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Call for a differentiated and careful approach

SCNAT Workshop on Open Data and Data Management, Bern, 29 October 2018

Open Data ?

Indeed, you have invited the right expert ! …

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Wiki Loves Monuments: Photograph a monument, help Wikipedia

Directive on the re-use of public sector information

From Wikipedia, the free encyclopedia
(Redirected from PSI Directive)

Directive 2003/98/EC on the re-use of public sector information, otherwise known as the **PSI Directive**,[2][3] is an EU directive that encourages EU member states to make as much public sector information available for re-use as possible. Previous to the creation of this directive this area was left to member states to regulate. This directive now provides a common legislative framework for this area.

The Directive is an attempt to remove barriers that hinder the re-use of public sector information throughout the Union.

Need for differentiation

Are we talking about…

Open access to published data?

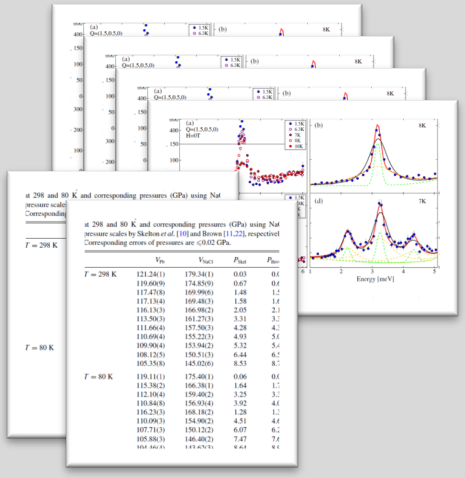
or

Open access to all data enabling an independent reproduciblity of the published data by third parties?

or

Open data to not yet analyzed and published data ("live-access")?

published data << raw-data



PSI per year:

1000 articles per year

…each 4 figures, 2 tables

…each 10-1000 x raw-data

Access to published data

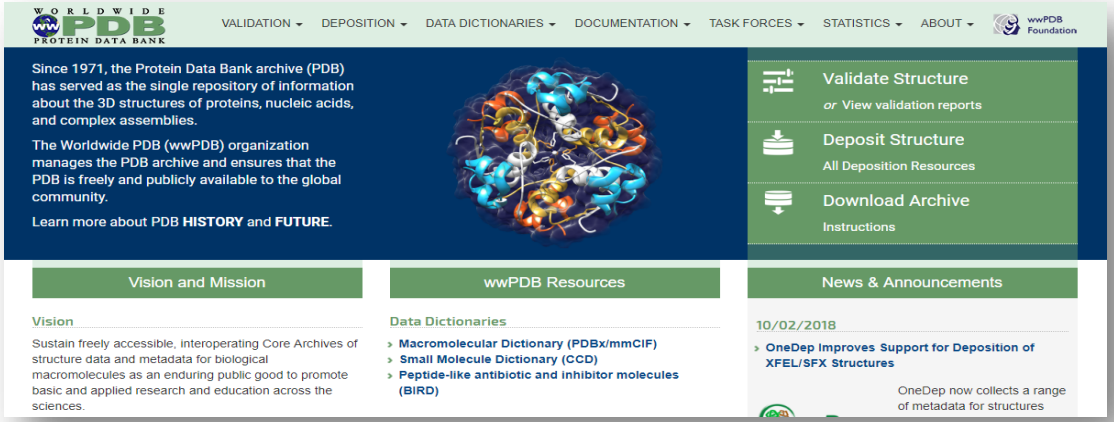
Some arguments in favour of it

- Researchers have a **natural interest** that their findings (= published data) are used and serve as a basis for further knowledge gain.
- Cumbersome digitizing from figures or typing from tables of a publication are **no longer up to date**.
- Effort to place these data in a repository together with reference to the publication for the purpose of explaining the background (= meta-data), represents **minor additional effort for researchers**

However

- National/European regulations should also demand international regulations
- Taxpayers may expect first a national exploitation of the published data

Highly successful example - Protein Data Bank PDB



Total depositions >150’000

Downloads/year > 650’000’000

www.wwpdb.org

X-ray facilities or cryo EM

Research lab

open access Data Bank PDB

Data Acquisition → Data processing → Structural Model and density map → Deposition of data (obligatory for publication) → Entry of a new structure

Megabyte to Terabyte depending on Method → Megabyte → Kilo to Megabyte

Access to raw-data for independent reproduciblity

In principle, this allows for meta-analysis and thus

- enforce more transparency
- fight against fraud, lack of (research) integrity
- impair bibliometric impact as *the* common most important indicator
- avoid duplication of (research) efforts
- (enable faster dissemination)

However

- Ethics, value systems and self-regulation have evolved over more than a century from the scientific community - beware of disruptive top-down regulations!
- Regulations in practice sometimes difficult to implement - enormous effort (preparation, annotation with metadata, archiving, accessibility, quality assurance)
- Switzerland is in an international context (! other standards outside the EU)

Top-down vs bottom-up

Extract from a recent report of the European Commission (2017):

"Researchers and research organisations (including both learned societies and research-performing institutions) are seen as crucial participants in any decisionmaking process mapping future Open Science implementation and related training, so as to ensure successful and effective uptake by the research community."

This very sentence is puzzling, as it stands only as **point #6 (out of 8)** in the list of "key concerns around open science implementation for member states" !

source: «MLE on Open Science: Altmetrics and Rewards – Incentives and Rewards to Engage in Open Science Ativities», p.16, European Commission, November 2017

The problem with “all raw-data”

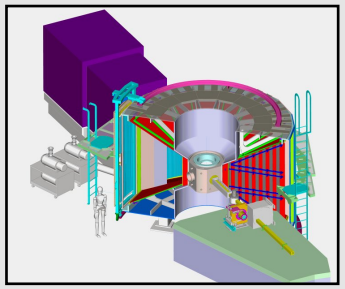
Astrophysical observation

<u>4 parameters:</u>
absolute time
absolute position
wavelength range
resolution

«simple» although potentially more complicated

- telescopes…
  construction and operation details…
- stars and universe
  «sample preparation» unknown…

“Observation” in materials science



<u>>>4 parameters:</u>
sample
instrument
environment
data collection
…

- samples are prepared under complex conditions: composition, processing, quality, dimensions, absolute orientation
- instrument setup: energy and momentum ranges, neutron/photon energies, resolution conditions
- samples are exposed to in-situ conditions: temperature, pressure, electric and magnetic fields, chemical environment, time scale
- data is collected with a wide range of strategies: orientation, acquisition rates

traditionally the publication itself and the references to earlier publications represent the meta-data to the data / versus / stand-alone data enriched with meta-data

Data Production at the Swiss Light Source PSI

Detector

Data Acquisition / Readout

Real Time Feed Back

Offline Data Analysis

Data Archive

High End Computing Center CSCS

PSI

SLS 01 → SLS 01 → SLS 01 → SLS 01

... → ... → ... → SLS ...

SLS 16 → SLS 16 → SLS 16 → SLS 16

S-FEL 01 → S-FEL 01 → S-FEL 01 → S-FEL 01

→ HPC Cluster → Storage → Tape Library

Max. 50 GB/s per detector

Max. 100 TByte per experiment 1-3 days

7-8 PByte 1-6 months

80 PByte for 5-10 years

Reciprocity ?

- Effort to enrich data with metadata for independent reproducibility -> partly gigantic-> competitive disadvantage for CH researchers
- How to handle contradicting regulations within international collaborations with different funding bodies?
  PSI publications: 73% international, 33% >5 institutions
- Commercialisation of raw-data (or published data) by "more protectionist" countries.
  Are we fine with an "RoI" in a third country?
- Disadvantages by setting the example?

Switzerland is not an island.
In the international competition
CH researchers must not be
discriminated against
by hurried obedience.

<u>Similar topic:</u>
Open Access: CH ranked 1st with 39% (cp. mean 30%)
followed by Croatia, Estonia, Belgium,
Great Britain (36%), USA (36%), ..., France (32%),
Germany (31%), ..., Japan (27%), China (17%).
-> With whom do we want to measure ourselves?

Source: European Commission based on Scopus

Conclusions

- Open access to published data
  Yes! Desirable and already being implemented.

- Open access to all data for the purpose of independent reproducibility by 3rd parties
  Difficult to implement in practice, requires HUGE effort

- Open access to enable more efficient use of data
  implement <u>suitable</u> measures for <u>suitable</u> data
  (adapted to individual research areas)

Consider in all three points that:

- Switzerland is not an island
- Research is international
- Must avoid competitive disadvantage for CH researchers and CH economy