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Implementing FAIR in data sharing: who are the actors and what are their responsibilities?

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In order to make data FAIR, various steps have to be defined. The larger the community, the larger the need for a stepwise FAIRification procedure approved by the whole community (David et al., 2020). Within this chain, each actor has to fulfill his functions using long term approaches (governance, policies, data stewardship, research). Various institutions need to spot the actors for FAIR data sharing within the whole disciplinary community. To improve the implementation of the FAIR principles, it is now essential to map the diversity of actors involved in implementing/training FAIR principles. To do that, it is necessary to describe in a common way (though adaptable to particular cases) the following elements:

RDA-SHARC-IG (SHARing Rewards and Credit Interest Group)*

This work has been done as part of the SHARC-IG, a recognised and endorsed interest group (78 pers., feb 2020) within RDA (Research Data Alliance). RDA is a community-driven organisation that aims to enable open sharing of data worldwide.

- each of the actors having a possible impact on the FAIRification of research data as well as their roles in these FAIRification processes,
- the FAIRification landscape at the international level within which each of the actors is positioned by identifying the resources and networks useful for the different communities
- each of these actors (concerning not only of FAIRification, but also of raising awareness of FAIR, governance of data sharing, training and evaluation of practices and of their recognition / encouragement).

Based on the ongoing work as part of the RDA-SHARC interest group regarding pre-FAIRification processes, this poster presents:

1. a description of the institutional FAIR landscape, of available resources and a view of all actors,
2. a diagram of actions and responsibilities of each actor in the iterative FAIRification process.

Because some variation in research and data science organisation does exist between institutions, this has to be taken into account when implementing FAIR principles. This tentative clarification of actors is the first step that can then be adapted to each national or disciplinary context.

1. FAIR landscape: actors types and roles (one actor can have several roles)

Research funders

The European Commission, national research funders, charitable organisations and foundations, and other funders of research activity.

Policy makers

Governments, international entities like OECD, research funders, institutions, publishers and others defining data policy.

Coordination fora

Global and national bodies such as the Research Data Alliance, CODATA, WDS Communities of Excellence, GO FAIR, German Data Forum (RatSWD), Dutch Coordination Point (LCRDM), DataONE, the Australian Research Data Commons (ARDC) and similar initiatives.

Standards bodies

Formal organisations and consortia coordinating data standards and governing procedures relevant to FAIR, e.g. repository certification, curriculum accreditation (e.g. W3C, NIST, ISO and national bodies).

Research providers

Institutions, universities and research organisations, private companies

Research communities

Practitioners from all research fields, clustered around disciplinary interests, data types or cross-cutting grand challenges.

Data service providers

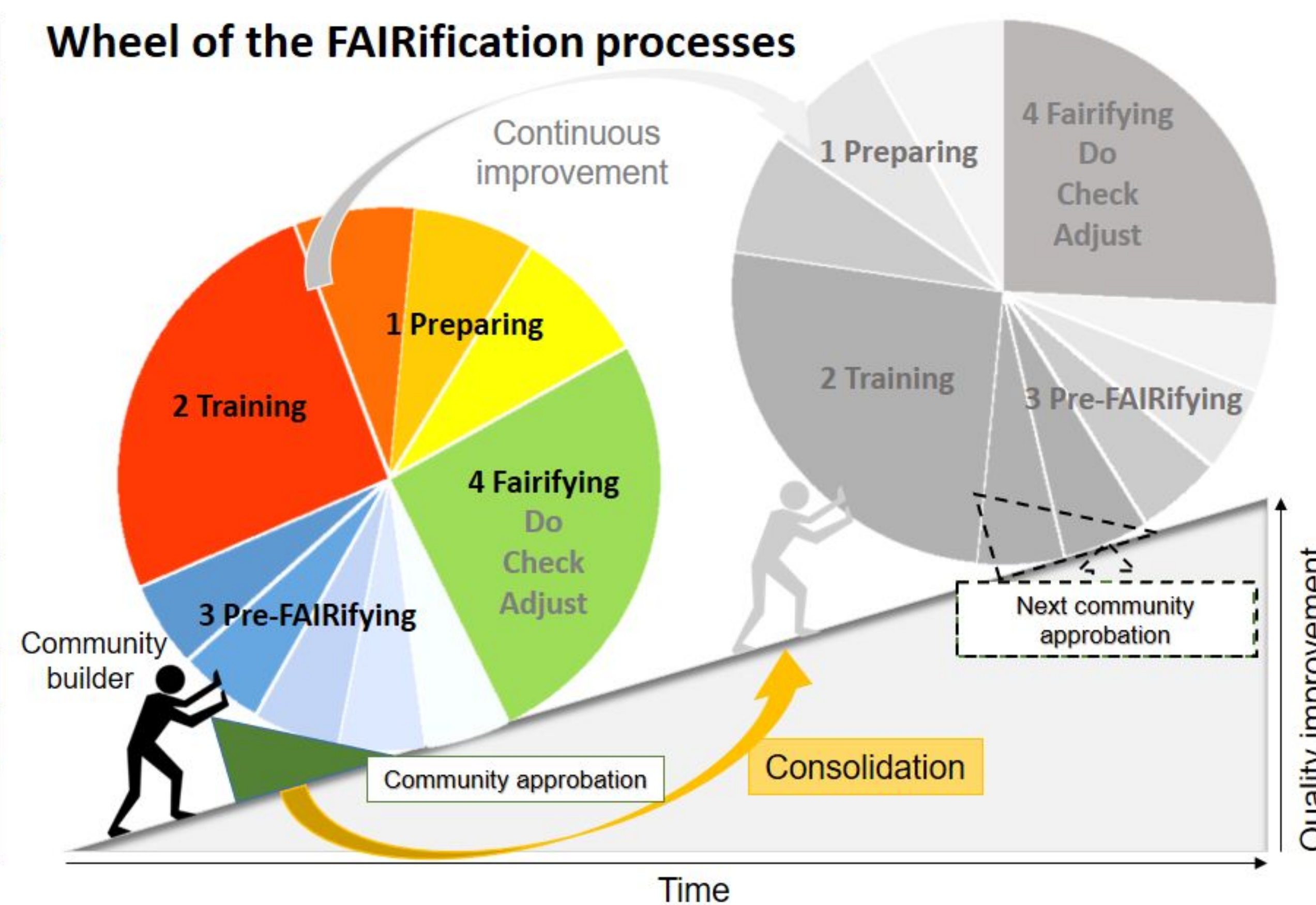
PID providers, domain repositories, research infrastructures (e.g. ESFRIs) and e-infrastructure, institutional, publishers, community and commercial tools and services.

Data stewards

Support staff from research communities and research libraries, and those managing data repositories.

Process	Steps
Preparing FAIRification	Explain FAIRification
	Define constraints
	Define advantages
Training	Increase FAIR literacy
	Convince partners
Pre-FAIRifying	Building shared strategy
	Define community
	Define objects and variables
	Select items to be identified
FAIRifying	Do: Downward levelling
	Check: first interoperations
	Adjust: Identifying gaps and new expectation

Wheel of the FAIRification processes



FAIRification can be schematized as a 'Deming wheel' describing iterative quality steps that needs to be approved by the community throughout the process (David et al., 2020, pre-print). This schema displays the "preparing" and "training" phases as *sine qua non* conditions for pre-FAIRification (David et al., 2019). The pre-FAIRification processes must be community-approved at each iteration. The FAIRification steps 'check' and 'adjust' implementation must be approved by the community before a new iteration.

2. Actions and responsibilities of each actor at the various steps of the iterative FAIRification process.

- E: Evaluate
- F: Fund
- G: Guide
- I: Implement
- P: Pilot (at least 1 per phase)
- R: Reward
- T: Train
- V: Validate

!! Take home messages !!

- **Before planification: all actors are involved.**
- **At every step**, four types of actors are required:
 - Coordination fora,
 - Standard bodies,
 - Research communities,
 - Data stewards

Research communities are essential to pilot and validate the FAIRification processes.

FAIRification processes and steps

		Explain FAIRification	Define constraints	Define advantages	Increase FAIR literacy	Convince partners	Building shared strategy	Define community	Define objects and variables	Select items to be identified	Analyse common Denominators (objects, variables)	Do: Downward levelling	Check: First interoperations	Adjust: Identifying gaps and new expectation
Research funders		F	E	E	FR	R						FR	E	R
Policy makers		G	E	E	GR	RG	G					E		
Coordination fora		G	G	G	G	G	G	G	G	G	G	G	G	G
Standards bodies		GT	G	G	GT	G	T		G	G	T	GT		G
Research providers		GT	E	E	GT	GV	GT	GI				ET		ER
Research communities		C	IP	IP	EV	PI	IV	PIV	V	V	V	IP	IPV	IPV
Data service providers		CG	GV	G	IT	I	GIT				V	IT	V	I
Data stewards		PCG	GV	GV	IPT	I	IPT	I	IP	IP	IP	IT	EI	I
		Preparing			Training		Pre-FAIRifying				FAIRifying			

This table is an ongoing work that needs to be collectively discussed. Your feedback is welcome.

* MORE INFORMATION ON SHARC IG WORK STEPS:

- ★ SHARC interest group at www.rd-alliance.org/groups/sharing-rewards-and-credit-sharc-ig
- ★ Romain David, Laurence Mabile, Mohamed Yahia, Anne Cambon-Thomsen, Anne-Sophie Archambeau, et al. **Operationalizing and evaluating the FAIRness concept for a good quality of data sharing in Research: the RDA-SHARC-IG (SHARing Rewards and Credit Interest Group).** assemblée MaDICS 2018, Nov 2018, Strasbourg, France. 2018. (10.5281/zenodo.1745374). (hal-01929834)
- ★ Romain David, Laurence Mabile, Mohamed Yahia, Anne Cambon-Thomsen, Anne-Sophie Archambeau, et al. **How to operationalize and to evaluate the FAIRness in the crediting and rewarding processes in data sharing: a first step towards a simplified assessment grid.** JNSO 2018 - Journées Nationales de la Science Ouverte, Dec 2018, Paris, France. 2018. (hal-01943521v2)
- ★ Romain David, Laurence Mabile, Mohamed Yahia, Anne Cambon-Thomsen, Anne-Sophie Archambeau, et al. **How to assess FAIRness to improve crediting and rewarding processes for data sharing? A step forward towards an extensive assessment grid.** RDA 13th (P13) Plenary Meeting, Apr 2019, Philadelphia, United States. (10.5281/zenodo.2625721). (hal-02094678)
- ★ Romain David, Laurence Mabile, Mohamed Yahia, Mogens Thomsen, Anne Cambon-Thomsen. **Evaluation tool of FAIR criteria literacy and compliance to foster research data sharing.** 2. Open Science FAIR Conference: « Synergies for Sustainable, Open and Responsible Research », Sep 2019, Porto, Portugal. 2019. (hal-02164148)
- ★ Romain David, Laurence Mabile, Alison Specht, Stryeck, Sarah, Mogens Thomsen, et al. **FAIRness Literacy: the Achilles' Heel of applying FAIR Principles.** 2020. (hal-02483307)
- ★ FAIR assessment template: <https://docs.google.com/spreadsheets/d/1v0qbeKlGqIDwzE9jqZzoaoDCbwYQlxOWbZzxiYbl/edit#gid=448406479>

* E.U. European Commission, Turning FAIR into reality, 2018, doi:10.2777/1524. <https://op.europa.eu/en/publication-detail/-/publication/7769a148-f1f6-11e8-9982-01aa75ed71a1/language-en/format-PDF/source-80611283>



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