

CAN LCA BE FAIR? – ASSESSING THE STATUS QUO AND OPPORTUNITIES FOR FAIR DATA SHARING

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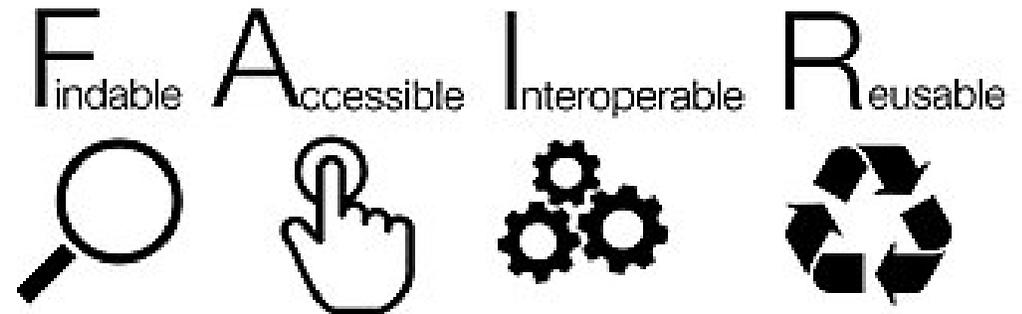


The product life cycle stages (pre-sustainability.com)

Introduction

- **Life cycle assessment (LCA)** is the evaluation of potential environmental impacts of a product throughout its life cycle
- **Data intensive models** - data on raw material, resources, energy and emission flows for all or several processes in a product life cycle

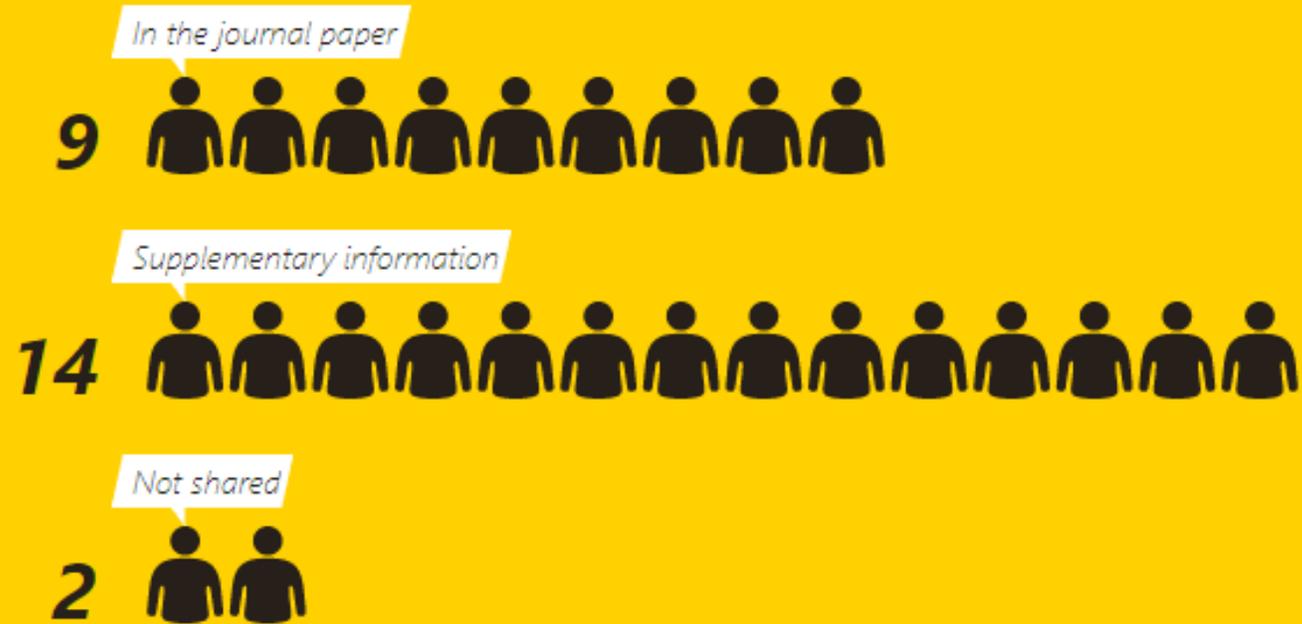
- Growing need for better data
- Widespread agreement on adoption of core FAIR principles (introduced in 2016)
- Implementation promoted across scientific disciplines and geographic boundaries
 - European open science cloud (EOSC) and the European commission; NIH Data Commons (US), the Australian Research Data Commons and the African open science platform



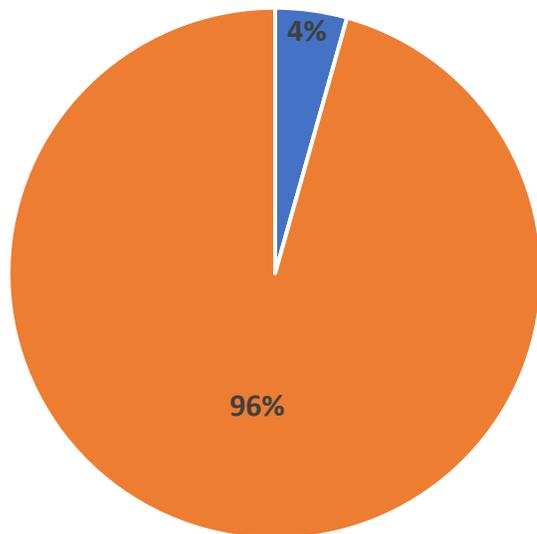
Source: [Wikimedia](#)

HOW WAS THE INVENTORY SHARED?

Key data in LCA
– Life cycle
inventories

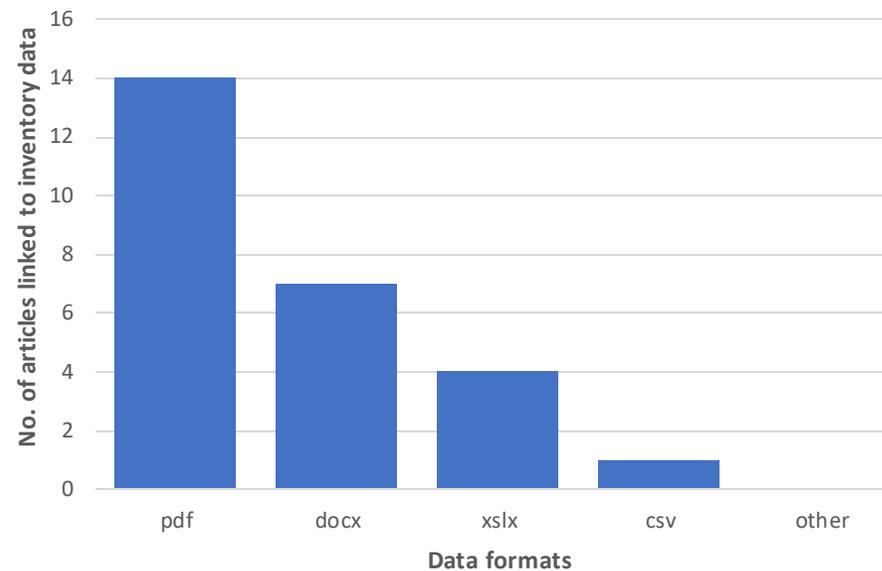


Is the data shared with a persistent identifier

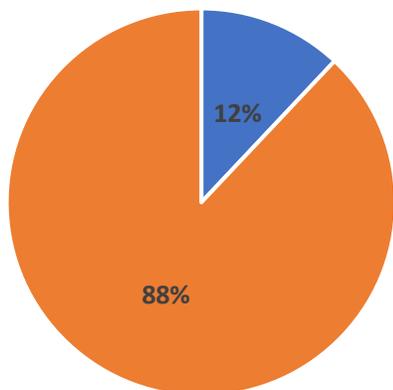


■ Data shared with separate persistent identifier ■ Data shared with doi of the paper

What is the data format?

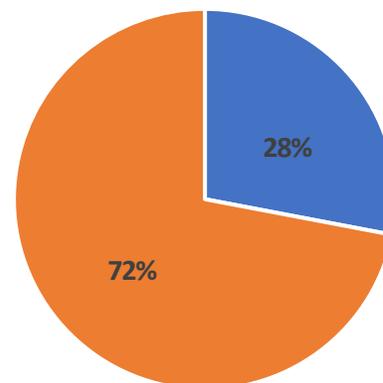


Is the data shared inter-operable ?



■ Data shared such that it can easily be used in common LCA softwares
■ Not interoperable

What licenses are used to share LCI data in peer reviewed studies?



■ Open access licence ■ Access by subscription

FAIRness Assessment tools and metrics



F-UJI

Automated FAIR Data
Assessment Tool



FAIRsFAIR PRecs

FAIR Data Maturity Model (FDMM)

Ten Simple Rules for FAIR vocabularies

O'FAIRe

SHARC (Sharing rewards and credits)

FAIR-IMPACT

Expanding FAIR solutions across EOSC

How do these tools help?



FAIR assessment

F-UJI is a web service to programatically assess FAIRness of research data objects (aka data sets) based on metrics developed by the [FAIRsFAIR](#) project.

Please use the form below to enter an identifier (e.g. DOI, URL) of the data set you wish to assess. Optionally you also can enter a metadata service (OAI-PMH, SPARQL, CSW) endpoint URI which F-UJI can use to identify additional information.

Research Data Object (URL/PID):*

Metric:

[Settings](#)

[▶ Start FAIR Assessment](#)

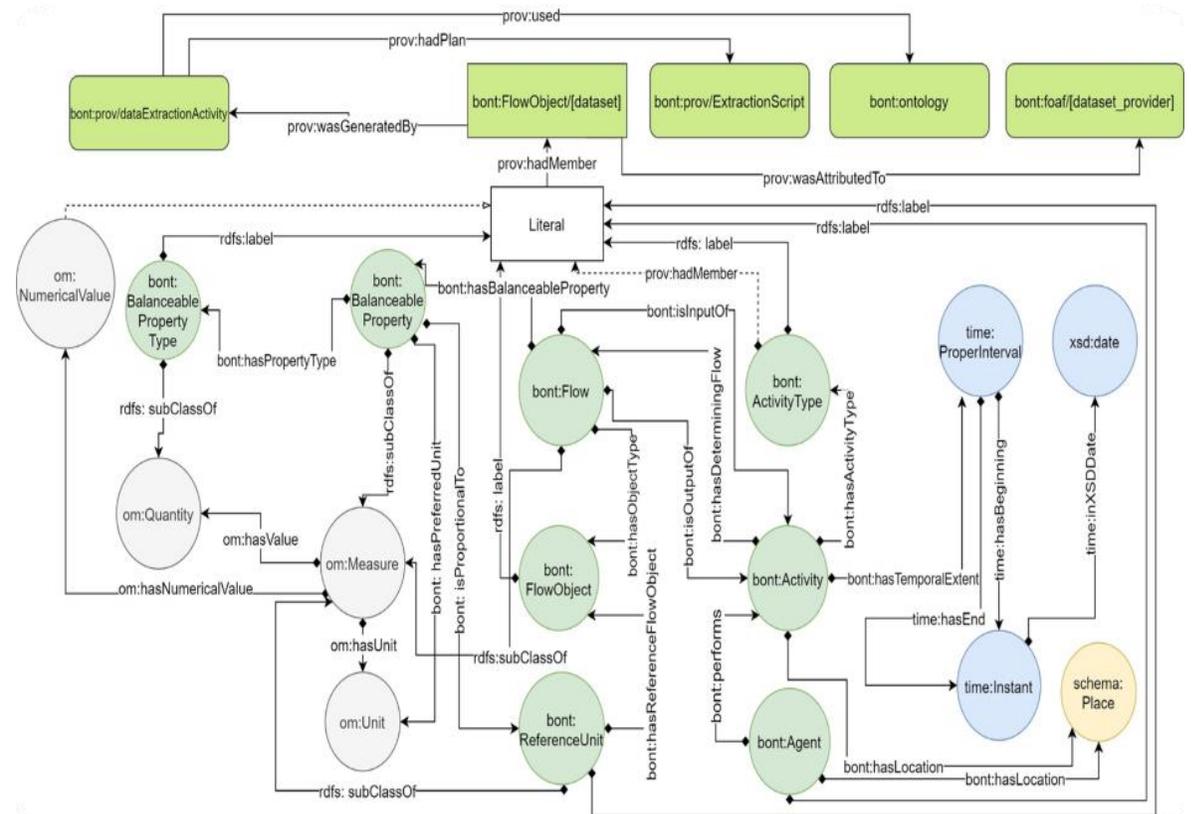
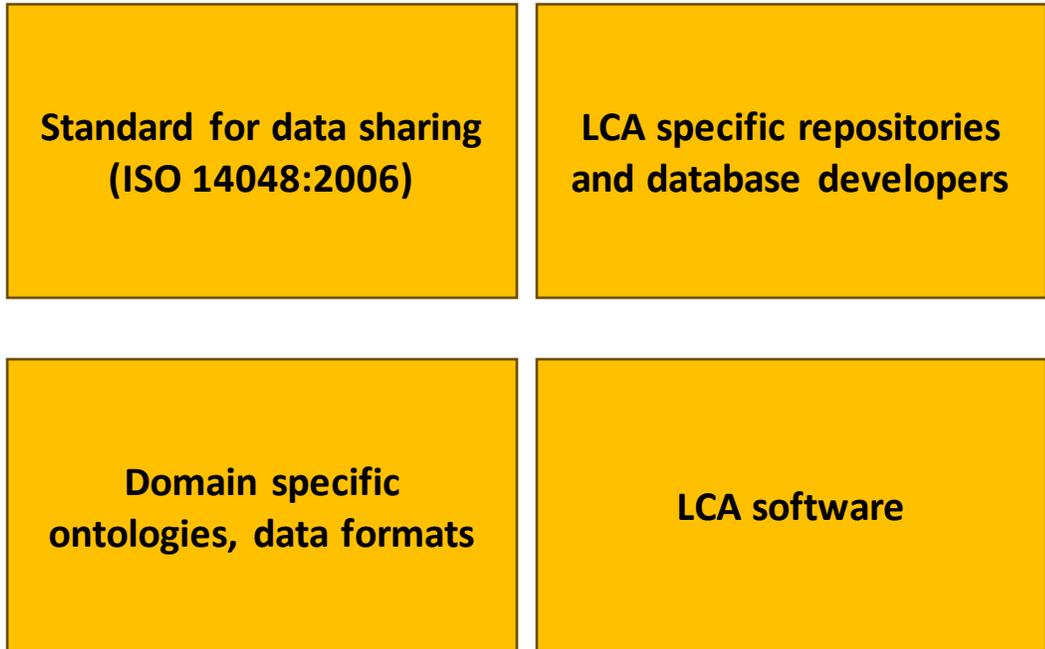
Key Learnings – FAIR Impact Assessment

- Assess the generic recommendations and best practices (MUST, SHOULD, MAY HAVE)
- Using a combination of FAIR tools improved the FAIRness of the digital object (dataset/semantic artefact)
- Authoring metadata can be challenging (generic metadata, domain specific metadata, issues with duplicating info)
- Improving FAIRness score depends on multiple factors and not solely the responsibility of data provider.
- Tools are useful to benchmark the status quo and lead to strategy development in the community

Name of the resources analysed		Chemical Methods Ontology	BONSAI Ontology
P-Rec 1	Does the SA have a persistent identifier of type purl, w3id or handle	1	1
	Does the identifier resolve to a machine readable format?	1	1
	Does the SA provide a GUPRI for version?	0	0
TOTAL		2	2
P-Rec 3	Does the SA have descriptive metadata?	1	1
P-Rec 17	Does the SA have provenance information?	0	1
	Does the SA use W3C Prov?	0	1
TOTAL		1	3
P-Rec 16	Does the SA have a licence?	1	1
	Is the licence machine readable?	0	1
TOTAL		1	2
FAIR SCORE		50	87.5
P-Rec 15	Does the SA describe imports with provenance?	0	0
P-Rec 4	Is the SA published on a dedicated trusted semantic repository?	0	0
P-Rec 14	Does SA's metadata use widely used vocabularies (dc, dct, ...)?	1	1
P-Rec 11	Does the SA use a standard knowledge representation such as SKOS, OWL,...?	1	1
P-Rec 10	Does the SA align with a Top Level Ontology?	0	1
TOTAL		6	10
FAIR GLOBAL SCORE		46.2	76.9

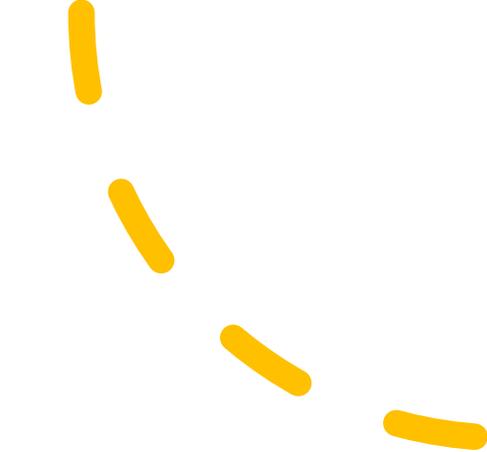
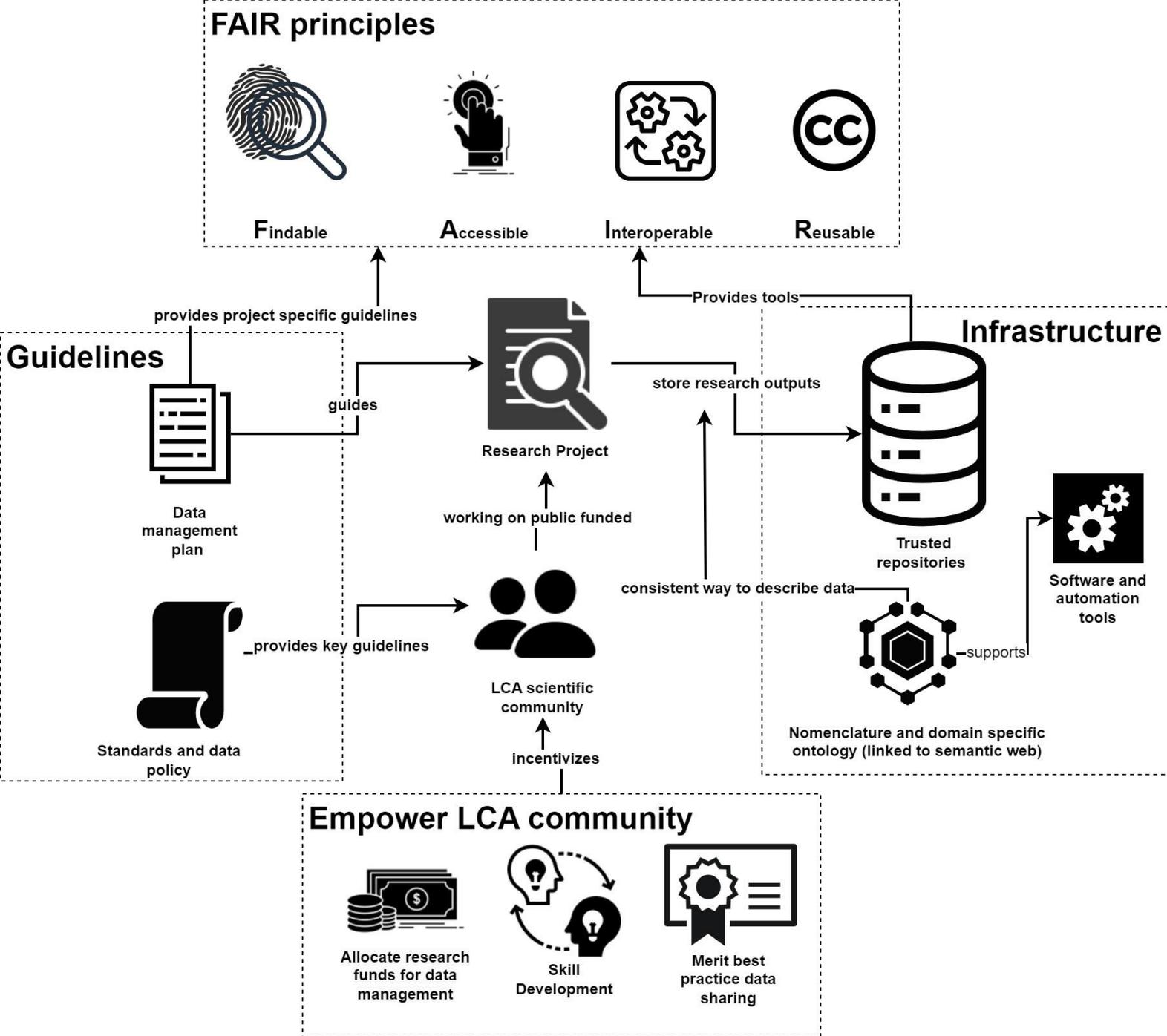
FairSFair questionnaire – Yann Le Franc

LCA Data Infrastructure



Conceptualizing LCA on the Semantic Web using BONSAL ontology ([Ghose et al.2020](#))

A FAIR data ecosystem



FAIR benefits

- Increased research data discoverability and outreach
- Reliable and reproducible LCA models
- Supports database development
- Supports interoperability
- Democratizes the data sharing in LCA community

THANK YOU

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FAIR-IMPACT

Expanding FAIR solutions across EOSC



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