



Open Science in Japan and Trials for Building an Open Research Information System at NISTEP

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The 133rd GIST Seminar The Barcelona Declaration: Building an Open Research Information System by Europe and Japan

Introduction

1. Open Science in Japan

- ✓ Policy:
- ✓ Data Platform:
- ✓ Monitoring Surveys:

2. Open Research Information System at NISTEP

- ✓ utilizing Open Data for EBPM
- ✓ Development of new survey research and data analysis methods

3. Summary (and one more thing)



Introduction

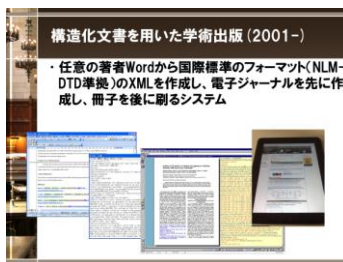
- Mosaic
- Amazon W3C
- Google
- Facebook
- Youtube
- Twitter
- LINE
- AlphaGo
- ChatGPT
- AGI

- 1990
- 1995
- 2000
- 2005
- 2010
- 2015
- 2020

Contribution

- Organic Syntheses
- **Digital Peer-Review Tracking System**
- Online journals
- **XML Publishing**
- DOI and CrossRef
- EJ-business
- **Open Access 2005**
- Advocacy for policy makers
- ORCID
- altmetrics
- RDA Tokyo 2016
- **G7 OSWG**
- OECD
- **Citizen Science**
- blockchain
- Virtual Learned Society

DX for journals with XML publishing



SGM, XML scholarly publishing

Advocacy for Science Council of Japan

日本学術会議
SCIENCE COUNCIL OF JAPAN



To Open Access and sharing Data



International Contribution For Open Science Policy



Blockchain taskforce for Chemistry



Japan Open Science Summit



DX for Learned Society

Re-Openness of Science (citizen science, virtual society, DeSci)

Theme

Digitalization of journals

DX for society and media

DX for research outputs focusing on Data and multidimensional Impacts



DX for PTA



Citizen Science (NHK)

DX for research and community



Decentralized Science blockchain



Scholarly communication on Metaverse

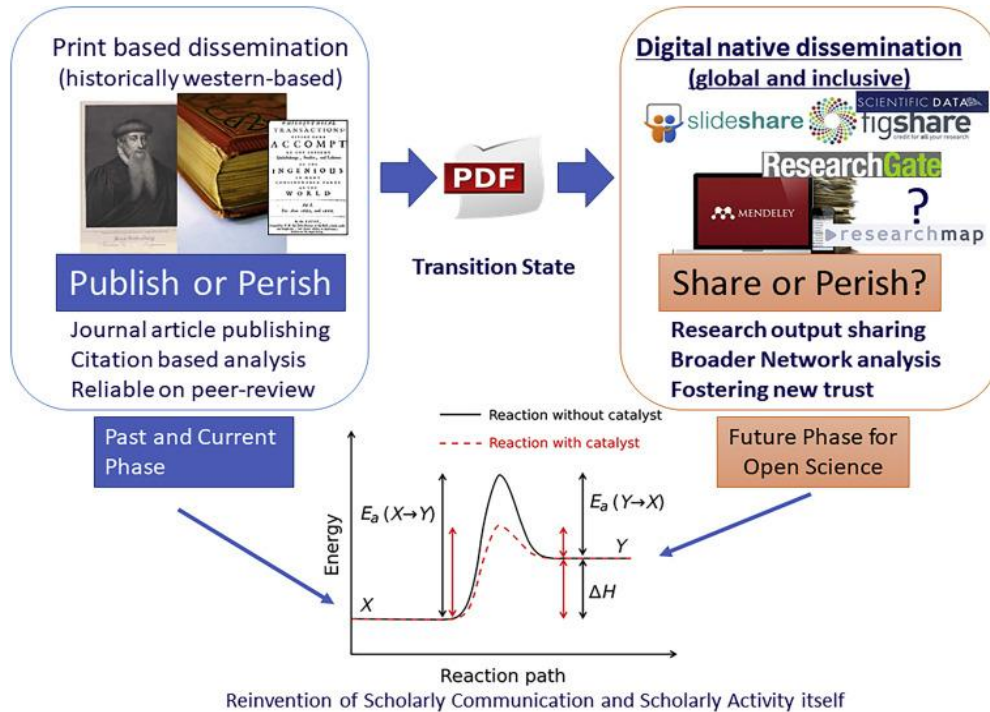
Wish to know how science and society would be changed eventually



TEDxKioicho



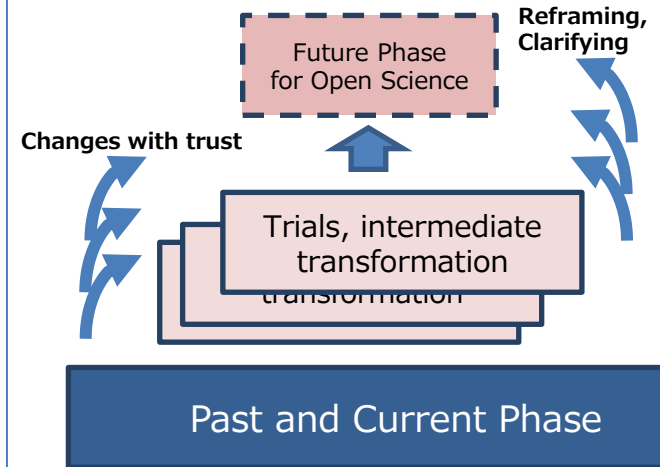
Phase Transfer



Additive Transformation

(in the early stage)

To ambiguous but promising phase



From established and reliable Phase

<https://doi.org/10.1016/j.patter.2020.100191>

Steady dialogue among stakeholders for **behavior changes** (with exploiting AI and other technologies on the other hand)

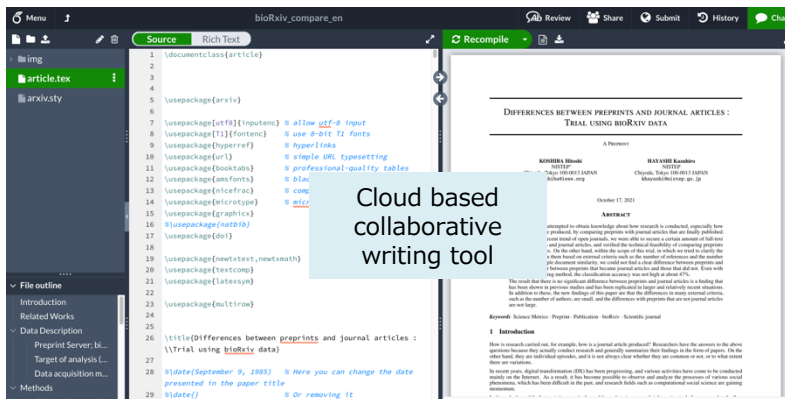
- 2013 Mark Hahnel (figshare)
- 2013 Jason Priem (ImpactStory)
- 2013 Timo Hannay (Digital Science)
- 2017 Laurel Haak (ORCID)
- 2018 Rebecca Thomas (F1000 Research)
- 2019 Shelley Stall (AGU)
- 2019 Hilary Hanahoe (RDA)
- 2023 Reslie Macintosh (Ripeta)
- 2023 John Willinsky (PKP)
- 2023 Daniel Hook (Digital Science)



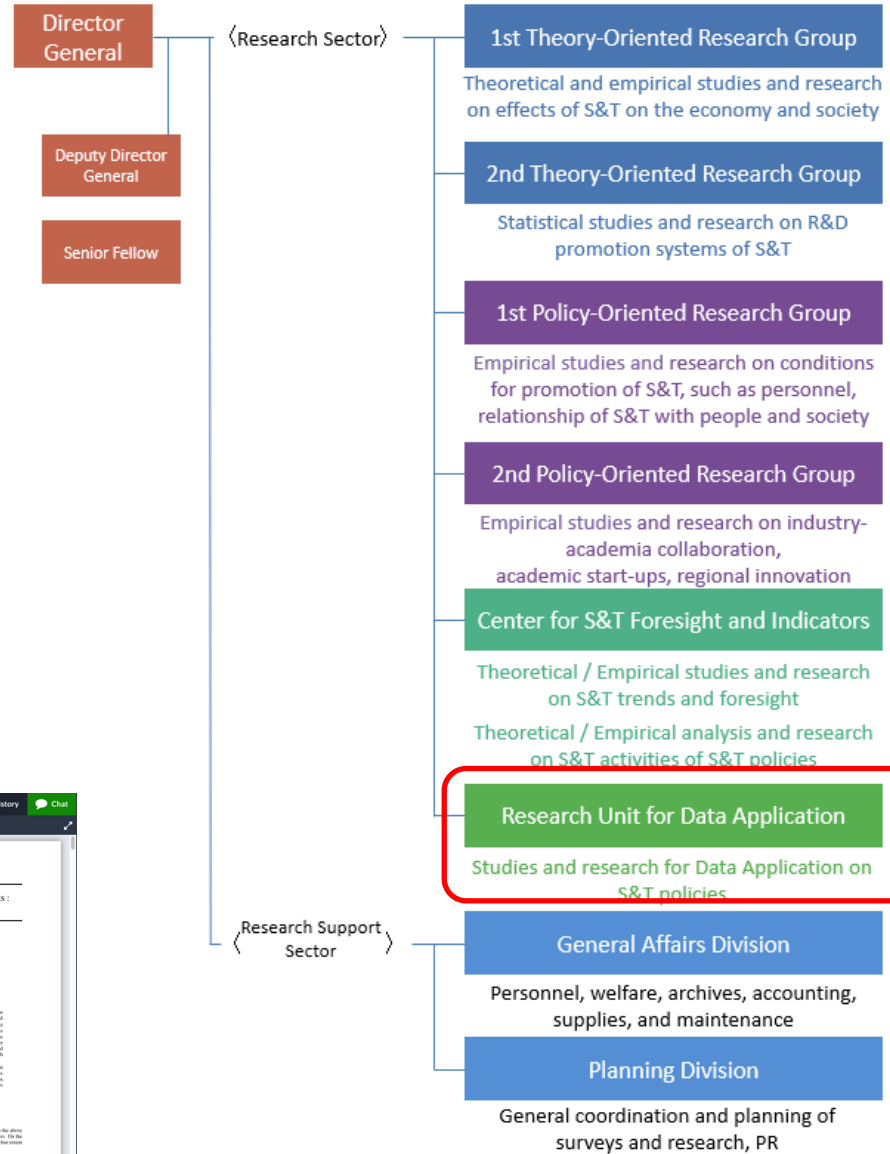
(2021.4)

Brand new unit for DX

- ◆ Launched on April, 2021
- ◆ Light-weight
 - Director 1, researcher (data scientist) 1, other staffs 2
 - ▶ Affiliated Fellow 10 as virtual staffs
- ◆ Online friendly since before COVID-19



Cloud based collaborative writing tool



■ Mission

- ◆ Surveys and research that capture new research trends focusing on Open Science and AI
 - **Leading Open Science Policy and its monitoring**
 - **Development of new survey research and data analysis methods based on Data Science, AI-related technology**
 - Building a space for dialogue that promotes the transformation of science, society, and science and society oriented by open science
- ◆ DX for NISTEP
 - Support other research Groups and Units to exploit the potential of Data Science, AI and Open Science



1. Open Science in Japan: Policy, Data Platform, Monitor

G7 Research Compact

G7 Research Compact

As Open Societies with democratic values we believe in academic freedom. The freedom to pursue intellectual enquiry and to innovate allows us to make progress on shared issues and drive forward the frontiers of knowledge and discovery for the benefit of the entire world. We recognise that research and innovation are fundamentally global endeavours. Nations, citizens, institutions, and businesses have made huge strides forward, not otherwise possible, through open research collaboration across borders. Working together we will use our position as leading science nations to collaborate on global challenges, increase the transparency and integrity of research, and facilitate data free flow with trust to drive innovation and advance knowledge.

Shared Values

The global response to COVID-19 has demonstrated the progress that arises from long-term collaboration which puts science at the heart of prevention, preparedness, response, recovery and resilience. This progress requires sustained investment in research and supporting infrastructure, including in basic research and high-risk, high-reward undertakings. As our nations and communities start to recover from the pandemic and build resilience for future shocks, we will continue to work with our research and business communities to remove barriers to the open and rapid sharing of knowledge, data and tools, to the greatest extent possible, recognising the importance of research security in particular in cutting-edge fields, and to promote open science and increase open, safe and transparent dissemination of science to citizens, and to strive to minimise technology-related risk.

We can only tackle the greatest challenges that we face and will face over coming decades – such as climate change, pandemics and biodiversity loss – through transparent, open and agile research collaboration. We must bring the widest possible range of resources, expertise and perspectives to bear on solutions which will benefit people across the globe.

We commit to promoting international research cooperation and the conditions of freedom, independence, openness, reciprocity and transparency under which it flourishes. Our governments have the right and responsibility to effectively ensure the security and integrity of the research ecosystem, in partnership with the research community, preventing the theft, misuse and inappropriate exploitation of our intellectual property and personal data, and other forms of misconduct.

We are committed to developing a strong, diverse and resilient science and research community which is inclusive of all groups, as recognised by the Working Group on Financing Science for Inclusive Growth. It is important to deepen participation of underserved, underrepresented and marginalised communities and expand their participation in the research and innovation ecosystem. Inclusion will enhance the strength of our research base and increase momentum on dismantling the social, legal, and regulatory barriers limiting participation, and complementing our G7 gender equality goals by tackling gender gaps. Principles and practices of inclusive growth distribute the benefits of science among diverse communities and regions across the G7 and beyond.

Open Science WG

Supporting as an expert

UNESCO

UNESCO
IN BRIEF WHAT WE DO WHERE WE WORK PARTNERS JOIN US RESOURCES

Home > Open Science > UNESCO Recommendation on Open Science

Open Science

193 Countries

UNESCO Recommendation on Open Science

At the 40th session of UNESCO's General Conference, 193 Members States tasked the Organization with the development of an international standard-setting instrument on Open Science in the form of a UNESCO Recommendation on Open Science to be adopted by Member States in 2021.

support

support

ISC

(International Science Council)

International Science Council

Current

Open Science and the UNESCO initiative – opportunity to republish ISC statement

In this statement made by the ISC delegation to the UNESCO Special Committee meeting on Open Science, 5-12 May 2021, the delegation explores how the recommendation and potential cascading interventions by Member States could develop along two divergent pathways. ISC Members are invited to download the statement and republish on their websites and in their scientific journals.

UN

United Nations Dag Hammarskjöld Library

2nd Open Science Conference

FROM TACKLING THE PANDEMIC TO ADDRESSING CLIMATE CHANGE

Open Science Conference 2021

Recommendation of the OECD Council concerning Access to Research Data from Public Funding

On 20 January 2021, the OECD Council adopted a revised Council Recommendation on Access to Research Data from Public Funding. The legal instrument, in force since 2020, has been updated to address new technologies and policy developments, and provides policy guidance in seven areas shown in the figure below. In addition, the revised instrument also covers only research data, but also related algorithms, workflows, models, and software (including code), which are essential for their interpretation.

- Find out more in our blog: [Machine data for science: an open access to address global challenges](#)
- Policy brief: [Why open science is critical to combatting COVID-19](#)
- Analytical report: [Enhanced Access to Publicly Funded Data for Science: Technology and Innovation](#)
- Open Access Initiatives related to COVID-19
- OECD work on open science

OECD RECOMMENDATION CONCERNING ACCESS TO RESEARCH DATA FROM PUBLIC FUNDING

AREAS OF POLICY GUIDANCE

- 1/ Data governance for trust
- 2/ Technical standards and practices
- 3/ Incentives and rewards
- 4/ Responsibility, ownership and stewardship
- 5/ Sustainable infrastructures
- 6/ Human capital
- 7/ International co-operation for access to research data

EXPANDED SCOPE COVERS RESEARCH DATA, METADATA, ALGORITHMS, WORKFLOWS, MODELS, AND SOFTWARE (INCLUDING CODE)

OECD

- <https://www.mofa.go.jp/mofaj/files/100200013.pdf>
- <https://en.unesco.org/science-sustainable-future/open-science/recommendation>
- <https://council.science/current-news/open-science-and-the-unesco-initiative/>
- <https://www.un.org/en/library/OS21>
- <https://www.oecd.org/sti/recommendation-access-to-research-data-from-public-funding.htm>

Entering an era of Open Science as a Default

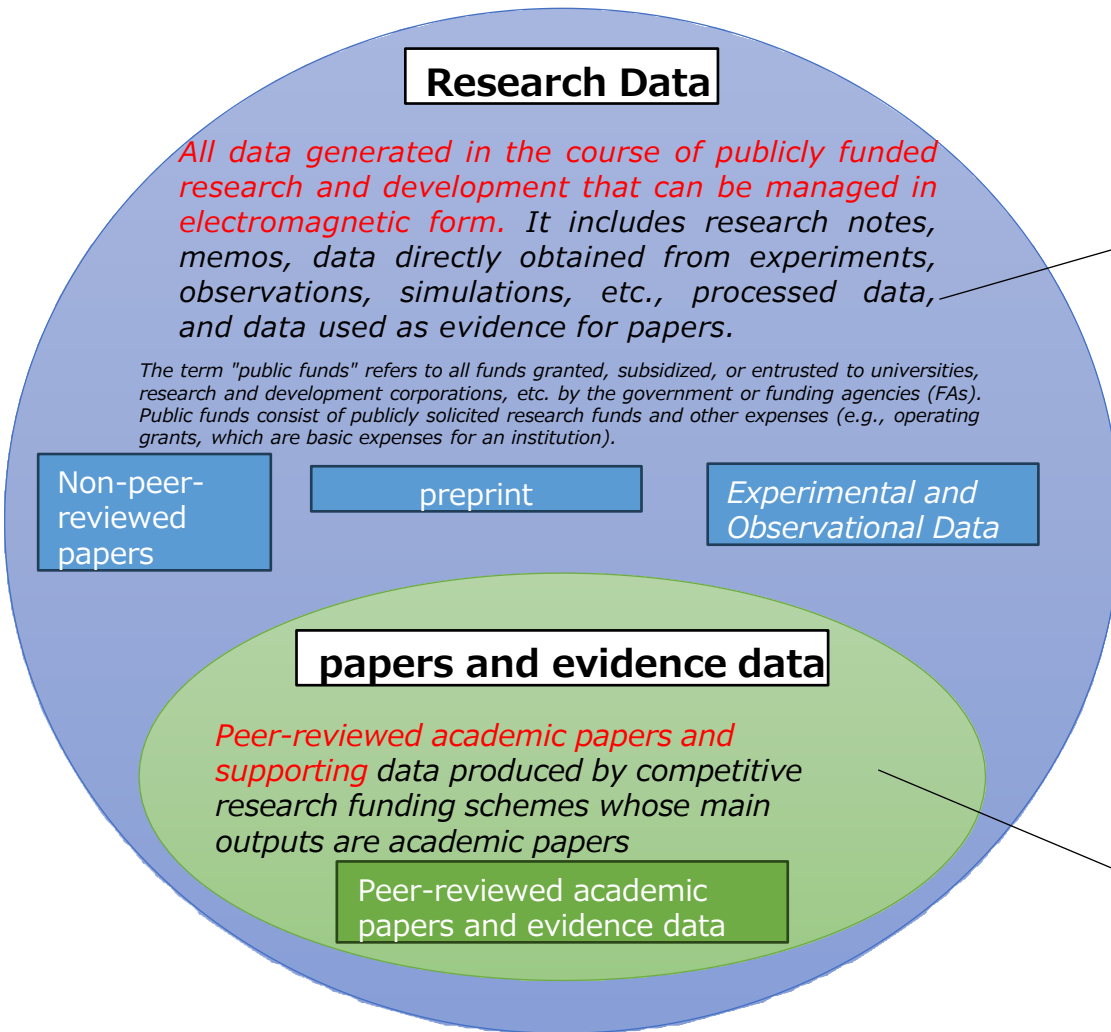
Open Science as a significant key driver for STI policy(Society 5.0)

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Beyond Open Access, rather directing disruptive transformation of scholarly communication, which drives innovation



Basic Approach to the Management and Utilization of Publicly Funded Research Data" (decided by the Council for the Promotion of Integrated Innovation Strategies on April 27, 2021)

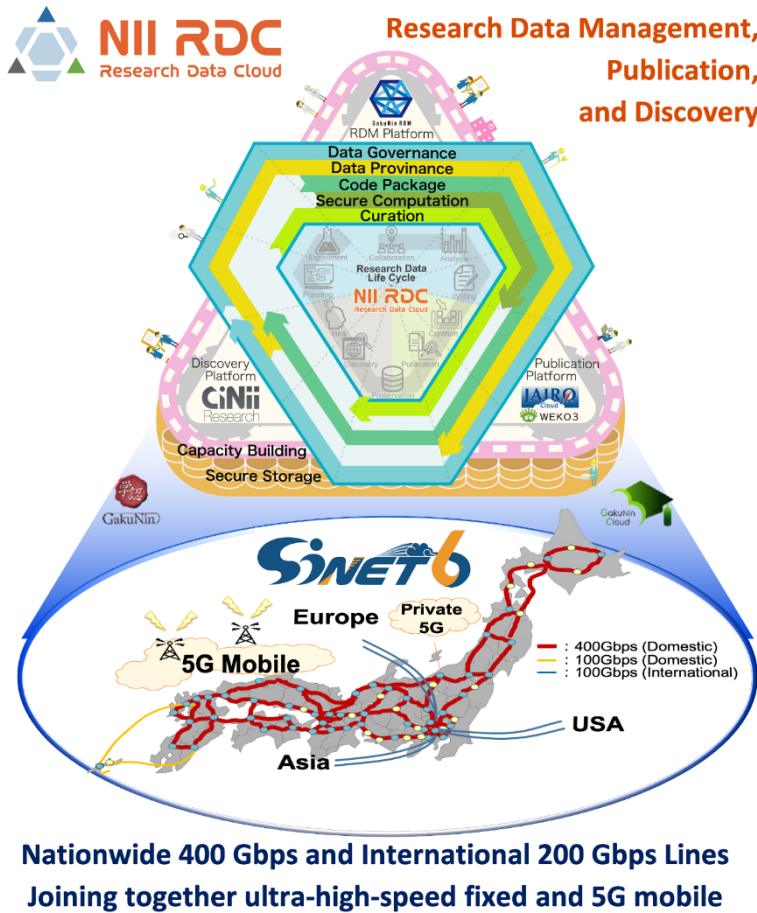
- ✓ Position NII RDC as a core platform to make metadata searchable
- ✓ Open/shared/unshared settings based on open/closed strategy
- ✓ Researchers identify data to be managed and grant metadata
- ✓ Introduction of a system for granting metadata to publicly solicited research funds
- ✓ Establishment of data policies at universities and other institutions, etc.

Basic Policy for the Realization of Immediate Open Access to Academic Papers and Other Documents" (decided by the Council for the Promotion of the Integrated Innovation Strategy on February 16, 2024)

- ✓ Require recipients of competitive research funds (including corporations) whose main results are academic papers to post academic papers and evidence data in an information infrastructure* such as an institutional repository immediately after publication in an academic journal.
- ✓ The aim is to enable everyone to freely utilize the results of research through the posting of academic papers and evidence data in information infrastructures such as institutional repositories.
- ✓ Support the development and enhancement of platforms for managing and utilizing research results, such as the research data infrastructure system (NII Research Data Cloud), other preprints, and academic papers, as a means of disseminating research results so that they can be freely utilized by everyone. etc.

*The information infrastructure, such as institutional repositories, is the research data infrastructure system (NII Research Data Cloud), which is positioned as "Japan's core platform for the management and utilization of research data" in the Sixth Science, Technology and Innovation Basic Plan (approved by the Cabinet on March 26, 2021). (2) Academic papers and evidence data shall be searchable on the NII Research Data Cloud.

Infrastructure



<https://ccrd.nii.ac.jp/sc22/>

Application

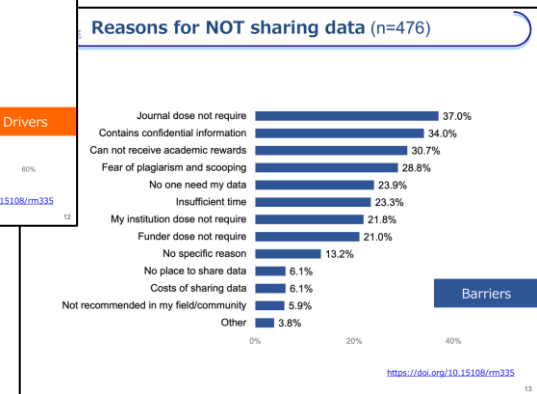
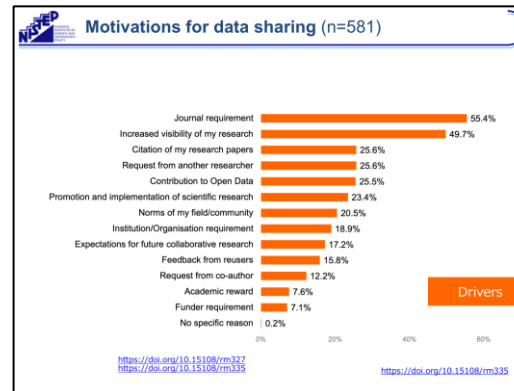
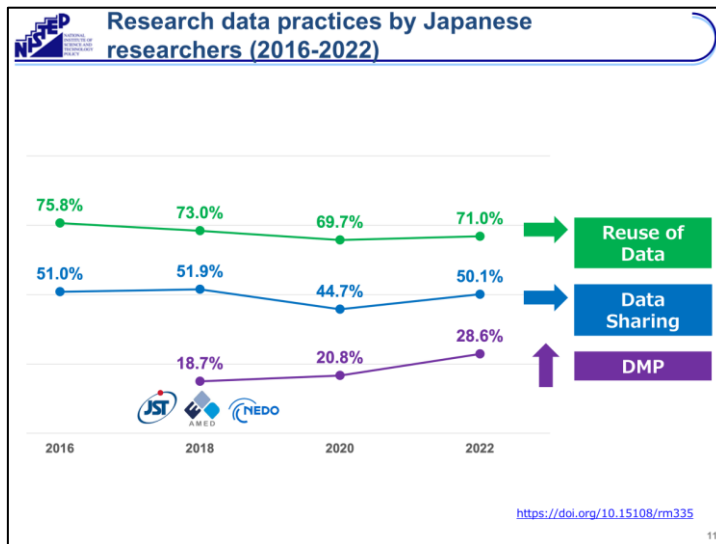
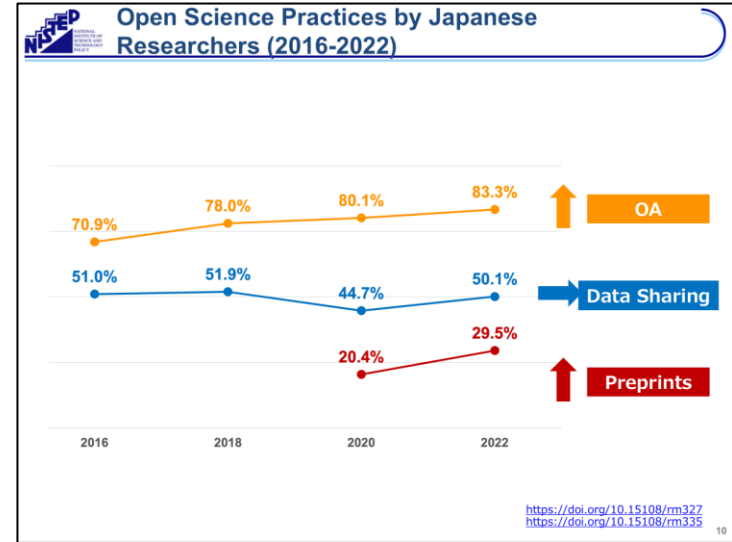
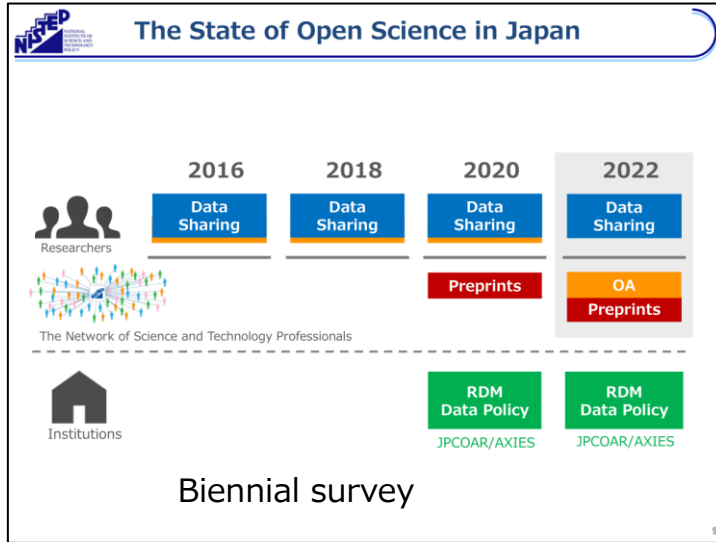


Promoting the use of AI, etc. Research Data Ecosystem Development Project

- RIKEN: Platform Coordination
- Univ of Tokyo: Integration and Utilization
- Nagoya Univ: Rules and guideline
- Osaka Univ: Human Resource Development

<https://www.nii.ac.jp/creded/project.html>

Survey for Semi-cohort of S&T experts (ca 2000) in NISTEP

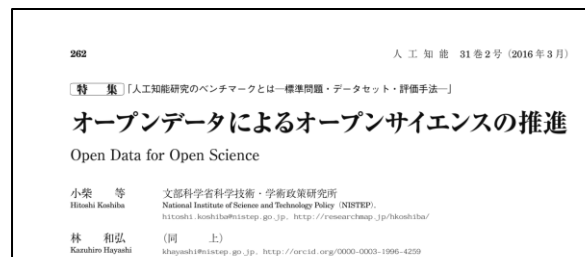


Collaboration with and contribution by **Ui Ikeuchi**, NISTEP



2. Open Research Information System at NISTEP

Collaboration with and contribution by
Hitoshi Koshiba, NISTEP



Open Data for Open Science (<Special Issue> Benchmarks in AI Research: Standard Problems, Data Sets, Evaluation Methods)

本稿では、オープンサイエンス、オープンデータの概観から提案する。以下では、オープンサイエンスやオープンデータそのものについて説明したうえで、関連するいくつかの事例について紹介しながら、これらの提案について説明する。なお、意見・提言などに相当する部分は個人の見解である。

社会と科学が距離を縮め、人工知能に対しても実用への期待と需要が高まる中で、科学界において提案される各種の技術や手法がビジネスや行政に関わる実務的な問題を解くことができるか、もしくは解くための支援ができるか、といったことも重要な評価指標の一つとなっている。

ここで機械学習を中心とした場合の人工知能では、技

2. オープンサイエンスとオープンデータ

2-1 オープンサイエンス

■ Progress in DX* and openness

- ◆ Progress in the release and utilization of open data on science and technology and research activities, including public funding, patents, and preprints.
- ◆ By collecting these data and analyzing them together, it will be possible to quickly grasp the whole picture of the trends.

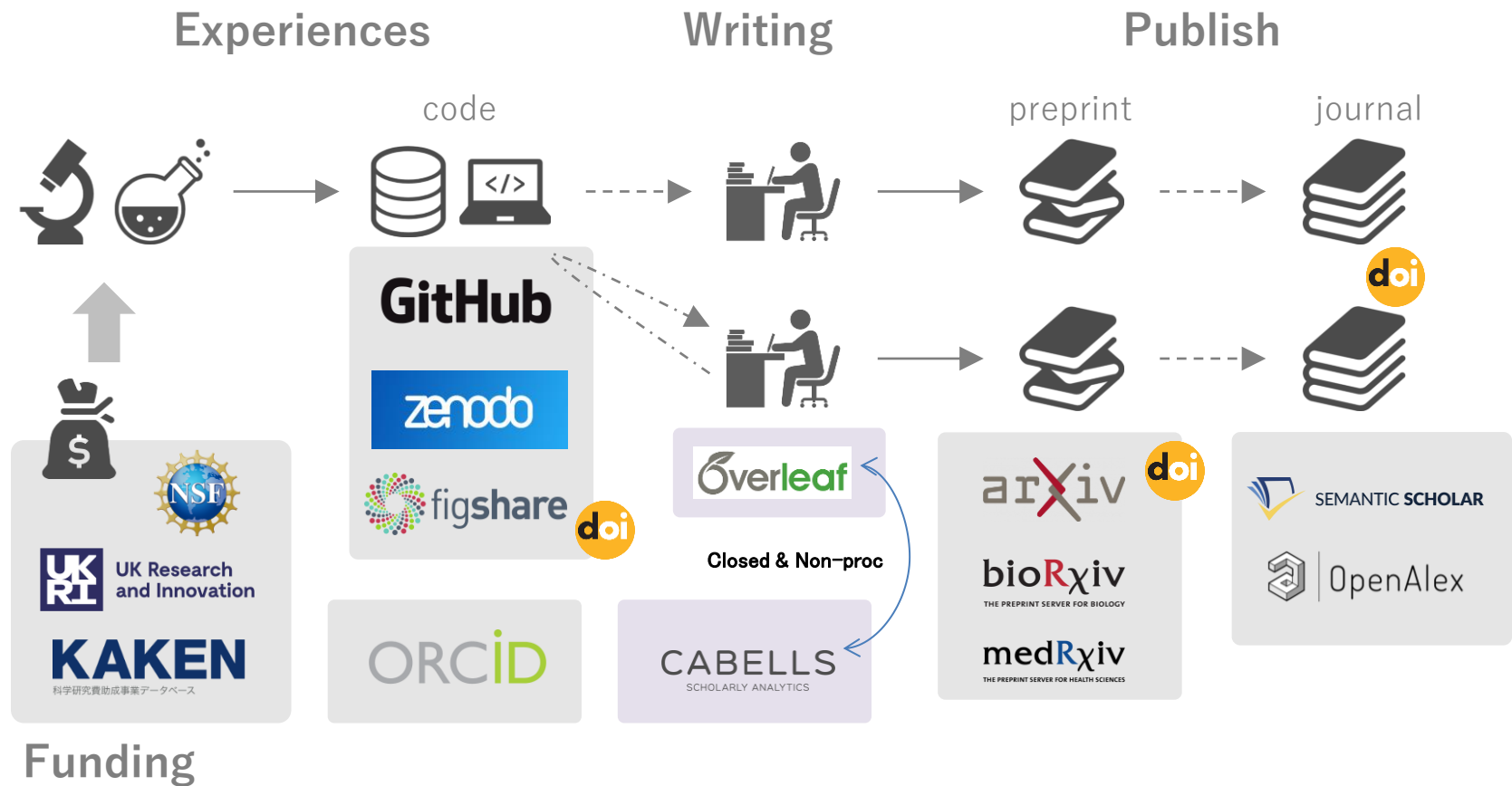


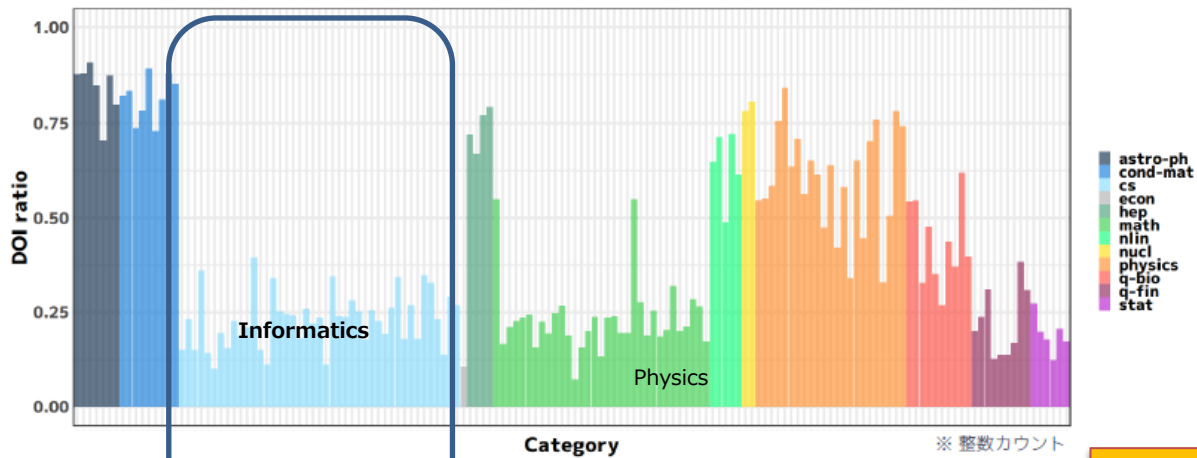
■ Challenges: lack of uniform classification, lack of explicit citation relationships, etc.



■ Analysis using AI-related technologies such as machine learning and natural language processing

- ◆ Contribute to the promotion of DX and EBPM as a ministry or agency by systematizing and providing as much as possible.
 - Realize a new style of research activities that can be carried out together with administrative officials and other users.

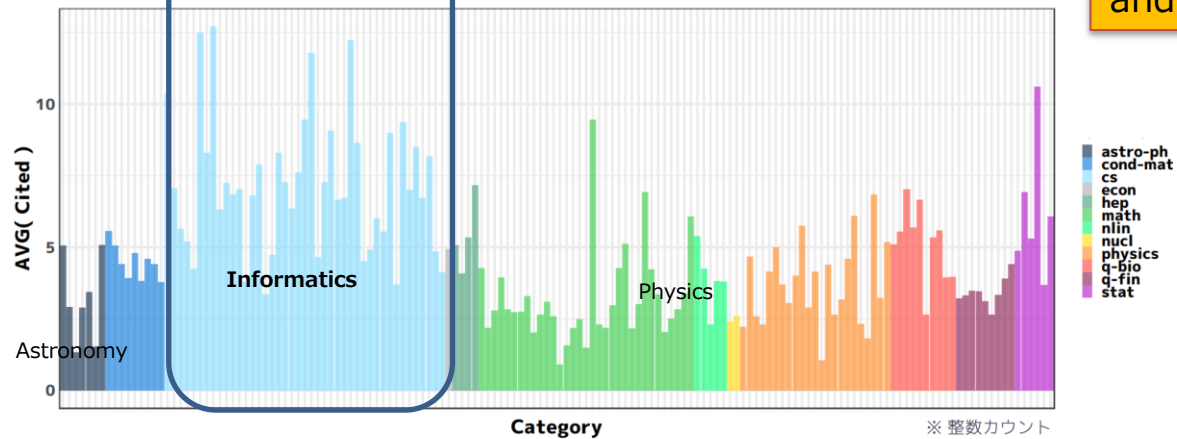




Astronomy

Ratio of "with publishers' DOI"

Informatics does not tend to publish in traditional journals and cites preprints



Astronomy

Average # of citation

Analysis of preprint

- New information source preprints in addition to journal articles, patents, etc.

Since there is no commercial DB, it is necessary to work on collection and shaping individually.

There is a possibility that the power structure will change, and it will take a few more years to reach regular operation.

COVID-19

bioRxiv

分界時のarXiv投稿からDOI付公開までの期間

arXiv

■ 算出対象は2020年1月1日時点のデータ

■ 算出対象は2020年1月1日時点のデータ

■ 算出対象は2020年1月1日時点のデータ

Example of open article DB analysis

Example of Microsoft Academic-based Topic Co-occurrence Analysis

| Topic | Count | Percentage |
|-------|-------------|------------|
| 1 | 144,108,001 | 8 |
| 2 | 11,918,017 | 0.6 |
| 3 | 10,803,013 | 0.6 |
| 4 | 11,749,011 | 0.6 |
| 5 | 1,002 | 0 |

データ概要：分野共起関係

■ 元々の投稿数が多いため、医学系が突出

■ コミュニティ分割でも、医療系とそれ以外に二分される

An example of Semantic Scholar-based disciplinary co-occurrence analysis

Example of field integration analysis

- Example of visualization of the relationship between the integration of disciplines and impact
- This is an important point of view when we consider the relationship between humanity and society in the future.

Japan 2012

Japan 2016

図説 | <https://design.nistep.go.jp/scholarview/>

Example of analysis of an international conference

- Collection and analysis of data from top information-related conferences, including NeuIPS, AAAI, and other AI-related conferences

- RM253(2016) : <http://doi.org/10.15108/rm253>
- Reported by the Committee on Information Science and Technology (94th, 95th meetings), etc.

NeuIPS

AAAI: Association for the Advancement of Artificial Intelligence

Number of posts by country

Trend of topics on LDA basis

Example of survey-based trend analysis

- Utilized from 2015 to 2017 for decision making
- Analyze and visualize changes in keyword co-occurrence relationships, etc.

ビッグデータ

人工知能 機械学習

Examples of analysis of various public competitive funds

- Understanding domestic trends of various funds from open data
- Separate U.S. and European versions exist.

SPAS-Domestic

活動中課題件数の推移 (2000～2017年)

Changes in the number of issues related to "infection control" in general

These are "triggers" to communicate potential users (hopefully policy makers) to improve them AND to enhance data literacy of potential users

1. Open Science in Japan

- ✓ Policy: 2021 Research Data Sharing, 2024 Open Access mandata from 2025
- ✓ Data Platform: NII Research Data Cloud and its application program
- ✓ Monitoring Surveys: to understand the actual status of open science

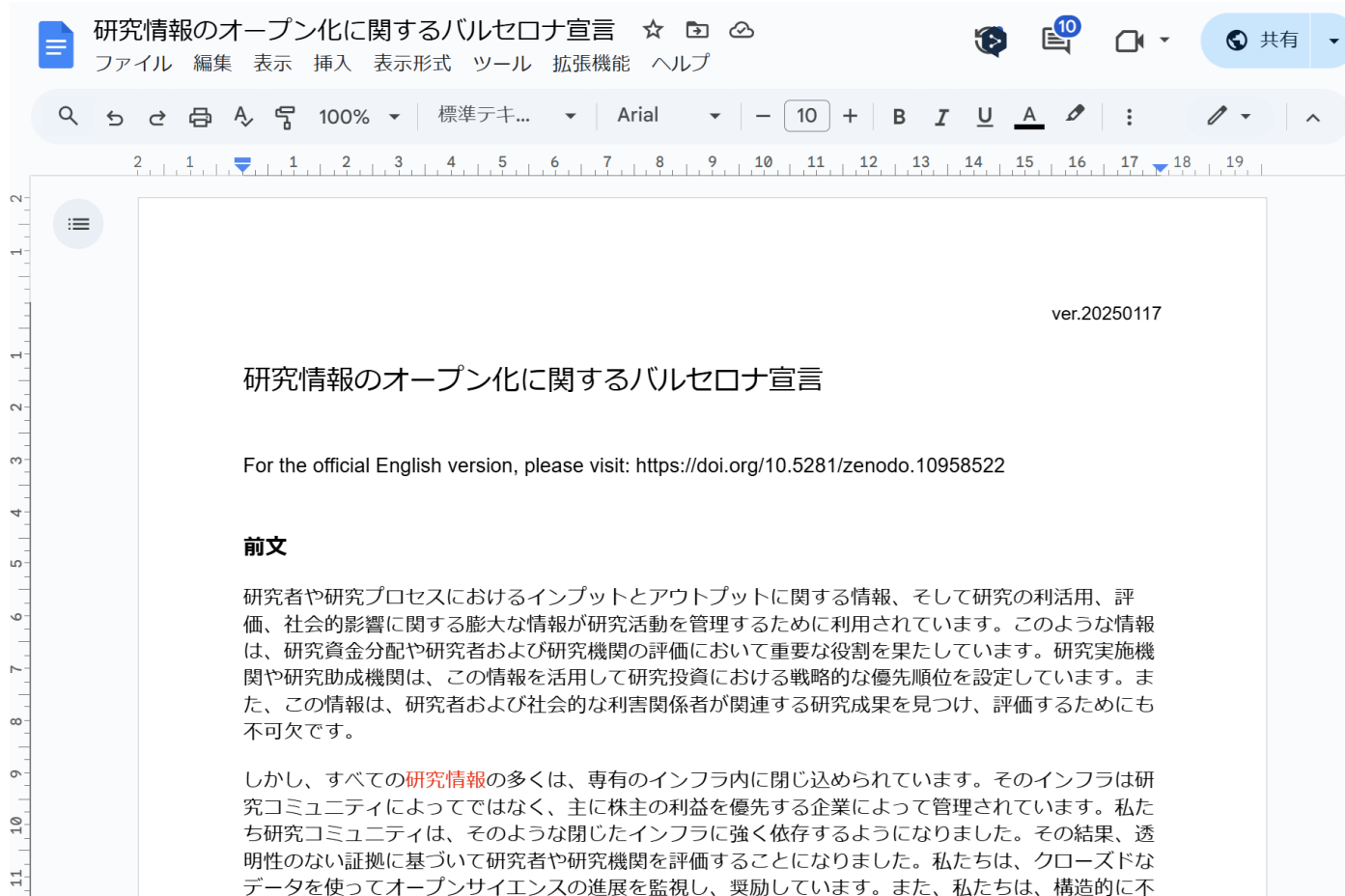
2. Open Research Information System at NISTEP

- ✓ 10 years trials for utilizing Open Data for EBPM
- ✓ Development of new survey research and data analysis methods using data science and AI-related technologies, etc.
- ✓ Seeking an alternative methodology to the one with proprietary database or even traditional one itself.

- **Contribute to the promotion of EBPM through the development and deployment of analysis systems and the utilization of open data**

For promoting DX and Open Science

1. Japanese Translation of Barcelona Declaration Project
2. Volunteer Recruiting to check it



研究情報のオープン化に関するバルセロナ宣言 ☆ 📁 ☁

ファイル 編集 表示 挿入 表示形式 ツール 拡張機能 ヘルプ

ver.20250117

研究情報のオープン化に関するバルセロナ宣言

For the official English version, please visit: <https://doi.org/10.5281/zenodo.10958522>

前文

研究者や研究プロセスにおけるインプットとアウトプットに関する情報、そして研究の利活用、評価、社会的影響に関する膨大な情報が研究活動を管理するために利用されています。このような情報は、研究資金分配や研究者および研究機関の評価において重要な役割を果たしています。研究実施機関や研究助成機関は、この情報を活用して研究投資における戦略的な優先順位を設定しています。また、この情報は、研究者および社会的な利害関係者が関連する研究成果を見つけ、評価するためにも不可欠です。

しかし、すべての**研究情報**の多くは、専有のインフラ内に閉じ込められています。そのインフラは研究コミュニティによってではなく、主に株主の利益を優先する企業によって管理されています。私たち研究コミュニティは、そのような閉じたインフラに強く依存するようになりました。その結果、透明性のない証拠に基づいて研究者や研究機関を評価することになりました。私たちは、クローズドなデータを使ってオープンサイエンスの進展を監視し、奨励しています。また、私たちは、構造的に不

Contact us by Jan 31th!