | |
| Discipline | gesis Leibniz-Institut für Sozialwissenschaften | MILLENNIUM INSTITUTE OF ASTROPHYSICS | | |

# What is needed = 5 focus areas

Integrate digital workforce capacity development into broader science policy frameworks and actions, e.g. for open science and research integrity.

Identify the key competencies, skills and roles required for data-intensive science in different contexts.

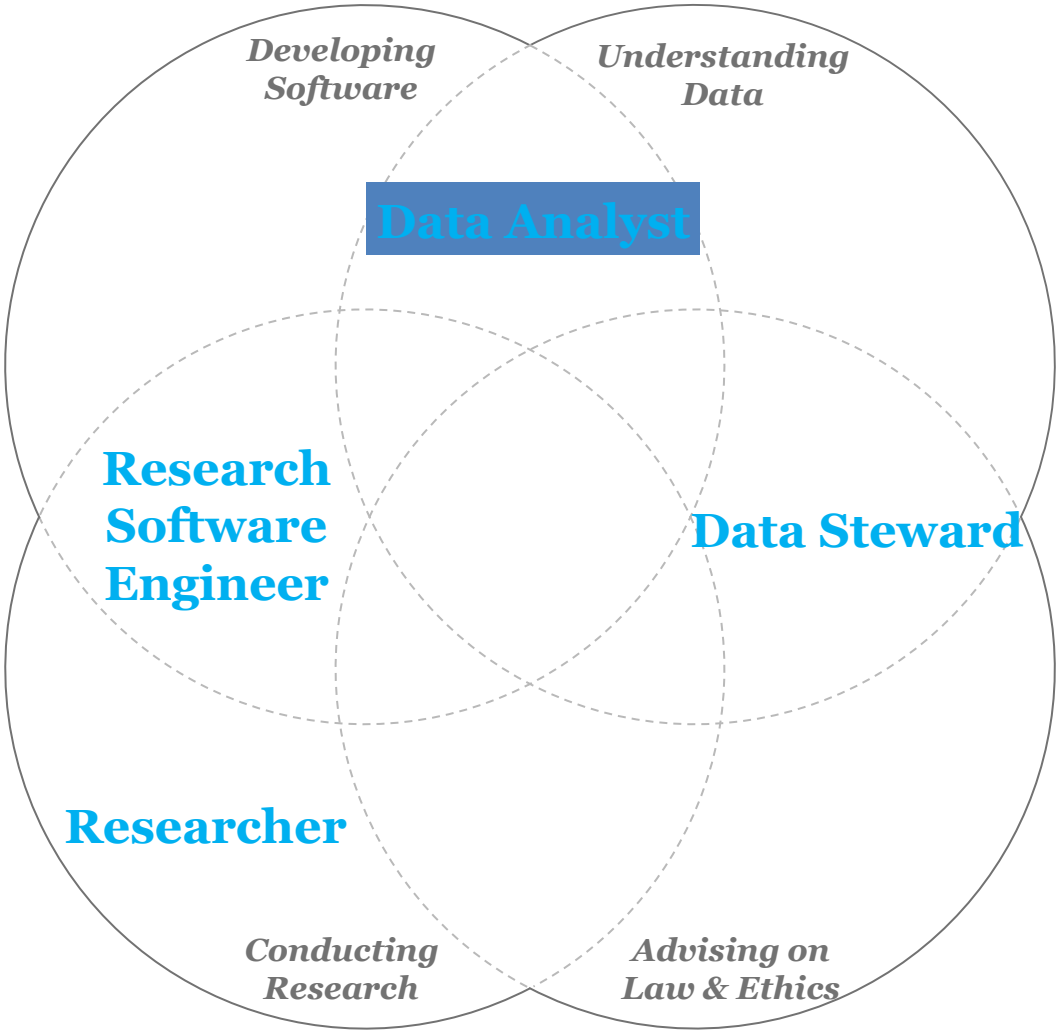



Implement changes in academic evaluation and reward systems in order to attract and retain diverse digitally skilled staff.

Support training in foundational digital skills and more specialized skills for scientists and research support professionals.

Support development of communities for new professional roles, learners and trainers.

# 1. Digital skills, frameworks & roles



# 2. Provision of training

## Training

- Not enough trainers to meet demand.

## Scaling up

- Scaling up training is challenging.
- Most of the cases rely on un-certified trainers and volunteer workforces.

## Diversity

- Inequalities persist.

## Private sector's role

- Commercial initiatives play an important part of the overall ecosystem

# 3. Community building

## Challenges

Communities are essential for knowledge transfer, mutual learning, enabling collaborative development

- Trainers
- Data stewards and librarians
- Research software engineers
- Digital science leaders

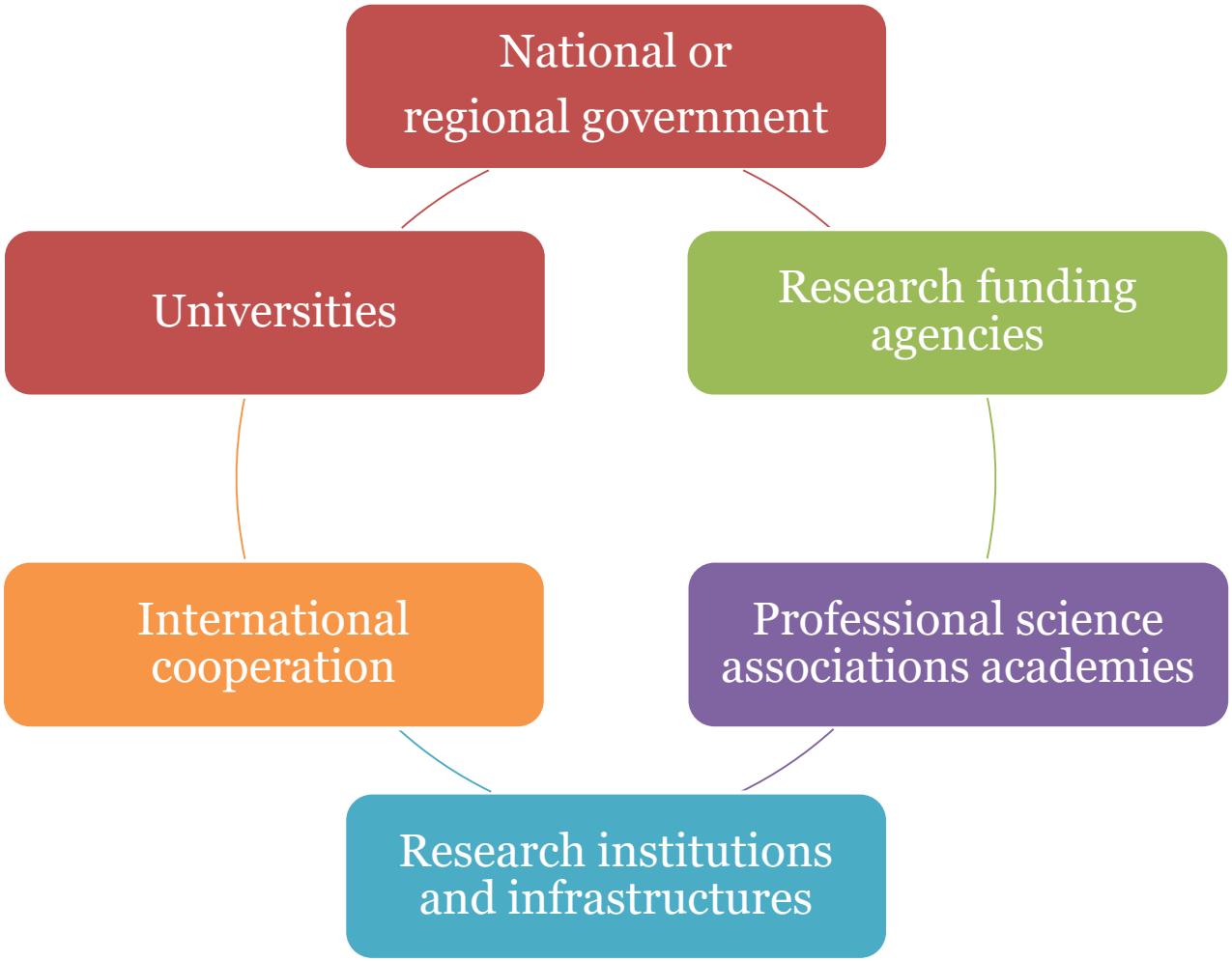
The Carpentries

https://galaxyproject.eu/posts/2018/06/06/carpentry-con/

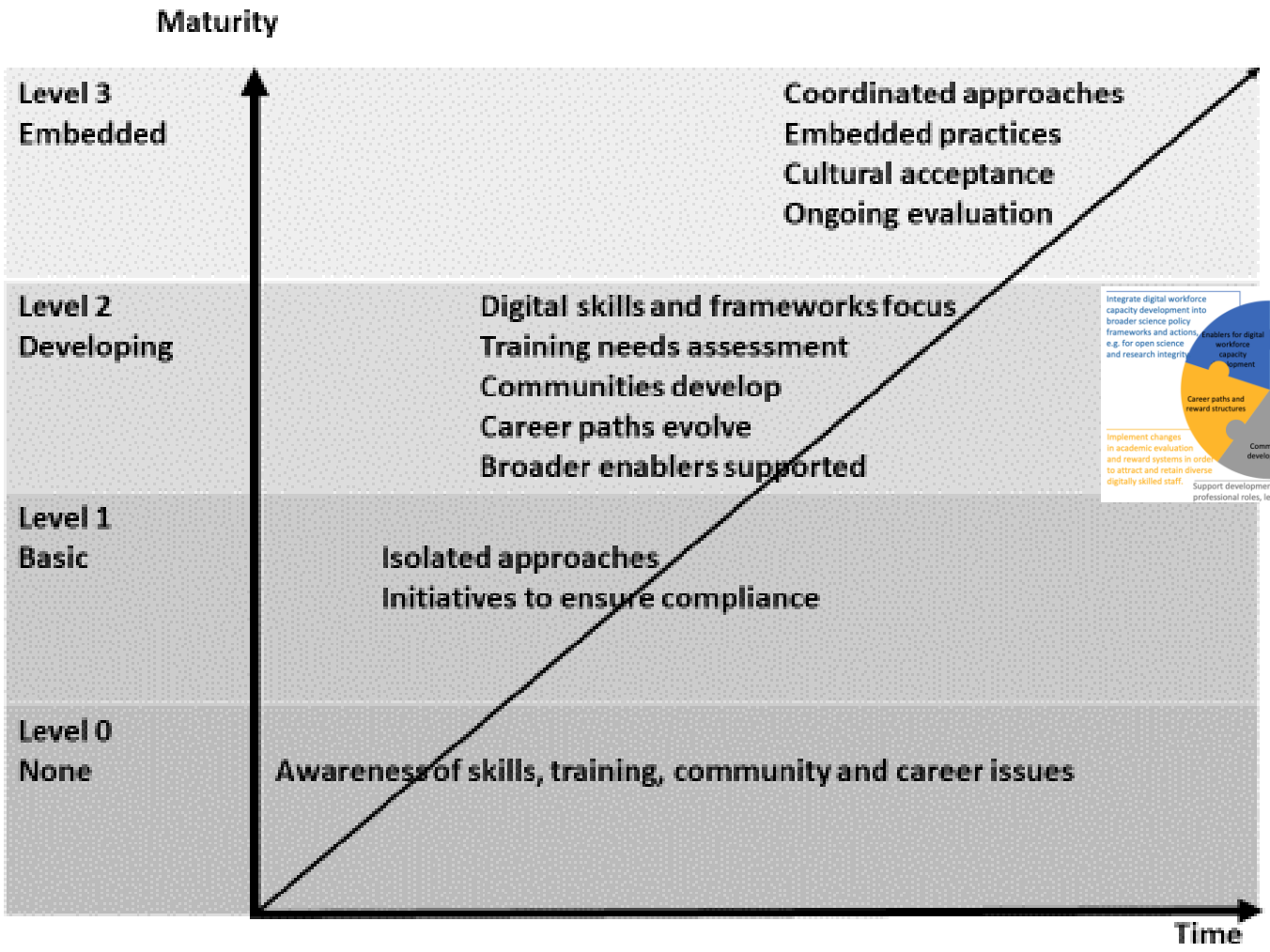
# 4. Career paths & reward structures

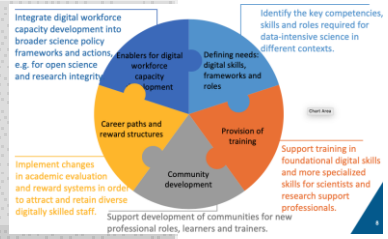
| | Challenges | Actions |
|---|---|---|
| **Career paths** | • Long-term career pathways for professional support staff (data stewards, RSEs) is unclear.<br>• Librarians, archivists and curators play new roles who coordinate and manage digital assets. | • Recognise the value of each skill set and providing progression opportunities.<br>• Establish long-term career pathway. (E.g., TU Delft) |
| **Reward structures** | • Lack of strong incentive for researchers and research support professionals who acquire and apply digital skills.<br>• Difficulty of human resource movement between industry and academia. | • Exchange schemes and joint appointments between academia and industry. (E.g., CIFAR)<br>• Recognise data and software as valuable outputs and assets for science. (E.g., ELIXIR) |

# Recommendations for various actors



# Digital workforce capacity maturity model



# National or regional governments

## Recognise

- The need for a digitally skilled workforce in research across all 5 areas

## Actions

- Analyse national needs and responses, including international and disciplinary initiatives developments, to understand leveraging opportunities
- Support workforce development across all 5 areas

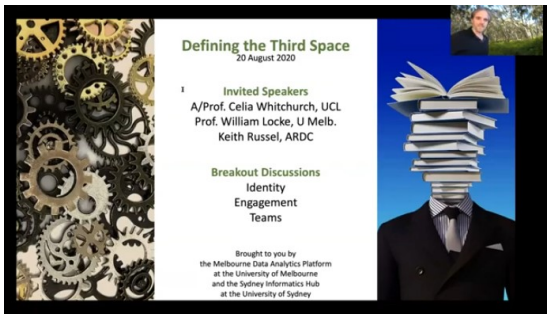
# Universities

## Connected with universities and national and international networks.

- Provide training to researchers and research support staff
- Develop new career paths with appropriate evaluation and reward mechanisms

## International cooperation

- Engage in international collaboration
- Share training materials and experiences



# Community initiatives

Society of Research Software Engineering

THE CARPENTRIES

RESEARCH DATA ALLIANCE

**Professionalising Data Stewardship IG**

FAIR Principles Implementation Networks News Events Resources About GO FAIR

**Data Stewardship Competence Centers (DSCC)**

# National initiatives

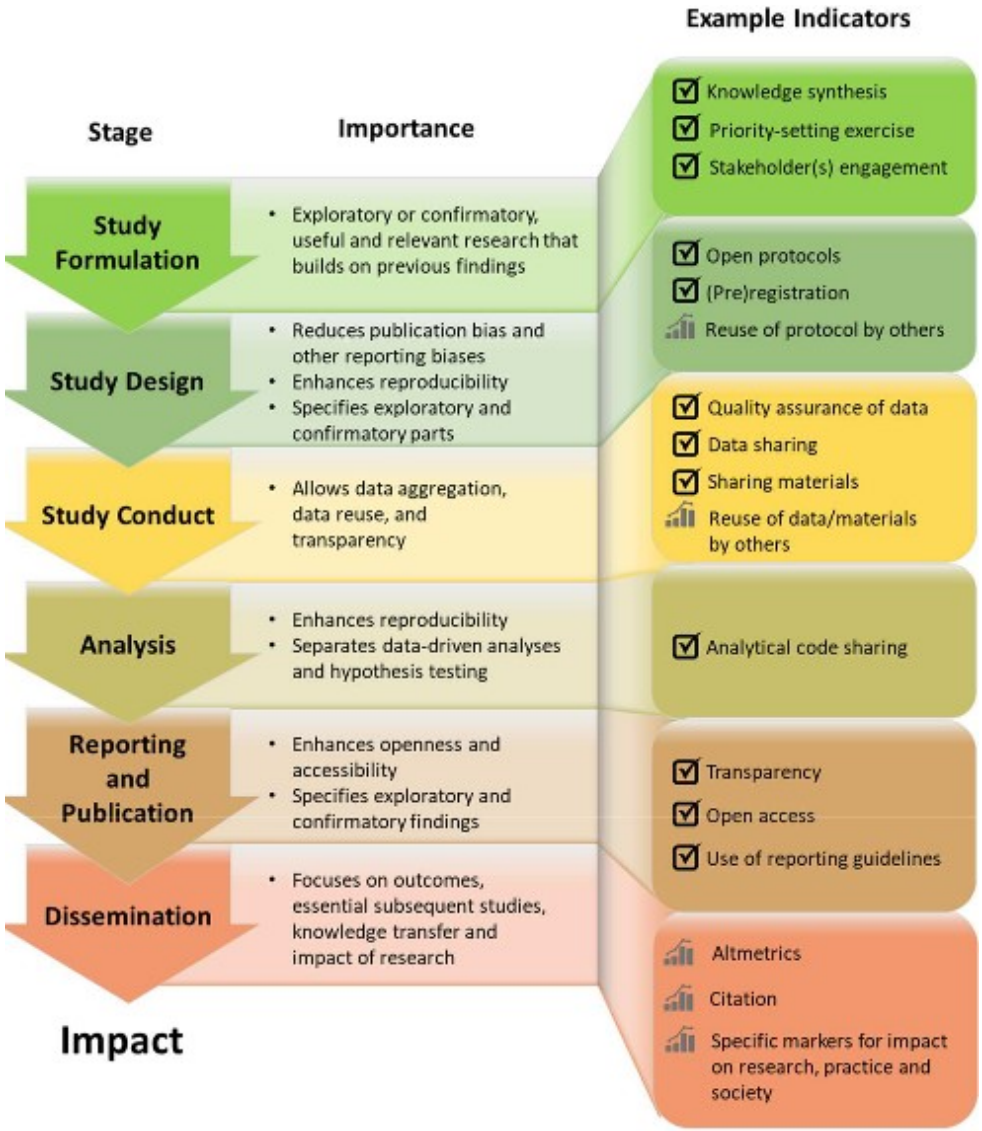
Netherlands: Room for everyone's talent

US: NSF grant proposal guidelines (2013): Biosketch can include products

UK: The Hidden REF (Research Excellence Framework) recognises all research outputs and every role that makes research possible.

Latin America: FOLEC (Latin American Forum for Research Assessment)

# Policy instruments




- San Francisco Declaration on Research Assessment (DORA) recognises the need to improve the ways in which outputs of scholarly research are evaluated.
- Sorbonne Declaration on Research Data Rights emphasises the development of appropriate recognition for researchers who make their data FAIR and share it with appropriate open data licenses.
- Hong Kong Principles for assessing researchers researchers are explicitly recognised and rewarded for behaviors that strengthen research integrity (Including quality assurance of data and data sharing).

# International initiatives

•Open Science Registry (EU-OSPP) will provide a global registry of pilots and implementations to inspire best practices and new assessment mechanisms for Open Science [upcoming event at RDA].

**opensciencеregistry.org/**

Creating the Open Science Registry on rewards and incentives - 12 Nov, RDA Plenary

•European Open Science Cloud Working Group: Skills and Training

•Knowledge Exchange Openness Profile is working towards a possible solution of the lack of incentivising mechanisms & research evaluation practices for open scholarship contributions.


Open Scholarship

31 January 2020

Openness Profile: Defining the Concepts

**Purpose:** Report: 10.5281/zenodo.3607579

**File type:** PDF

Download

# …. open science is the new normal

**How can you organisation move towards this goal?**