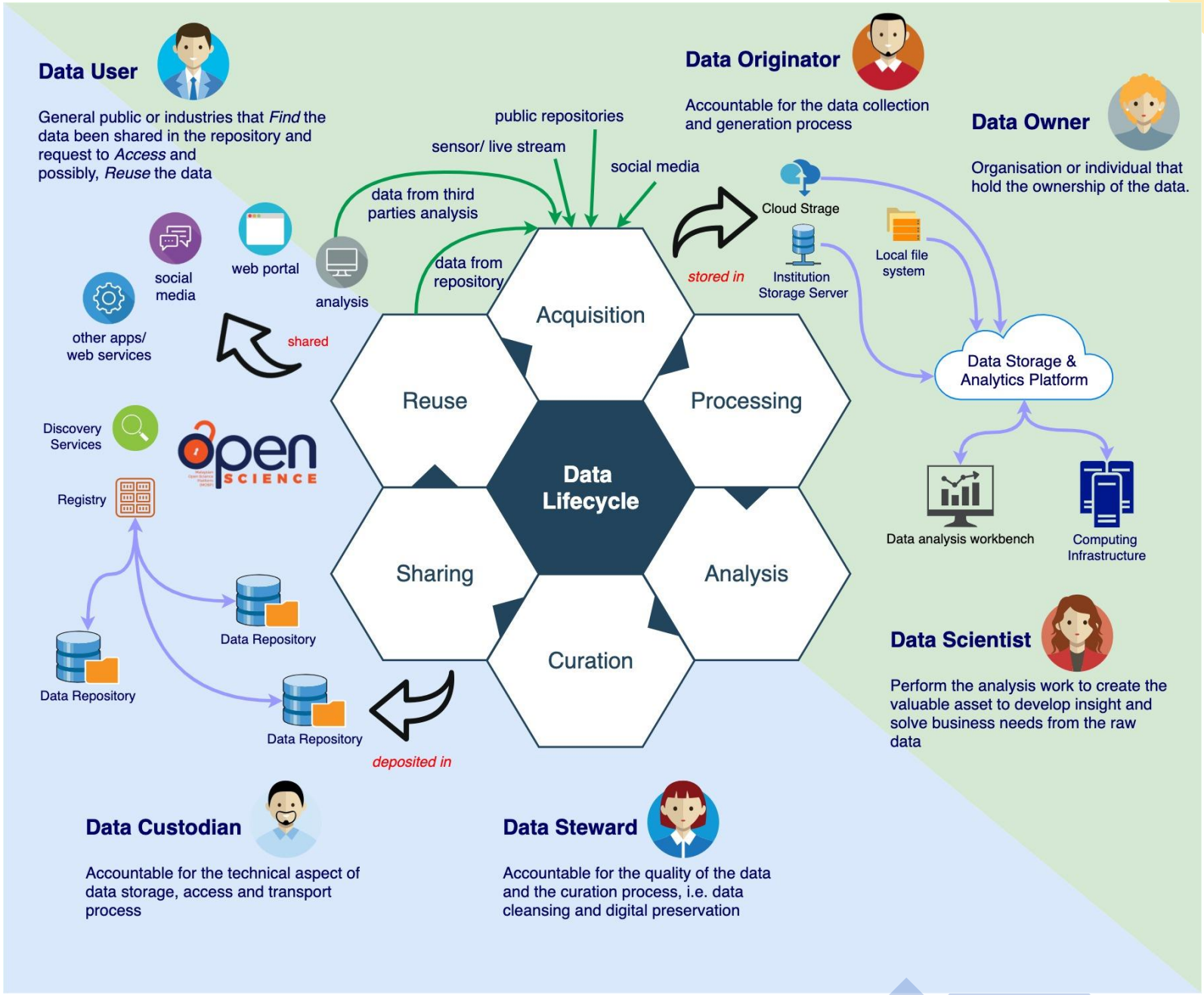
Malaysia Open Science Platform

Open science today for new science tomorrow

Liew Chee Sun

csliew@um.edu.my

www.akademisains.gov.my/mosp/


Data User
General public or industries that *Find* the data been shared in the repository and request to *Access* and possibly, *Reuse* the data
Data Originator
Accountable for the data collection and generation process
Data Owner
Organisation or individual that hold the ownership of the data.
public repositories
sensor/ live stream
social media
data from third parties analysis
data from repository
web portal
social media
other apps/ web services
analysis
shared
Cloud Strage
stored in
Institution Storage Server
Local file system
Data Storage & Analytics Platform
Data analysis workbench
Computing Infrastructure
Acquisition
Processing
Analysis
Curation
Sharing
Reuse
Data Lifecycle
Discovery Services
Registry
Data Repository
Data Repository
Data Repository
deposited in
Data Scientist
Perform the analysis work to create the valuable asset to develop insight and solve business needs from the raw data
Data Custodian
Accountable for the technical aspect of data storage, access and transport process
Data Steward
Accountable for the quality of the data and the curation process, i.e. data cleansing and digital preservation

the value of research data increases with use

minimally restrictive and voluntary common-use license

address the “divide in scientific production”

The Beijing Declaration on Research Data

The Beijing Declaration supports international efforts to make research data as open as possible and only as closed as necessary. It seeks to make data and metadata Findable, Accessible, Interoperable, and Reusable (FAIR)[iii] on a global basis and, wherever possible, automatically processable by machines. Although this Declaration is relevant mostly for research data that are generated through public funding, there are also instances in which privately funded data are made broadly available, in which case these principles would also apply. In addition, data not initially generated for research may be used in research at a later stage. The Beijing Declaration endorses many existing research data policies and management practices that have been promoted by previous declarations and statements, and they are included as references in the Appendix. The participants in the September 2019 policy meeting have produced the following set of ten principles:

1. **Research is increasingly driven by data** that are beyond human processing alone. Researchers therefore should have access to diverse, trustworthy, and reusable sources of data that are readily available and machine actionable. Data stewardship capacity building and comprehensive policies that enable the creation, dissemination, preservation, and above all the **global reuse of data and information** are essential, including sustained support for the required infrastructure and expertise.
2. **Research data have global public good characteristics.** A pure public good cannot be depleted by use (also called non-rivalrous) and cannot be excluded from use. Research data cannot be depleted, but can be restricted in use, although exclusion of reuse by others can be very inefficient and controversial, especially if the data are generated by public funding. **The value of research data increases with use.**
3. Publicly funded research data should be **findable** online to build an **international data commons**. Findable data require comprehensive metadata descriptions and persistent identifier tags, because data that cannot be easily located by potential users—whether by humans or machines—are of limited value. Together, principles three to seven result in **“FAIR” data** (data that are Findable, Accessible, Interoperable, and Reusable)—both for machines and humans.
4. Publicly funded research data are, by default, **in the public interest and should be accessible to the greatest extent possible for international reuse**. They were created or collected on behalf of the public that paid for them, and thus should be **as open as possible and only as closed as necessary**. This is even more important in cases where the data relate to issues covered by the UN landmark agreements.
5. Publicly funded research data should be **interoperable, and preferably without further manipulation or conversion,** to facilitate their broad reuse in scientific research.[iv] Software, instruments, and data formats should be well-documented and should not impose any proprietary lock-in that restricts reuse. Data should be described with rich metadata and should use community-recognized terminologies to maximize interoperability and reuse.
6. Despite strong reasons for making research data as open as possible, there are **legitimate reasons to restrict access to and reuse of data**, including interests of national security, law enforcement, privacy, confidentiality, intellectual property, and indigenous data governance, among others. Restrictions should have an express justification and research data **otherwise should be open by default on a global basis**. If the data need to be closed, an effort should be made to provide responsible and proportionately controlled access.
7. **National legislation** that exempts research data from copyright or other intellectual property (IP) protections is one way to enable and support reuse of public data. Another way is for researchers to choose a minimally restrictive and **voluntary common-use license**[v].
8. Funders of academic and applied research should require the **submission of adequate data stewardship plans**, including clear guidelines for the provision of long-term availability, accessibility, and conditions for reuse. Open data policies should be accompanied by commensurate penalties for noncompliance as well as appropriate incentives.
9. **Activities that address the “divide in scientific production”** between less economically advanced regions and those economies with advanced research infrastructures should include access to publicly funded research data and related information. The wider deployment and access to advanced technical research infrastructures is a necessary, but not sufficient, condition to reduce the divide.
10. **Research data policies should promote the principles in this Declaration and be coordinated internationally.** They should be implemented with clear policy wording and guidelines, specific funding, and a commitment to monitor their impact with the overall objective of building a global FAIR data commons.

as open as possible
as closed as necessary

should be open by default on a global basis

data stewardship plans

What is Open Science?

"An inclusive construct that combines **various movements and practices** aiming to make scientific knowledge openly available, accessible and reusable for everyone, to **increase scientific collaborations and sharing of information** for the benefits of science and society, and to **open the processes of scientific knowledge creation, evaluation and communication to societal actors** beyond the traditional scientific community." - *UNESCO Recommendation on Open Science*

It demands science, which includes **basic and applied sciences, natural and social sciences and the humanities**, to be done with integrity that assures accuracy of research data, in an open, reliable and reproducible fashion.

For Open Science, data sharing is guided by **the FAIR principle**.

FAIR stands for **F**indable, **A**ccessible, **I**nteroperable and **R**eusable. Specifically, FAIR is described as:

a. **Findable –** Data and metadata are easily to find by both humans and computers. Usually this task is enabled by machine-readable persistent identifiers and metadata

b. **Accessible –** Data can be retrieved using the outlined protocols

c. **Interoperable** – System can be used with other tools

d. **Reusable** - Data is well-defined and can be used for different purposes and in different settings

What is Open Science?

OPEN ACCESS TO SCIENTIFIC KNOWLEDGE

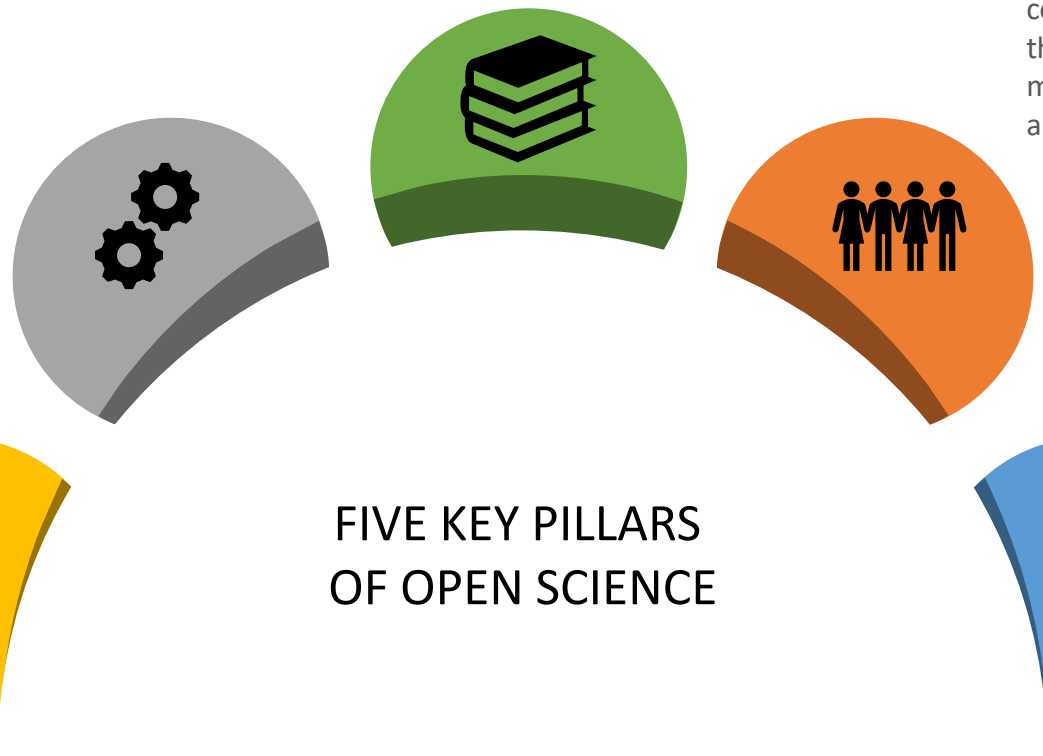
timely, free and affordable access to: i) scientific publication, ii) open research data, iii) open-source software and source code, and iv) open hardware

OPEN SCIENCE INFRASTRUCTURES

shared research infrastructures (including major scientific equipment or sets of instruments, knowledge-based resources, open computational infrastructures that enable data analysis and digital infrastructures) that are needed to support Open Science and serve the needs of different communities.

OPEN ENGAGEMENT OF SOCIETAL ACTORS

extended collaboration between scientists and societal actors beyond the scientific community, by opening up practices and tools that are part of the research cycle and by making the scientific process more inclusive and accessible to the broader inquiring society.



FIVE KEY PILLARS OF OPEN SCIENCE

OPEN SCIENCE COMMUNICATION

a range of science communication activities that accompany Open Science practices and that support the dissemination of scientific knowledge to scholars in other research fields, decision-makers, and the public at large.

OPEN DIALOGUE WITH OTHER KNOWLEDGE SYSTEMS

dialogue between different knowledge holders, that recognizes the richness of diverse knowledge systems and epistemologies and diversity of knowledge producers

Source: Draft text of the UNESCO Recommendation on Open Science (SC-PCB-SPP/2021/OS-IGM/WD3)

About MOSP

1. MOSP is initiated by the Ministry of Science, Technology and Innovation (MOSTI), managed by Academy of Sciences Malaysia (ASM) through the Malaysia Open Science Alliance
2. Launched on 7 November 2019 (then MESTECC)
3. A 2-year pilot project (2019 to 2021), linking all 5 Research Universities and Research Institutes under MOSTI
4. The pilot project is to look into the initial 3 main areas:
    a. Landscape studies and Guidelines for Open Science in Malaysia;
    b. Capacity Building and Awareness and
    c. Infrastructure

Malaysian Cabinet Paper
(Memorandum Jemaah Menteri; MJM)

Memorandum daripada Menteri Sains, Teknologi dan Inovasi

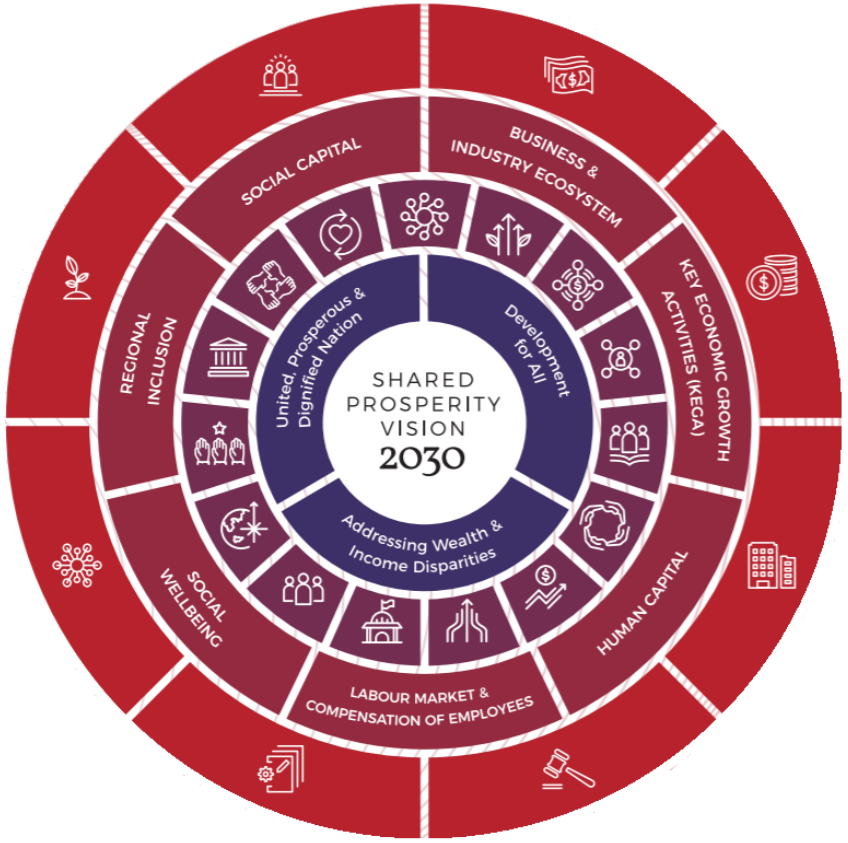
Pewujudan Malaysia Open Science Platform

The Cabinet approved a paper for Malaysia Open Science Platform (tabled by MOSTI) to be initiated on 14 August 2020.

Aim:

To gather and consolidate Malaysia's research data which are **valuable national assets** in a platform that would enable accessibility and sharing of these research data in accordance with the FAIR principle.

Purpose of MOSP



MOSP is a strategic transformative initiative to strengthen Malaysia's STI Collaborative Ecosystem towards achieving Shared Prosperity Vision 2030 and addressing the United Nations Sustainable Development Goals

Malaysia Open Science Platform (MOSP)

Malaysia Research Landscape

GERD (1.04%), RM15,060 million (2018)

3,942 Researchers (2,853 Full Time Equivalent) from 52 Government Research Institutes/ Agencies

234,765 research papers indexed by Scopus with more than 1.7 million citation and more than 15,669 domestic patent filed (2001-2017)

72,806 Researchers (55,051 Full Time Equivalent) from 100 public and private Institution of Higher Learnings

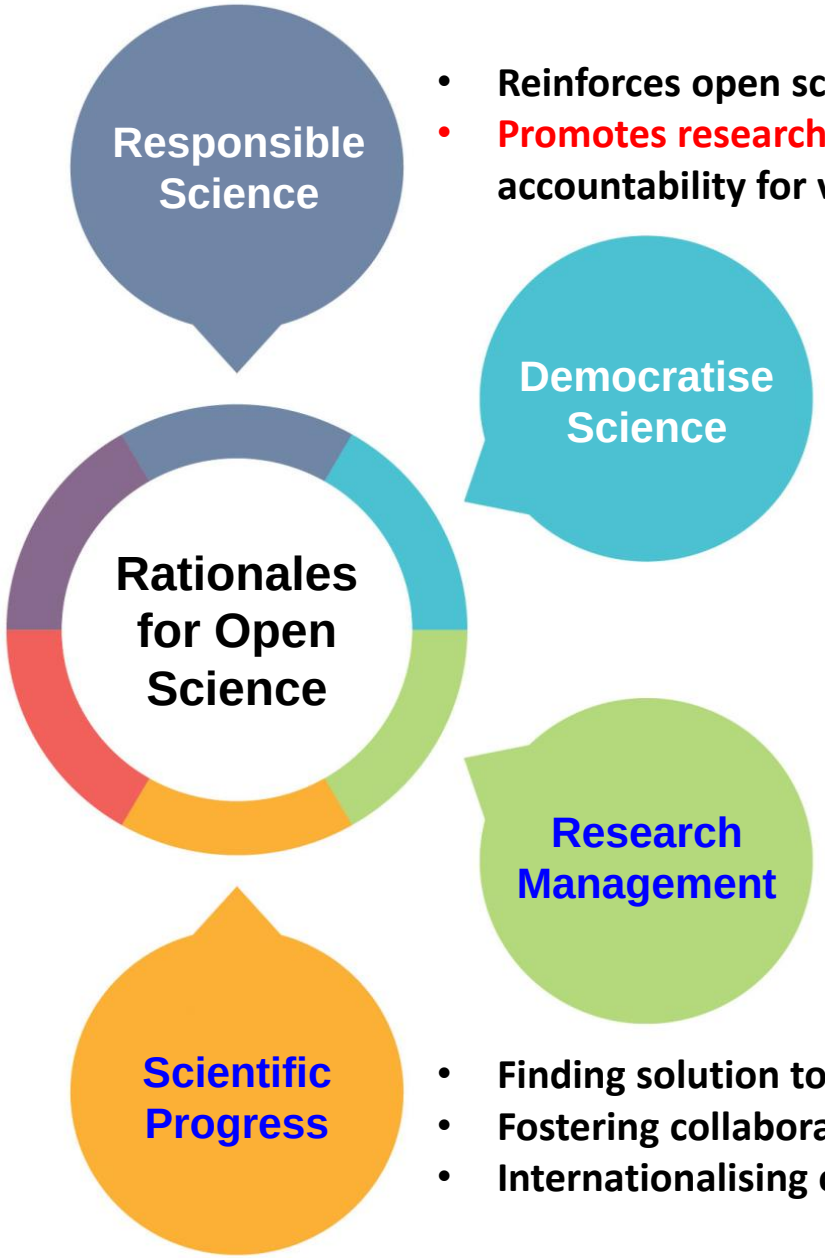
Source: MASTIC, 2019

Purpose of MOSP

To gather and consolidate Malaysia's research data which are valuable national assets in a platform that would enable accessibility and sharing of these research data in accordance to the FAIR principle.

Source:
i. National Survey of Research and Development (R&D) 2019
ii. National Bibliometric Study 2001-2017

Value of MOSP



- Reinforces open scientific inquiry
- Promotes research quality and integrity through reproducibility, transparency and accountability for verification and avoid fraud

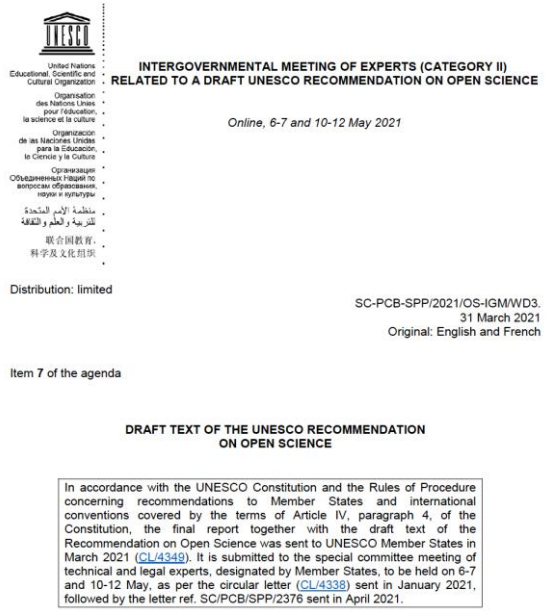
- Publicly funded researchers are accountable to society
- Increases the return on public investments in scientific research
- Promotes equitable use of data and enables citizen science participation
- Business enterprises benefit in producing new products and services through open innovation
- Science-informed policy-making

- Maximise data utility
- Minimise costs of unnecessary duplication of research
- Better planning in research management and funding

- Finding solution to local and global challenges through Big Data Analytics
- Fostering collaborations and research beyond disciplinary boundary
- Internationalising our local research

UNESCO Recommendation on Open Science

1. promoting a common understanding of Open Science, associated benefits and challenges, as well as diverse paths to Open Science;
2. developing an enabling policy environment for Open Science;
3. investing in Open Science infrastructures and services;
4. investing in human resources, education, digital literacy and capacity building for Open Science;
5. fostering a culture of Open Science and aligning incentives for Open Science;
6. promoting innovative approaches for Open Science at different stages of the scientific process;



United Nations Educational, Scientific and Cultural Organization
Organisation des Nations Unies pour l'éducation, la science et la culture
Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura
Организация Объединенных Наций по вопросам образования, науки и культуры
منظمة الأمم المتحدة للتربية والعلم والثقافة
联合国教育、科学及文化组织

INTERGOVERNMENTAL MEETING OF EXPERTS (CATEGORY II) RELATED TO A DRAFT UNESCO RECOMMENDATION ON OPEN SCIENCE

Online, 6-7 and 10-12 May 2021

Distribution: limited

SC-PCB-SPP/2021/OS-IGM/WD3.
31 March 2021
Original: English and French

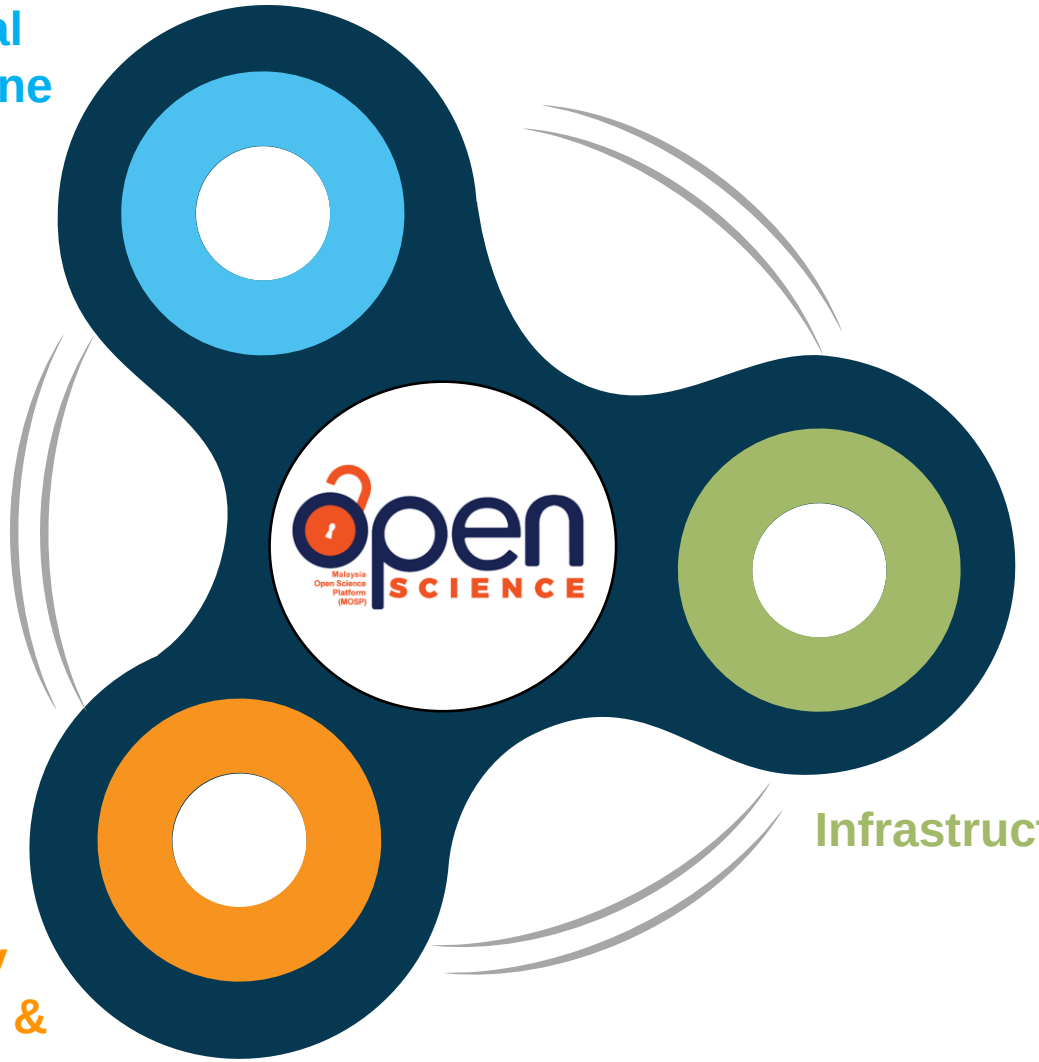
Item 7 of the agenda

DRAFT TEXT OF THE UNESCO RECOMMENDATION ON OPEN SCIENCE

In accordance with the UNESCO Constitution and the Rules of Procedure concerning recommendations to Member States and international conventions covered by the terms of Article IV, paragraph 4, of the Constitution, the final report together with the draft text of the Recommendation on Open Science was sent to UNESCO Member States in March 2021 (CL/4349). It is submitted to the special committee meeting of technical and legal experts, designated by Member States, to be held on 6-7 and 10-12 May, as per the circular letter (CL/4338) sent in January 2021, followed by the letter ref. SC/PCB/SPP/2376 sent in April 2021.

Source: Draft text of the UNESCO Recommendation on Open Science (SC-PCB-SPP/2021/OS-IGM/WD3)

MOSP Focus Areas



TARGETS:

1. To develop one Landscape Study on Open Science in Malaysia by end of 2020
2. To develop one National Guidelines on Open Science by end of 2020
3. To train 200 data stewards by 2022
4. To reach 500,000 people and raise awareness about Open Science
5. To develop and execute one Platform for raw research data sharing by 2022

Engagement of MOSP with International Agencies working on Open Science

Open Science Forum for Asia and The Pacific, 13 Feb 2020

Dialogue on Open Science, 14 Feb 2020

MOSP has been in consultation with other open science initiatives globally such as Australia's ANDS, OECD, ISC-CODATA, and Japan's RCOS to learn best practices of Open Science and to get their support to materialise MOSP.

MOSP is also a member of international open science networks such as the

- **Global Open Science Cloud (GOSC), CODATA**
- **UNESCO Open Science Advisory Committee**

Draft PPSTI Statement on Open Science

The Policy Statement on Science, Technology and Innovation Communication endorsed by the 2017 APEC PPSTI-10 in Viet Nam recognized the importance of open science and open access and the need to set clear policies that will help increase the returns from public and private investment, reinforcing cooperation and open scientific inquiry, as evidenced by the COVID-19 pandemic, and promoting research in new areas, which can have regional and global benefits.

Open Science represents an approach to the scientific process which is based on cooperative work and new ways of disseminating knowledge by using digital technologies and new collaborative tools. The idea captures a systemic change to the way science and research have been carried out for the last fifty years: complementing the standard practices of publishing research results in scientific publications by sharing and using all available knowledge at an earlier stage in the research process.

The recent response of the scientific community to the COVID-19 pandemic has demonstrated how Open Science can accelerate scientific solutions to a global challenge. The genetic sequence of the SARS-CoV-2 virus was posted in an open access repository and made freely available for all researchers. Several companies also made the designs for protective face shields open-source, allowing these shields to be freely 3D printed in cities and societies where they are needed the most.

Open Science does not require that all data are fully open and accessible. They should be available under well-defined conditions and that is why we support the FAIR guiding principles, rendering data Findable, Accessible, Interoperable and Reusable. Our emphasis also includes the collective benefits, authority to control, responsibility and ethics, including principles such as the CARE Principles for Indigenous Data Governance. These principles will cultivate a culture of openness and transparency, whilst at the same time ensuring ethics and integrity are maintained.

Pursuant to this, we recognise that Open Science has a vital role in fostering sustainable and inclusive economic growth and development, bringing with it the full benefit of innovation. This can only be realized by increasing the commitment of the public and private sector to a robust Open Science ecosystem which will underpin the aspirations of society for a more equitable sharing of scientific information.

21 Aug 2020, Kuala Lumpur

OPEN SCIENCE IS HERE TO STAY

(Excerpt from the Joint Statement Endorsed by APEC Community)

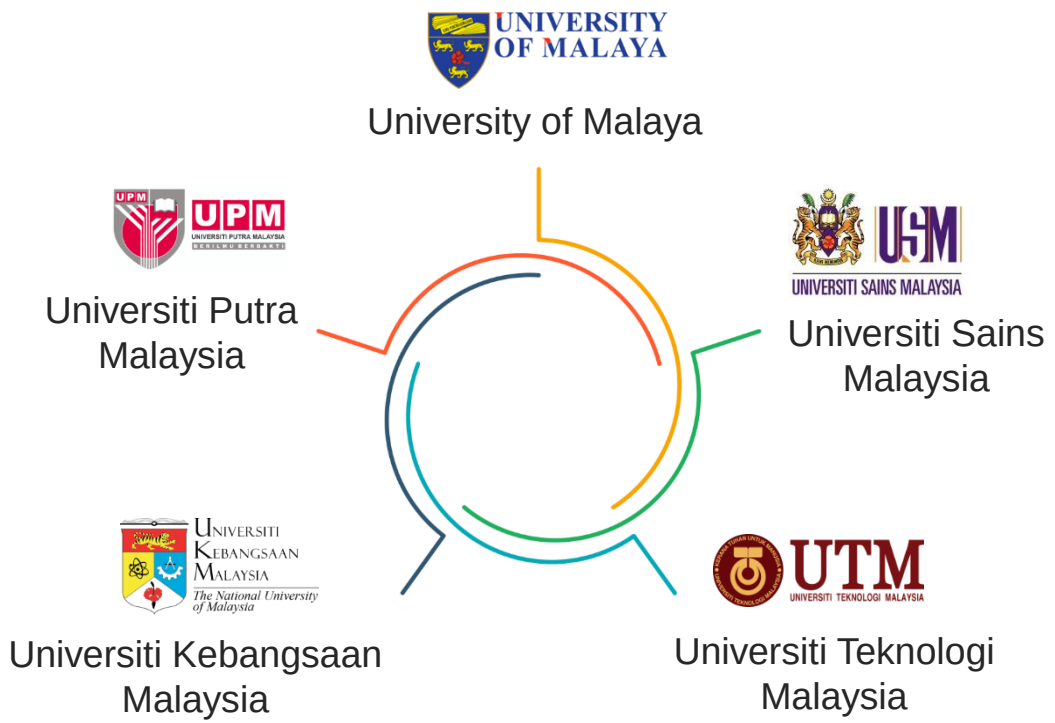
1. **Open Science does not require that all data are fully open and accessible. They should be available under well-defined conditions and that is why we support the FAIR guiding principles, rendering data Findable, Accessible, Interoperable and Reusable.**

2. **Pursuant to this, we recognise that Open Science has a vital role in fostering sustainable and inclusive economic growth and development, bringing with it the full benefit of innovation. This can only be realized by increasing the commitment of the public and private sector to a robust Open Science ecosystem which will underpin the aspirations of society for a more equitable sharing of scientific information.**

Malaysia Open Science Alliance

1. Academy of Sciences Malaysia (ASM)
2. Ministry of Higher Education (MOHE)
3. Ministry of Health Malaysia (MOH)
4. Ministry of Natural Resources, Environment and Climate Change
5. Ministry of Science, Technology and Innovation – Malaysia Science and Technology Information Center (MASTIC)
6. Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)
7. Forest Research Institute Malaysia (FRIM)
8. Malaysia Research University Network (MRUN)
    i. University of Malaya
    ii. Universiti Sains Malaysia
    iii. Universiti Teknologi Malaysia
    iv. Universiti Kebangsaan Malaysia
    v. Universiti Putra Malaysia

Pilot Initiative:
Linking Platform for sharing of Research Data



National Guidelines for Open Science

Targets:

1. To develop one Landscape Study on Open Science in Malaysia by end of 2020

2. To develop one National Guidelines on Open Science by end of 2020

1. Engagements with global Open Science initiatives
2. Surveys
3. Interviews

Target groups: Top management universities, researchers, librarians, head of data centres

4. Workshops, Meetings

Target groups: universities, government agencies, ministries, legal units, industry

Completed

Workshops, discussions, meetings

Target groups: universities, government agencies, ministries, legal units, industry

On-going

Best practices of other countries ***Completed***

Landscape Study on Open Science in Malaysia

Completed

National Guidelines on Open Science has been drafted

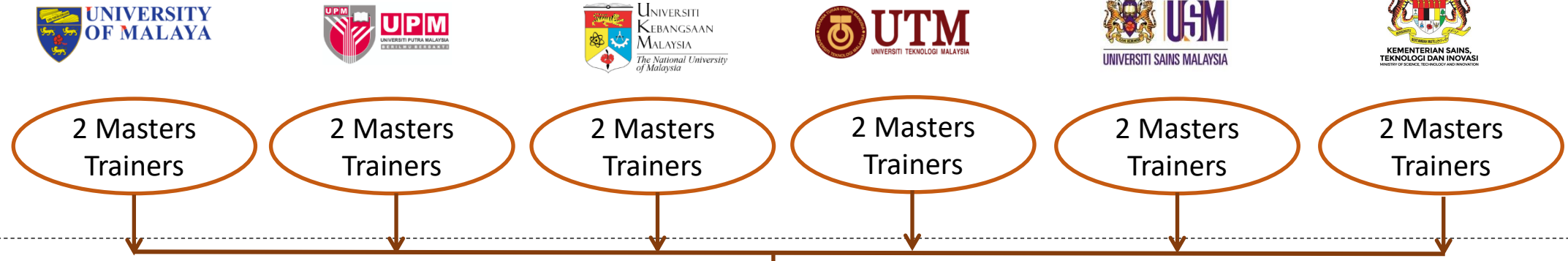
National Guidelines is in the final phase of publication. Embargoed until launching of Malaysia Open Science Platform

Training of Trainers Program for Data Stewardship on Open Science

Target: To train 200 data stewards by 2022

Trained by eLearning Curve (online), certified by CIMP Jun-Sept 2020

Status: Completed



Trained by Masters Trainers (online)			
ToT Program	SERIE 1	SERIE 2	SERIE 3
Duration	09/2020-01/2021	03/2021 – 08/2021	11/2021 – 03/2022
Trained data stewards	**56**	**137**	**42**
Target groups	**Librarians & research managers**	**Researchers, librarians, & research manager**	**Researchers, librarians, & research manager**
Institutions	**5 Research Universities and agencies under MOSTI**	**Higher learning institutes (public & private), research institutes and agencies**	**Higher learning institutes (public & private), research institutes and agencies**

Trained Data Stewards Statistics

Institute	Total
Universiti Teknologi Malaysia (UTM)	36
Universiti Malaya (UM)	25
Universiti Sains Malaysia	19
Universiti Putra Malaysia (UPM)	11
Universiti Kebangsaan Malaysia (UKM)	11
Universiti teknologi mara (UiTM)	6
Universiti Pertahanan Nasional Malaysia (UPNM)	6
Universiti Islam Antarabangsa Malaysia (UIAM)	5
Universiti Sains Islam Malaysia (USIM)	4
Universiti Utara Malaysia (UUM)	3
Universiti Pendidikan Sultan Idris (UPSI)	1
Universiti Malaysia Sarawak (UniMAS)	1

Institute	Total
Universiti Malaysia Terengganu (UMT)	1
Universiti Sultan Zainal Abidin (UniSZA)	1
Xiamen University	10
Multimedia University	8
Monash University	6
University of Southampton	3
Newcastle University	1
International Medical University (IMU)	1
MAHSA University	1
Asia e University	1
Peserta Pasca Pengajian	2
UNESCO	14

Institute	Total
PLAN Malaysia	10
Akademi Sains Malaysia	3
MASTIC	2
Kementerian Pengajian Tinggi (KPT)	1
National Institute of Health (NIH)	10
Maritime Institute of Malaysia (MIMA)	5
Forest Research Institute Malaysia (FRIM)	6
Malaysia Space Agency (MYSA)	5
Jabatan Kimia Malaysia	4
Institute for medical Research (IMR)	4
Jabatan Metereologi Malaysia (MET)	3
Jabatan Nuklear Malaysia	1

Awareness about Open Science

Target: To reach 500,000 people and raise awareness about Open Science

Website & Social Media updates

Infographics:

1. Malaysia Open Science Platform
2. Future careers in Open Science
3. Research data lifecycle

Events:

1. Launching of MOSP (7 Nov 2019)
2. Open Science Forum for Asia and the Asia Pacific (13 Feb 2020)
3. Dialogue on Open Science (14 Feb 2020)
4. APEC Policy Sharing Webinar on Open Science (21 Aug 2020)
5. Asia-Pacific Online Regional Consultation Towards a UNESCO Recommendation on Open Science (15 Sep 2020)
6. Citizen Science from Malaysia's Perspective (05 Oct 2020)
7. Webinar on Open Science by UM (11 Jan 2021)
8. Open Science Symposium @ USM (4 March 2021)
9. K-Sharing: Normalizing Open Science by UTM (30 March 2021)

Completed

Video promotions

Newspaper articles

Media appearance

Webinars on Open Science

Side events/roadshows

Planning

500,000 people reached by end of 2021

MOSTI nominated Prof Dr Noorsaadah Abd Rahman FASc as a representative for Malaysia at UNESCO Open Science Advisory Committee

Awareness Activities And Outreach

1.5 mil

- Professor ChM Dr Noorsaadah Abd Rahman presented about MOSP on RTM – Selamat Pagi Malaysia

350,000

- Newspaper articles:
  - **Open Science, Envisioning that No One is Left Behind**
  - **Malaysia Open Science Platform: A Dream or A Reality?**

145,000

- Online outreach through webinars, presentations and news

169,000

- Public and private engagements

33,000

- Promotional video for Open Science by ML Studio

= 2 mil

Open Science In The 5 Research Universities

UNIVERSITI MALAYA

- 1 RDM Policy
- 1 Research Data Repository Pilot Project
- 1 UM Open Science Committee
- 25 Trained Data Stewards

UNIVERSITI SAINS MALAYSIA

- 1 Open Science Guidelines
- 1 USM Library TV
- 1 Jawatankuasa Pemandu Open Science USM (2021)
- 19 Trained Data Stewards

UTM UNIVERSITI TEKNOLOGI MALAYSIA

- 1 Research Data Management Platform
- 2 Open Science Academic Presentation
- 1 Open Science Policy and Guidelines in review
- 36 Trained Data Stewards

UPM UNIVERSITI PUTRA MALAYSIA

BERILMU BERBAKTI

- 1 Raw Research Data Repository
- 11 Trained Data Stewards

UNIVERSITI KEBANGSAAN MALAYSIA

The National University of Malaysia

- 1 Data Repository in development
- 11 Trained Data Stewards

Open Science Outreach Beyond MOSP Initiative

Besides the 5 research universities under the pilot project, MOSP is also being discussed and promoted by other institutes and individuals

Keluarga Malaysia Berbudaya Ilmu Dengan 'Sains Terbuka'

"**MOSP** diharapkan menjadi suatu strategi penting bagi universiti, institusi penyelidikan, perpustakaan dan para penerbit untuk mencapai hasrat mencipta, menyebar, dan memelihara ilmu untuk manfaat seluruh masyarakat tanpa sempadan.

Perpustakaan Universiti Sains Islam Malaysia (USIM) pula telah menggerakkan Inisiatif Akses Terbuka sejak tahun 2018 sehingga berjaya melancarkan Dasar Akses Terbuka USIM pada 23 Mei 2019, serta membina Sistem Repositori Penyelidikan USIM yang boleh diakses umum bermula pada bulan Jun 2020. Ia membolehkan orang awam mengakses secara percuma kepada semua penulisan warga USIM yang dihasilkan berasaskan penyelidikan."

- Nor Azzah Momin (Head Librarian, USIM Library)

Source: https://www.bernama.com/bm/tintaminda/news.php?id=2031765

Infrastructure development

Target:
To develop and execute one Platform for raw research data sharing by 2022

Engagements with five Research Universities, government agencies (for example, MAMPU & MIMOS) and industries involved in data sharing platforms

Completed

Engagements with KPT to learn about MyGRANTS as a benchmark and cross-reference for MOSP to avoid overlapping information or operational definitions

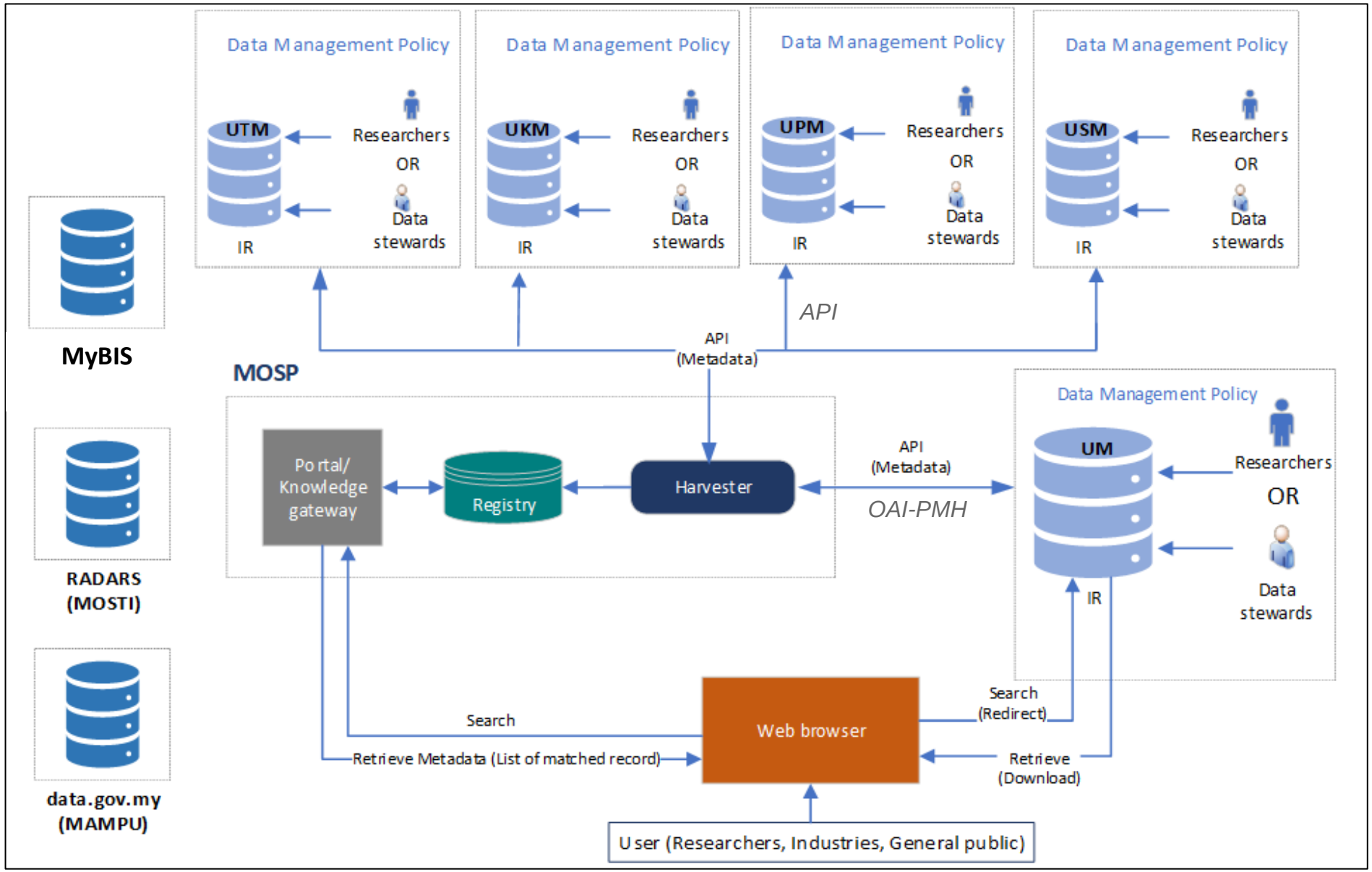
Completed

Development of functional requirements and technical specifications

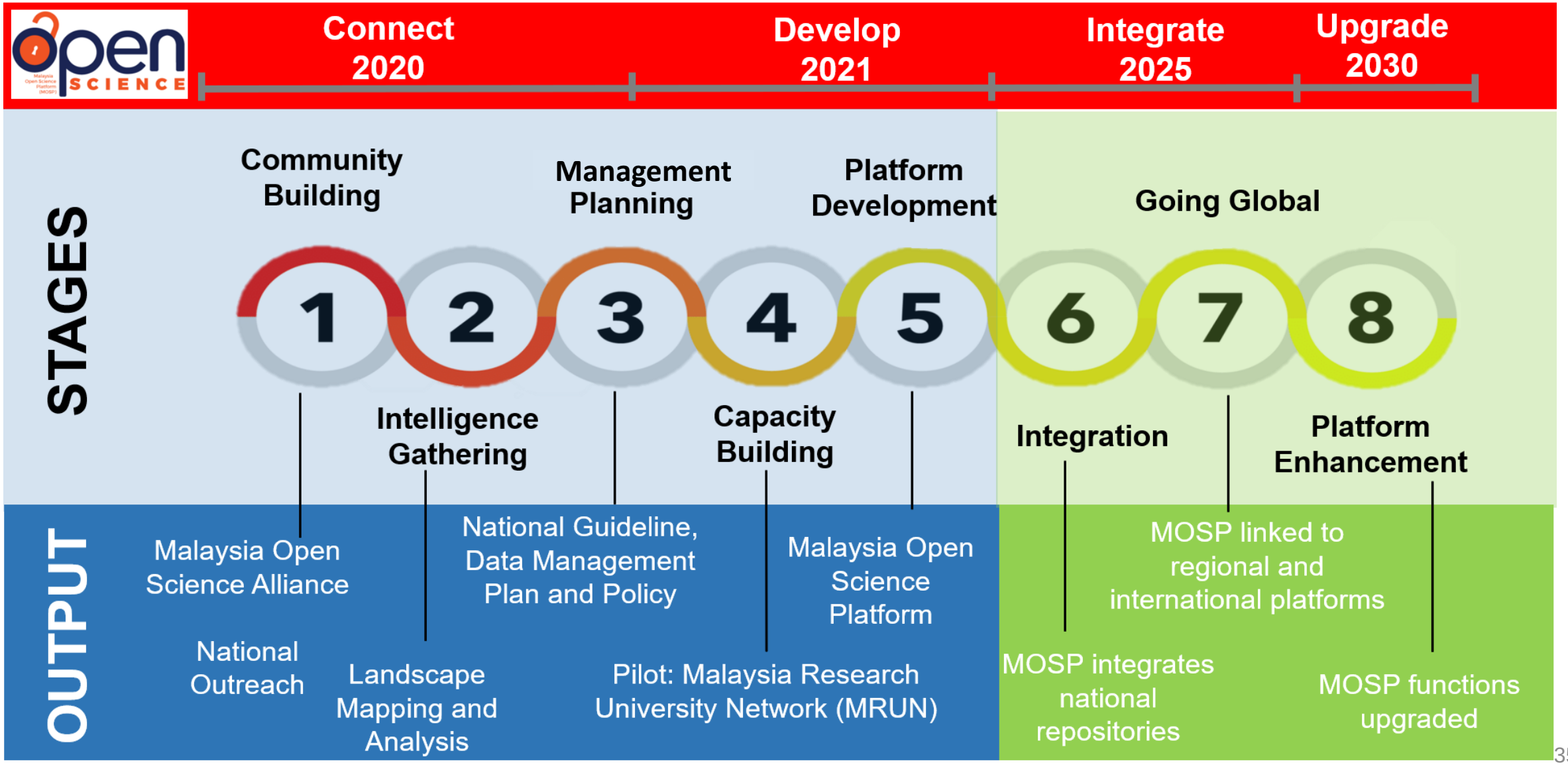
Completed

Raw research data sharing platform executed at 5 Research Universities

MOSP Architecture (Pilot Project)



MOSP Activity and Timeframe



Data Stewardship for Biodiversity

Laying the foundation for Open Science Journey in Malaysia

Project Overview

1. **Project title**: FAIR Data Stewardship Guidelines for Reproducibility in Biodiversity Research (Phase I)
2. **Project duration**: 1 year; from 01.10.2021 until 30.09.2022.
3. **Funder**: ISC ROAP/Academy of Sciences Malaysia
4. **Implementer / Secretariat**: Universiti Malaya

Project Deliverables

1. Produce sets of biodiversity (specimen) stewardship guidelines & training materials.

Three core modules:

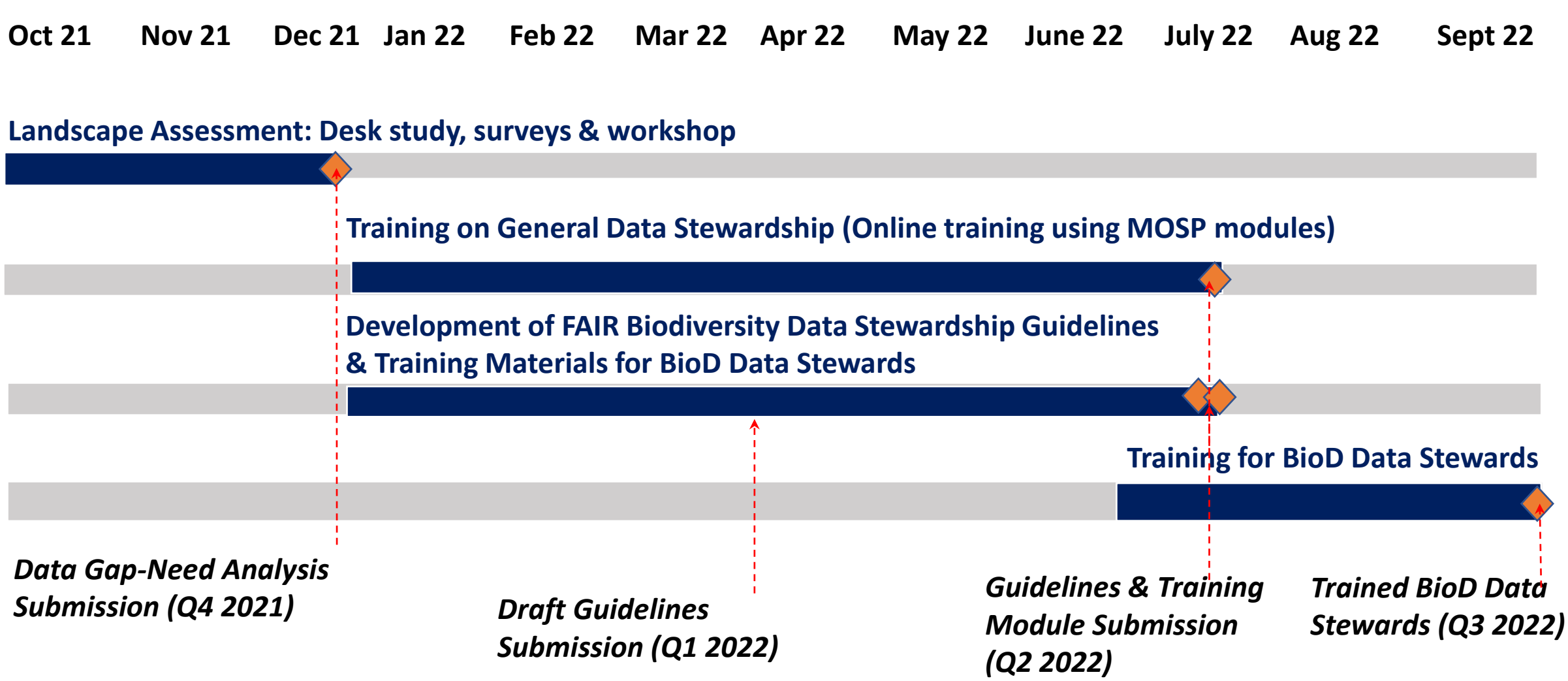
- Biodiversity Data Management
- Digitisation
- Data Cleaning

2. Building capacity in data stewardship for curators, researchers and data custodians

Two parts:

- Part 1: ToT Data Stewardship for Open Science
- Part 2: Physical Training on “FAIR Biodiversity Data Stewardship”

Project Timeline



Snapshots from engagements organized between September 2021 to March 2022

(Malaysia)

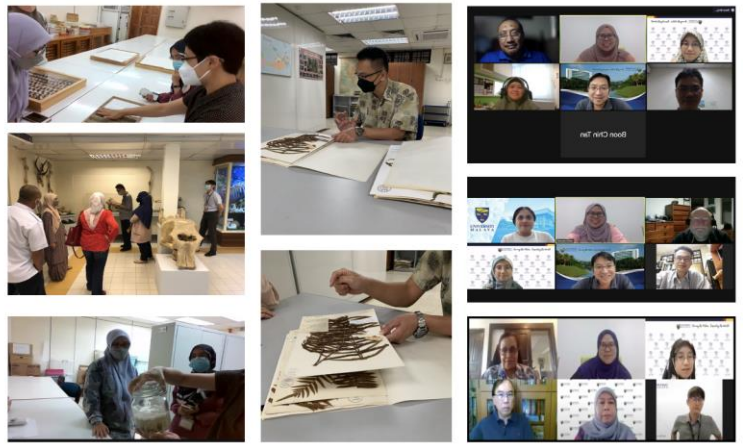
1. Seven Collection Centres & Museums in Malaysia
2. FRIM
3. MyBIS (KeTSA)
4. Universiti Malaya
5. Universiti Kebangsaan Malaysia
6. Universiti Malaysia Sabah
7. Universiti Malaysia Sarawak
8. Sabah Biodiversity Centre
9. Precision BioD Task Force (ASM)

(Overseas)

1. Singapore's Lee Kong Chian Natural History Museum
2. Australian Biodiversity Information Services

(Presentation & Participation)

1. Naming Nature 2
2. CODATA/Global Open Science Cloud
3. TropSc 2021
4. GBIF Asia Virtual Summit 2021
5. STIPAC Presentations
6. Special Seminar on Biodiversity Conservation and Museum Management



Findings from the Data Gap-Need Analysis

1. Biodiversity data management processes and workflows are not standardised

2. Lack of active taxonomists and expertise in digital and physical curation

CURRENT STATE

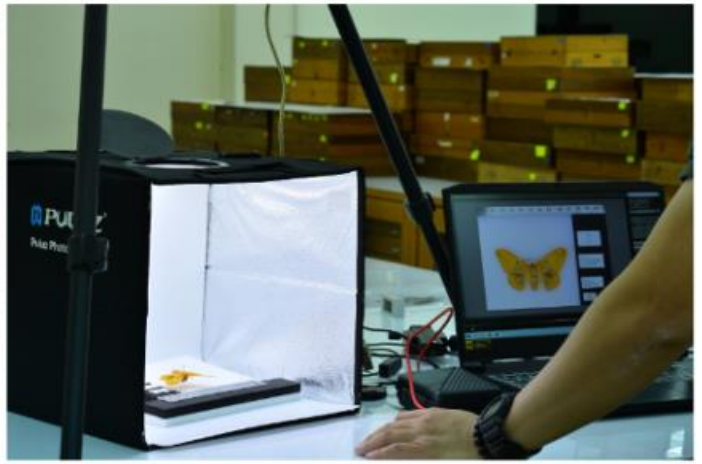
3. There are nomenclature, taxonomic and spatial errors in data entry.

4. Lack of proper guidance for all stakeholders in the data sharing ecosystem.

Overview of the Guideline

Deliverable	**FAIR Data Stewardship Guidelines**		
Domains	**Biodiversity (*Specimen*) Data Management**	**Digitisation**	**Quality Control**
Scopes	1. Cataloguing 2. Labelling 3. Curating and Storing 4. Retrieving and Analysing 5. Disseminating	1. Specimen Preparation 2. Specimen Image Capture 3. Specimen Image Processing	1. Data Quality Assessment 2. Data Cleaning
Key elements	**Roles & Responsibilities**	**Workflows**	**Tools**	**Software**
Outcomes	1. Standardised biodiversity data management & digitisation processes and workflows. 2. High quality and fitness-for-use of biodiversity data 3. Clear roles and responsibilities for data custodians, data aggregators and data in the data sharing ecosystem for biodiversity			

Digitization Filming for Demo Tutorial



DATE: 22 JUNE 2022

Photographing and recording step-by-step:

1. Introduction of Equipment,
2. Digitization Hands-On,
3. File Naming of Digitized Specimen.

FAIR Data Stewardship Guideline Writing Workshop

DATE: 23 – 24 JUNE 2022

TWO MAIN AGENDA:

1. Refine and finalize Guidelines and Training Materials

2. Planning for Stakeholder Engagement Workshop & Capacity Building Activities

FAIR BIODIVERSITY DATA STEWARDSHIP CAPACITY BUILDING PHYSICAL TRAINING

DATE: 26 - 29 SEPTEMBER 2022

PARTICIPANTS: 46 person from 13 Institutions

OBJECTIVES:

1. To create awareness and/or improve understanding about FAIR principle, Open Science, biodiversity data management, digitisation and data quality.
2. To refine, validate and improve draft guidelines and training manuals on Biodiversity (Specimen) Data Management, Digitisation and Data Quality.
3. To provide hands-on training for Biodiversity (Species) Data Management, Digitisation and Data Cleaning modules

Way Forward

Open Science Journey

FAIR BioD Stewardship Guidelines (A one-year project)

Oct 2021 – Oct 2022

Training for Biodiversity Data Stewards

June 2022 - Sept 2022

Digitisation of biodiversity collection

Nov 2022 – 2025 (Under KeTSA)

Development of e-curation platform

Data Aggregator, e.g. MyBIS

The **digitisation training module will be useful for digitisation of biodiversity collection under the KeTSA's initiative*

Issues & Challenges

1. Researchers' "buy-in"
2. Institutional support
3. *Trained and skilled personnels*
4. *Awareness and understanding*
5. *Technical readiness and capabilities*
6. Central "ownership"
7. MAJOR CHALLENGE: SUSTAINABILITY PLAN