Landscape of Open Science in Japan

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What is Open Science?

- Open Science is a new method of science.
  - Reinvent the framework of science
  - Enable new discoveries and innovations
- But not a "magic wand"
  - Not to replace the "traditional" method
- Nevertheless, expectations are high
  - Societal challenges require multi-disciplinary approach and commitment from entire society
- Could contribute to the research integrity
- Digital technology is one of the key drivers

Talk Plan

Part 1: Missing piece; how to promote researcher engagement?

Part 2: Landscape of Open Science policy in Japan

Part 1
Missing piece ;
## how to promote researcher engagement?

Current situation of Open Science

- **Policy** implementation is in progress
  - US Federal Agencies (OSTP memorandum (2013))
  - European countries (e.g., report by SPARC Europe)
  - EU FP program (Horizon 2020, Horizon Europe)
- **Infrastructures** have also being implemented
  - Data repository, DMP tool, data curation service, PID linking service, etc…
- Publishing industry is providing **key technology**
- However, **researcher**'s participation is not very high

Researchers are the "last missing piece"

Awareness is rising

- A survey results show that the data sharing practice is increasing

("Challenges and Opportunities for Data Sharing in Japan", 2019, Springer Nature)
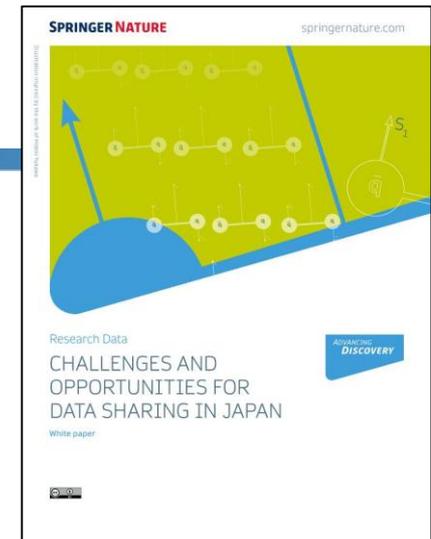
95% of Japanese researchers have shared their data (n=975)

Sharing data is important to the majority of Japanese researchers:

75%
of respondents rated the discoverability of their data as being somewhat important (score of 6 or above out of 10)

(n=1062)

The top two reasons why researchers would be motivated to share data are:

50% 'To progress research' in their field

42% For the transparency and re-use of data

(n=994)

Rational is diverse

- Recognition of value of data sharing depends on research culture or environment

("The State of Open Data 2017", 2017, Digital Science, figshare, in collaboration with Springer Nature and Wiley)

Figure - Motivations for sharing data
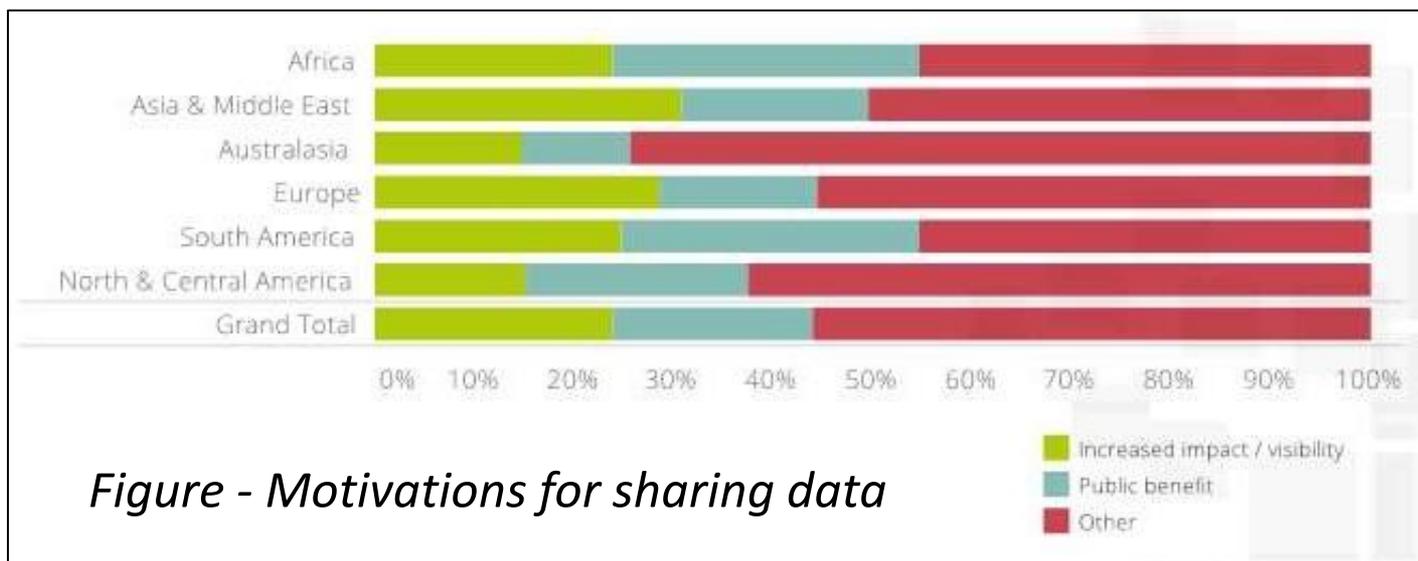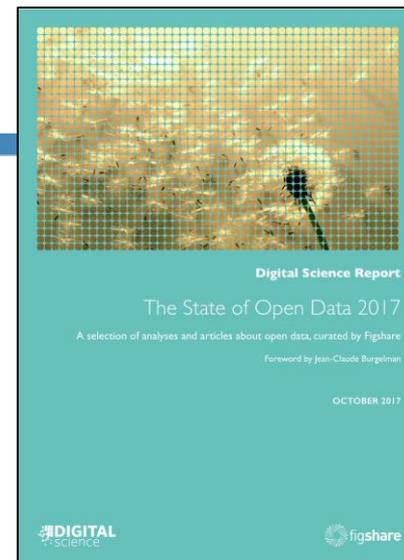
Open Science for academic researchers

- Sharing of knowledge
  - Research outputs (articles, data, etc.) are shared and used, and new knowledge is created as a result

- Sharing of research process
  - Research process is shared, new insights are brought in, new collaborations are triggered, and research is accelerated as a result

- Securing research integrity
  - "Proper treatment" of research process and output contributes to secure research integrity

There are many good reasons to participate

There are many reasons not to participate

Why should I give data to others for free? This is MY data. I've spend a lot of time and money for that.

I don't want my data to be used by others beyond my control. They could easily misinterpret my data and reach to wrong conclusion.

I need to keep my data closed until I publish a paper using the data.

Data needs careful curation before being shared and utilized. Who pays that?

Benefit, motivation, incentive….

- Researchers may participate when they recognize;
  - It benefits research activity and leads to better research output (e.g. writing another paper)
  - It helps to receive better evaluation (e.g. grant application, institutional evaluation)
  - It protects them from possible research misconduct.
- "One size doesn't fit all"
  - <u>Policymakers (including funders) need to discover an incentive system for researchers</u>
  - <u>And the system has large diversity depending on community, country or any (research) cultural background</u>

Incentive to "share"

External motivation

policy mandate

Internal motivation

incentive

Environment

infrastructure

Environment

community norm

Benefits

community reputation

Output

shared knowledge
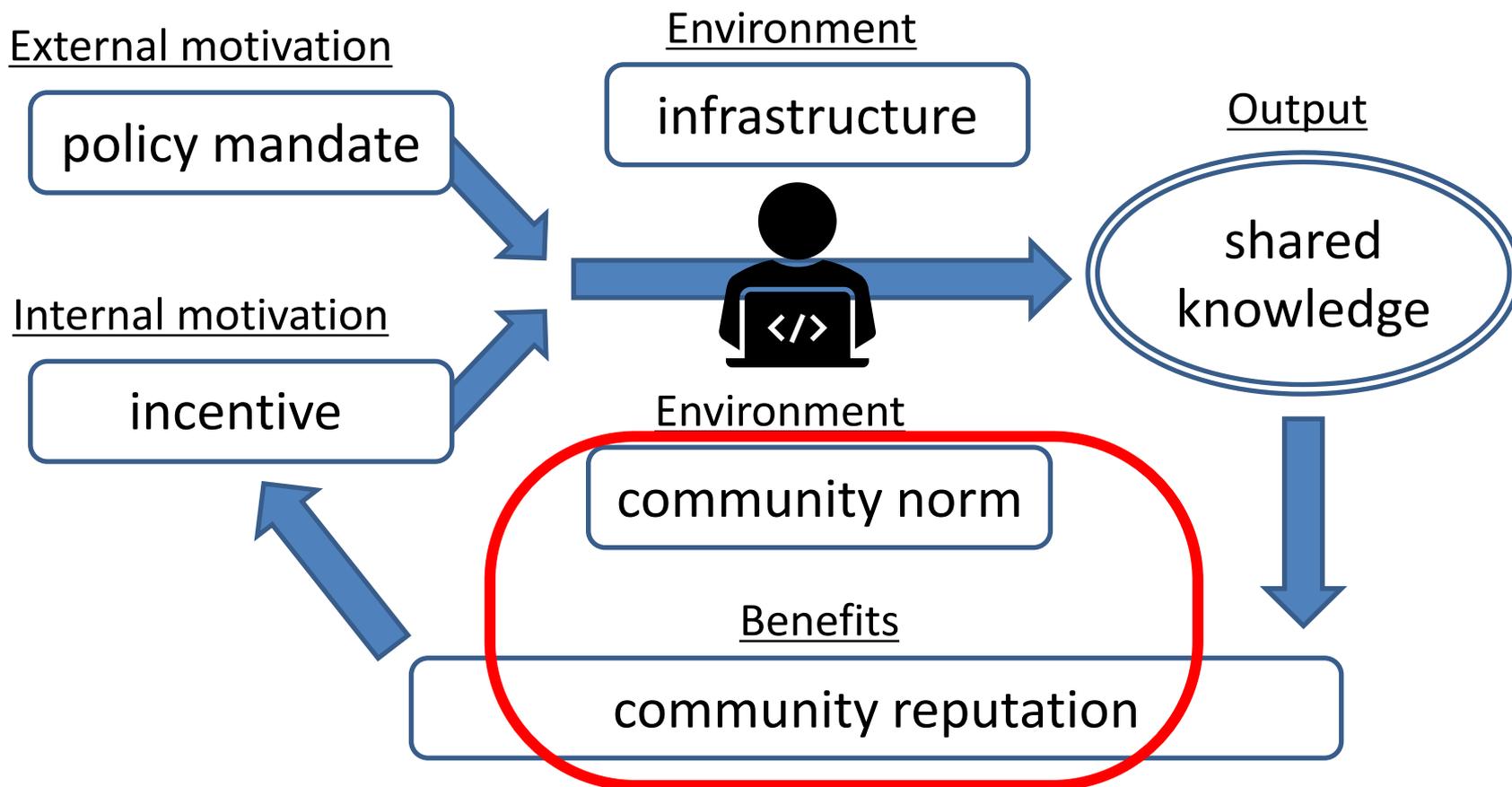
Possible incentive : community recognition of benefit of data sharing

Incentive to "use"

External motivation

evaluation criteria

Environment

infrastructure

Output

new knowledge

Internal motivation

better research

Environment

research practice

Benefits

research evaluation
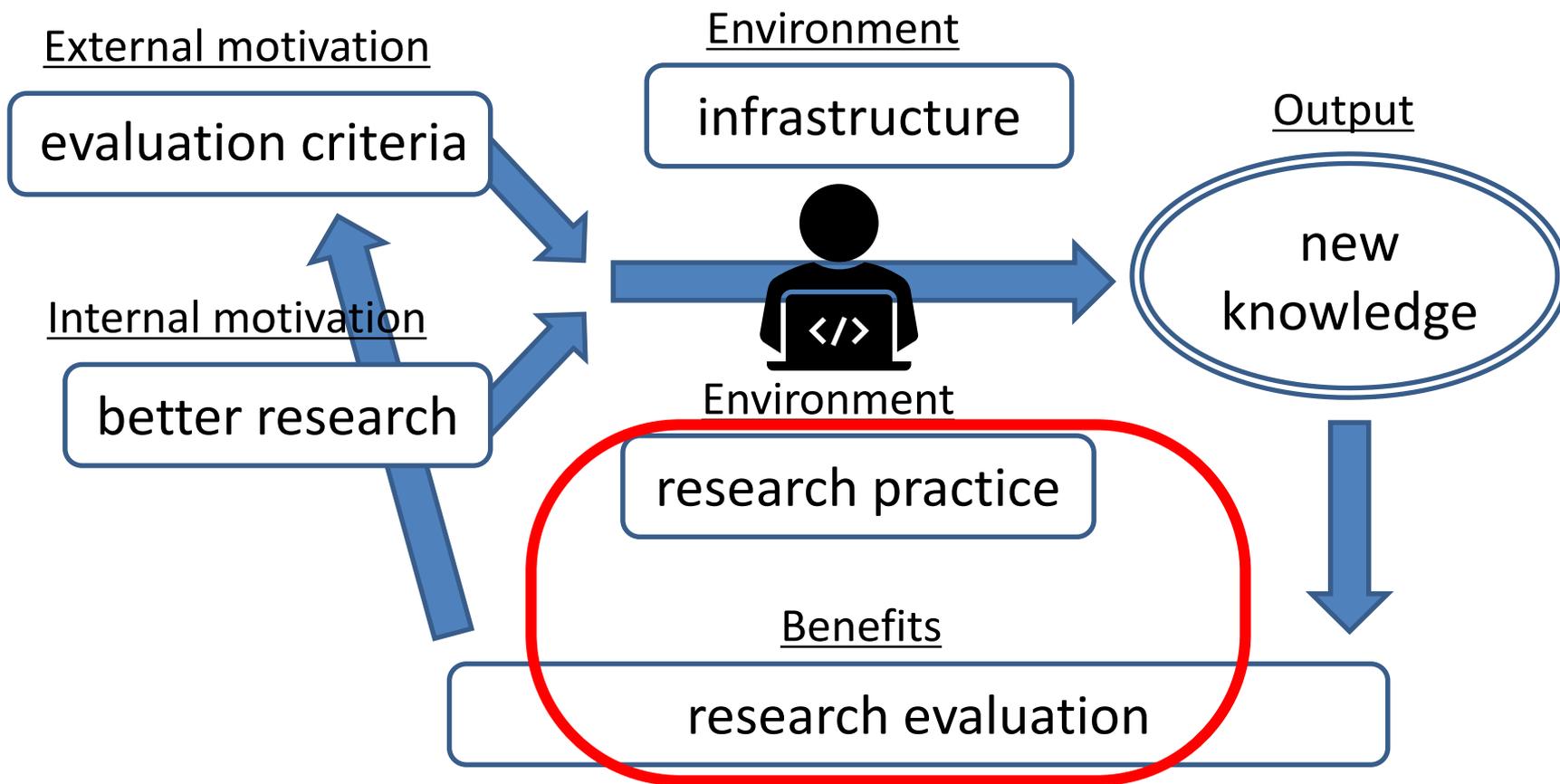
Possible incentive : better evaluation for new research output as a result of data use/reuse

How to create incentives? (funder's view)

- Key driver : "research evaluation" and "community reputation", based on the "community norm"

- Role of funders : to discover the community norm and to establish evaluation criteria based on it

- Role of publishers and digital solution providers : to enhance discoverability

- Open Science is not only about science, but is also about human behavior.

Short summary

- Promotion of Open Science has a potential to benefit all stakeholders involved in STI

- Implementation of policy and infrastructure has been carried out, while researcher's participation is still less visible or slow

- The motivation for participation must come from researcher's needs, and incentives must be discovered based on those needs

- One of the possible incentive is the evaluation or reputation they receive, and those must be aligned with community norms

Part 2
Landscape of Open Science policy in Japan

STI Administration System of Japan

Prime Minister

Cabinet Office

Council for Science, Technology and Innovation (CSTI)

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Ministry of Health, Labour and Welfare (MHLW)

Ministry of Agriculture, Forestry and Fisheries (MAFF)

Ministry of Economy, Trade and Industry (METI)

National Research and Development Agencies

- **JST*(Japan Science and Technology Agency)**
- AMED*(Japan Agency for Medical Research and Development)
- NIMS (National Institute for Materials Science)
- NIED(National Research Institute for Earth Science and Disaster Prevention)
- QST(National Institutes for Quantum and Radiological Science and Technology)
- RIKEN
- JAXA(Japan Aerospace Exploration Agency)
- JAMSTEC(Japan Agency for Marine-Earth Science and Technology)
- JAEA(Japan Atomic Energy Agency)

JSPS*(Japan Society for the Promotion of Science)

NEDO*(New Energy and Industrial Technology Development Organization)

(*funding agency)

Science and Technology Basic Plan

Science and Technology Basic Law (1995)

**The Science and Technology Basic Plan
(renewed in every 5 years)**

The 5th Basic Plan
(FY2016-2020)

The 4th Basic Plan Plan （FY2011-2015）

**The 2nd Basic Plan （FY2001～2005）
The 3rd Basic Plan （FY2006-2010）**

The 1st Basic Plan （FY1996-2000）

Total Budget:
17trillion JPY

Construction of new R&D system

Total budget:
2nd Plan: 24 trillion JPY
3rd Plan: 25 trillion JPY
Promotion of R&D on prioritized area

Total budget:
25 trillion JPY

Promotion of R&D to address societal and economical issues

Open Science in the 5th Basic Plan (2016-)

- Open Science is mentioned for the first time in the 5th Basic Plan

- In the plan, the Government of Japan will….

  – Establish a system for promotion of Open Science in collaboration with relevant stakeholders

  – Recognize that the utilization of research results from public funding should be maximized in principle

Open Science policy in Japan - footprints

Science and Technology Basic Plan (Cabinet)

2011 4th Plan - Promotion of Open Access

2016 5th Plan - Promotion of Open Science

2016   2017   2018 Integrated Innovation Strategy

Council for Science and Technology Innovation / Cabinet Office

2015 Discussion paper
- Promotion of Open Science

2018 Guideline for Data Management Policy Implementation at National Research Institutes

2019 Guideline for Data Repository

Ministry / Funding agency

2013 JST
– Open Access policy

2017 **JST – Open Science policy**
JSPS – Open Access policy
AMED – Data Management policy
METI – Data Management policy

Integrated Innovation Strategy 2018

- Strategic plan to implement the Basic Plan

- Renewed every year

- 2018 issue describes detailed implementation plan
  - "National data platform will be developed and made operational in 2020"
  - "All of 24 national research institutes will establish data management policy by 2020"
  - "All of 14 funding bodies (ministries and agencies) will establish data management policy by 2021"

Recent developments

- **Expert panel** on promotion of Open Science was established at the Cabinet Office in 2017

- Focus : **detailed implementation** of Open Science policy

- Output so far :
    - Guideline of data management policy planning at National Research and Development Agencies
    - Guideline of data repository

- On-going activity
    - Policy on national data infrastructure
   - National data policy

Japan Science and Technology Agency

Mission

JST, an advanced network-based research institute that promotes the state-of-the-art R&D projects, boldly leads the way for creation of innovation for tomorrow's world together with society.

Operations

Formulating visionary R&D strategies for co-creation of the future with society

Creating knowledge and transforming it into economic and social value

Promoting dialogue with society and cultivating human resources

Budgets

Others, **6%**

Formulating visionary R&D strategies for co-creation of the future with society, **1%**

114
Billion JPY
2018

Promoting dialogue with society and cultivating human resources, **6%**

Creating knowledge and transforming it into economic and social value, **87%**
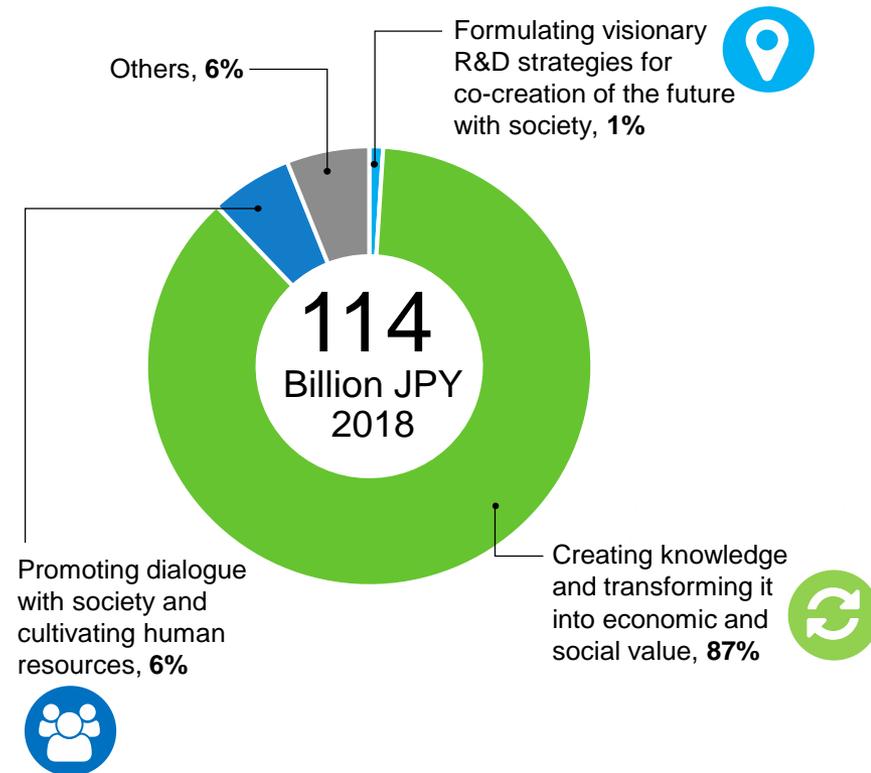
JST Policy on Open Science

JST Policy on Open Access to Research Publications and
Research Data Management　(April 1, 2017)

- Main contents
    - I. <u>Open Access to research publications</u>
        - →required to be made publicly available in principle
    - II. <u>Handling of research data</u>
        - Data Management Plan
            - → required to develop a data management plan defining how to manage research data, and to manage data accordingly
        - Access to research data
            - → recommended that underlying data should be made openly available

# Open Access – monitoring by CHORUS Dashboard
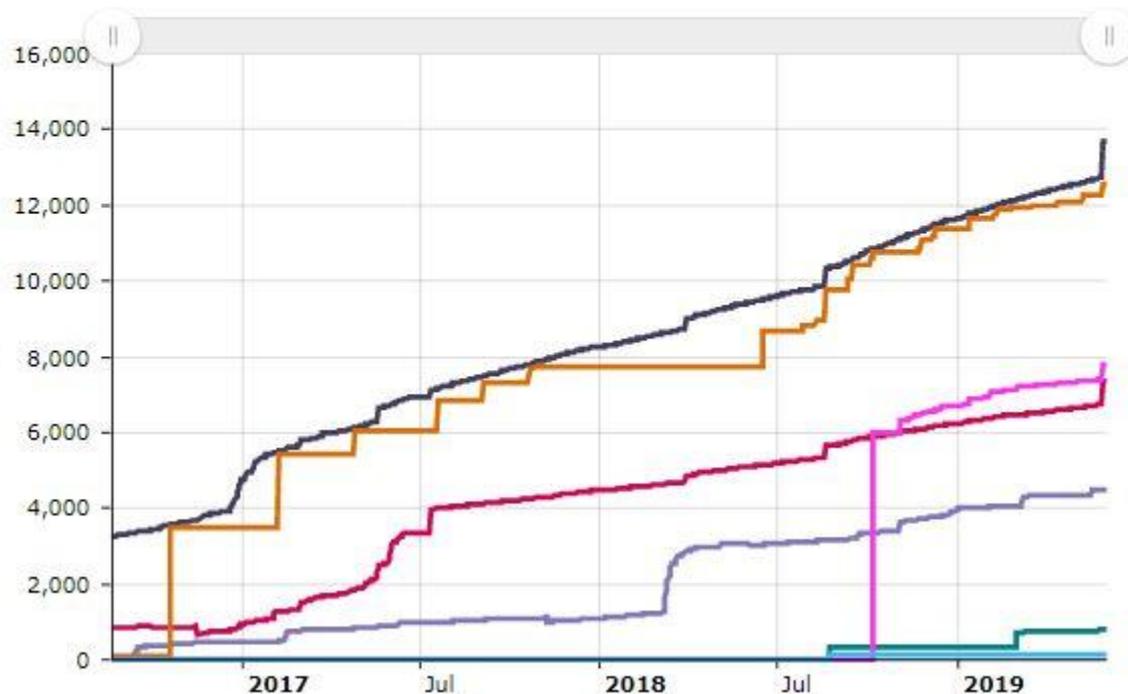
Open Access – monitoring by CHORUS Dashboard

Data Management Plan

Number of new projects with DMP submitted to JST
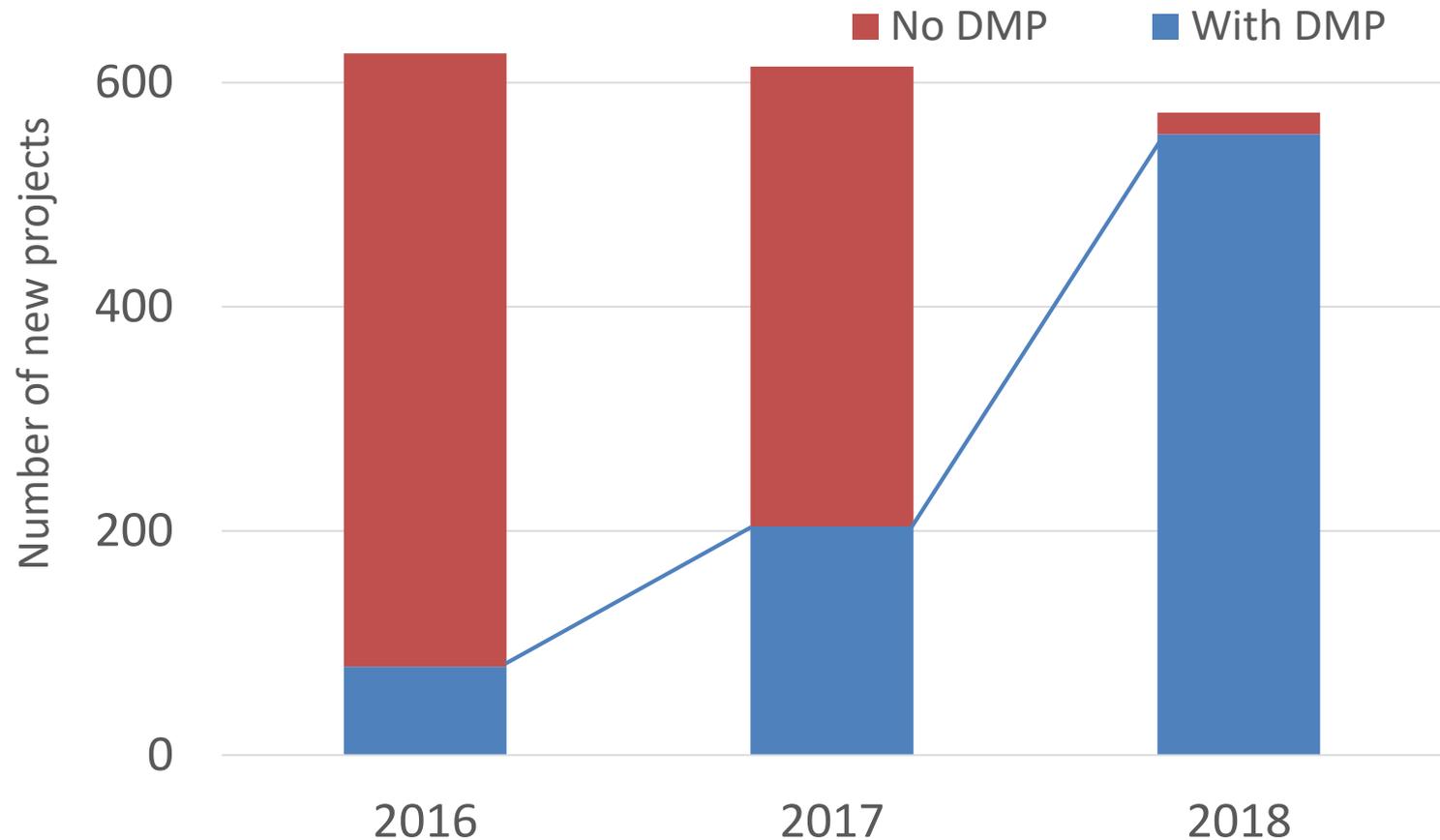
Future possible developments

- Open Access
  - Further promotion of OA
    - APC support grant
    - Automated injection of AM to open repositories
  - Identification of funded articles
    - Implementation of Grant ID to fully utilize publishing workflow (e.g. CHORUS)
- Data management and data sharing
  - Data management practice
    - Provision of technical and/or financial support
  - Data sharing practice
    - Guideline for "as open as possible, as closed as necessary"

Thank you for your kind attention.