Open Science Study

Open Evaluation conference

Vienna, 25 Nov. 2016

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ZSI

Open Science Study – Project

- Study commissioned by the European Commission
- Start: Jan. 2015; end: Feb. 2016
- Objectives:
  - Refine *Open Science* vision
  - Suggest an initial set of metrics (OS uptake/impact)
  - Suggest framework for an OS observatory

focus today

- Methods: desk research / interviews / future scenarios / focus groups / online assessment

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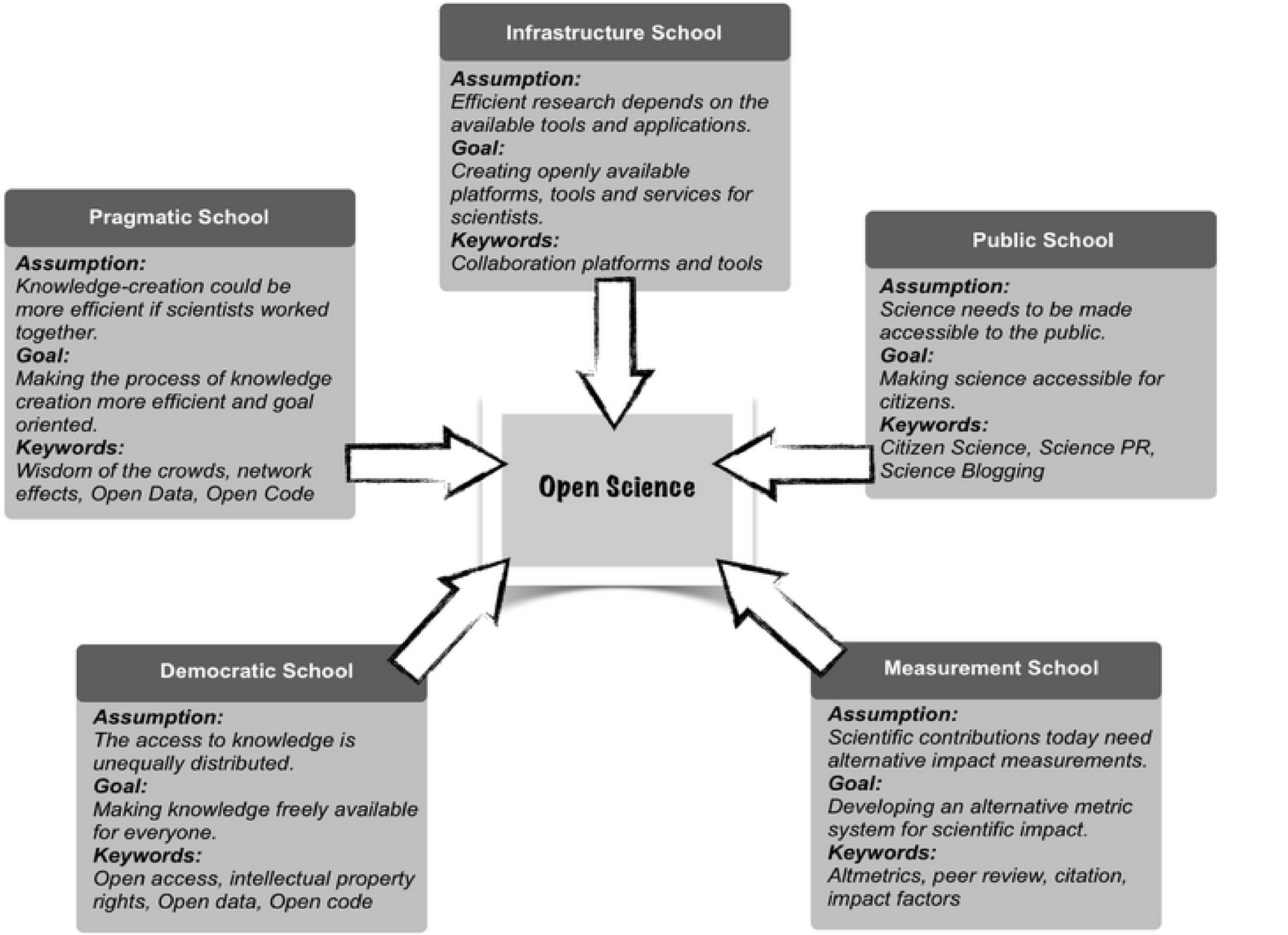
5 predominant thought patterns in the current Open Science discourse

(source: Open Science: One Term, Five Schools of Thought, Benedikt Fecher & Sascha Friesike)



opening science

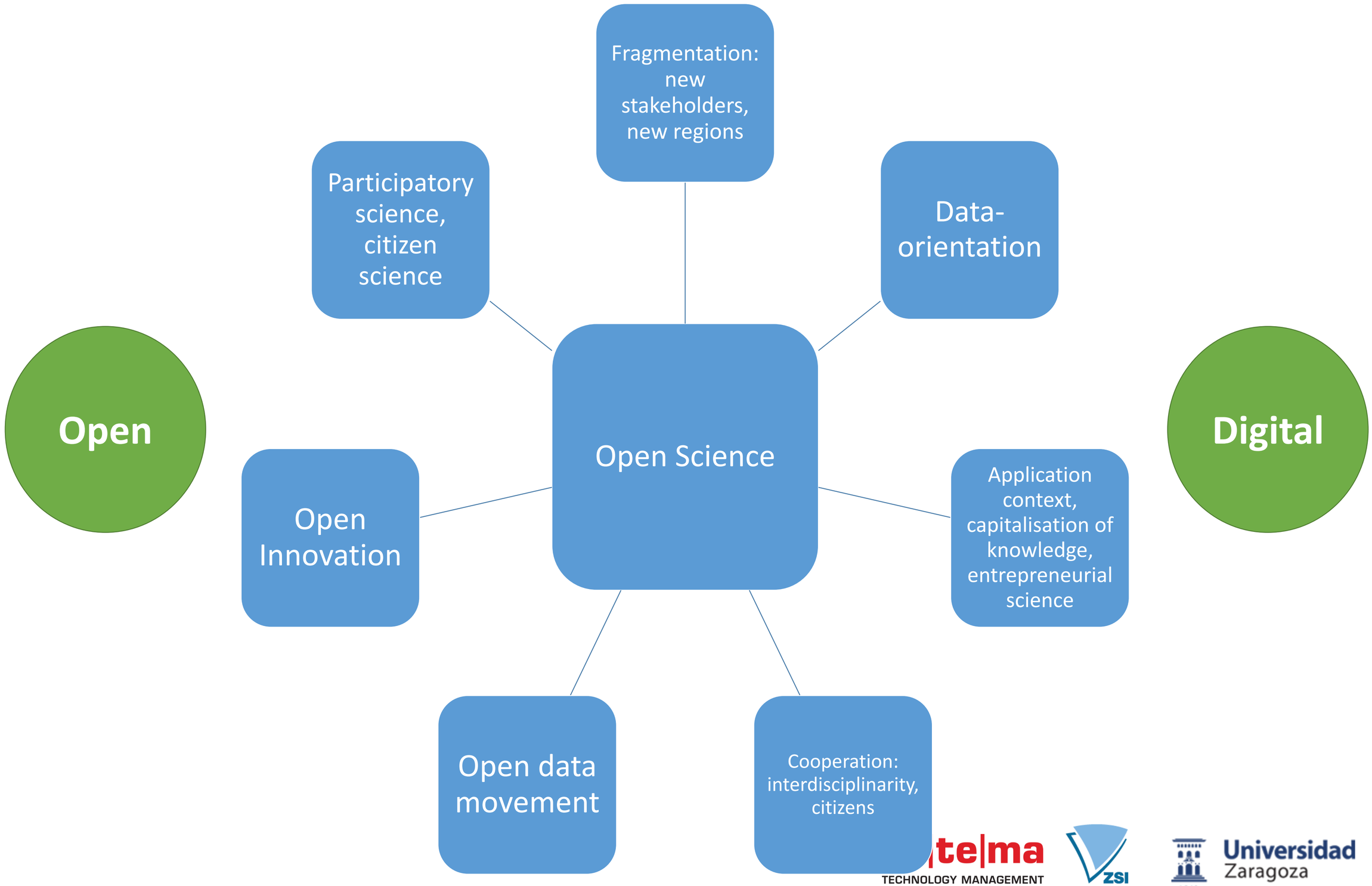
Expectations

What is expected of OS?

- Improving efficiency in science
- Increasing transparency and quality in the research validation process
- Speeding the transfer of knowledge
- Increasing the knowledge spill-overs to the economy
- Addressing global challenges more effectively
- Promoting the engagement of citizens in science and research

Source: OECD 2015b

OS Context



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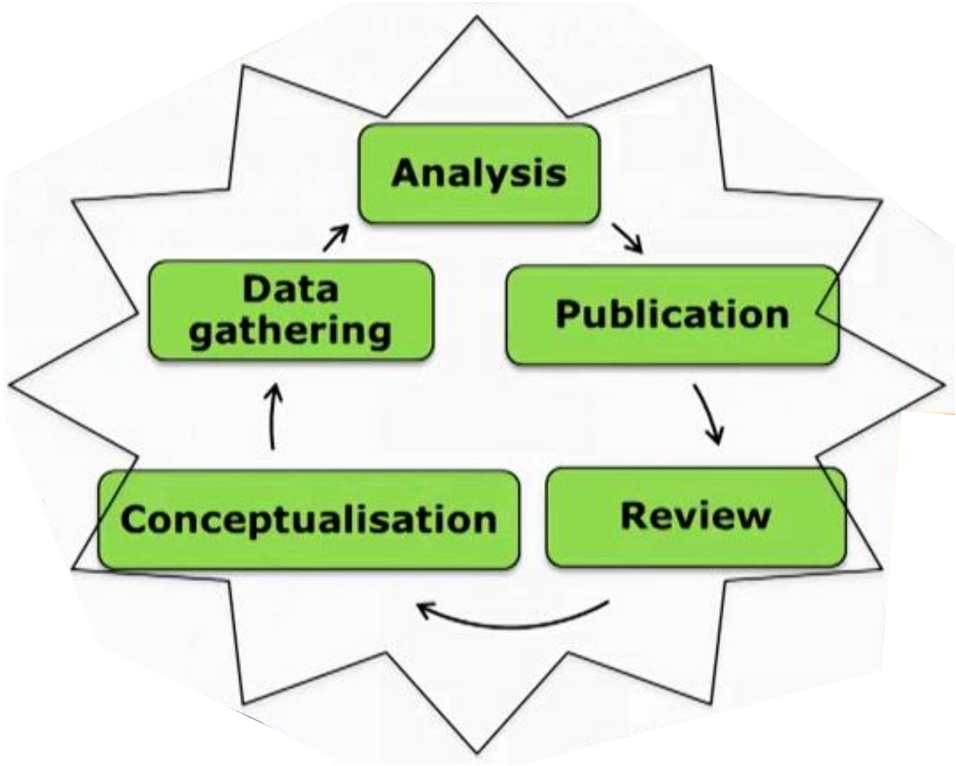
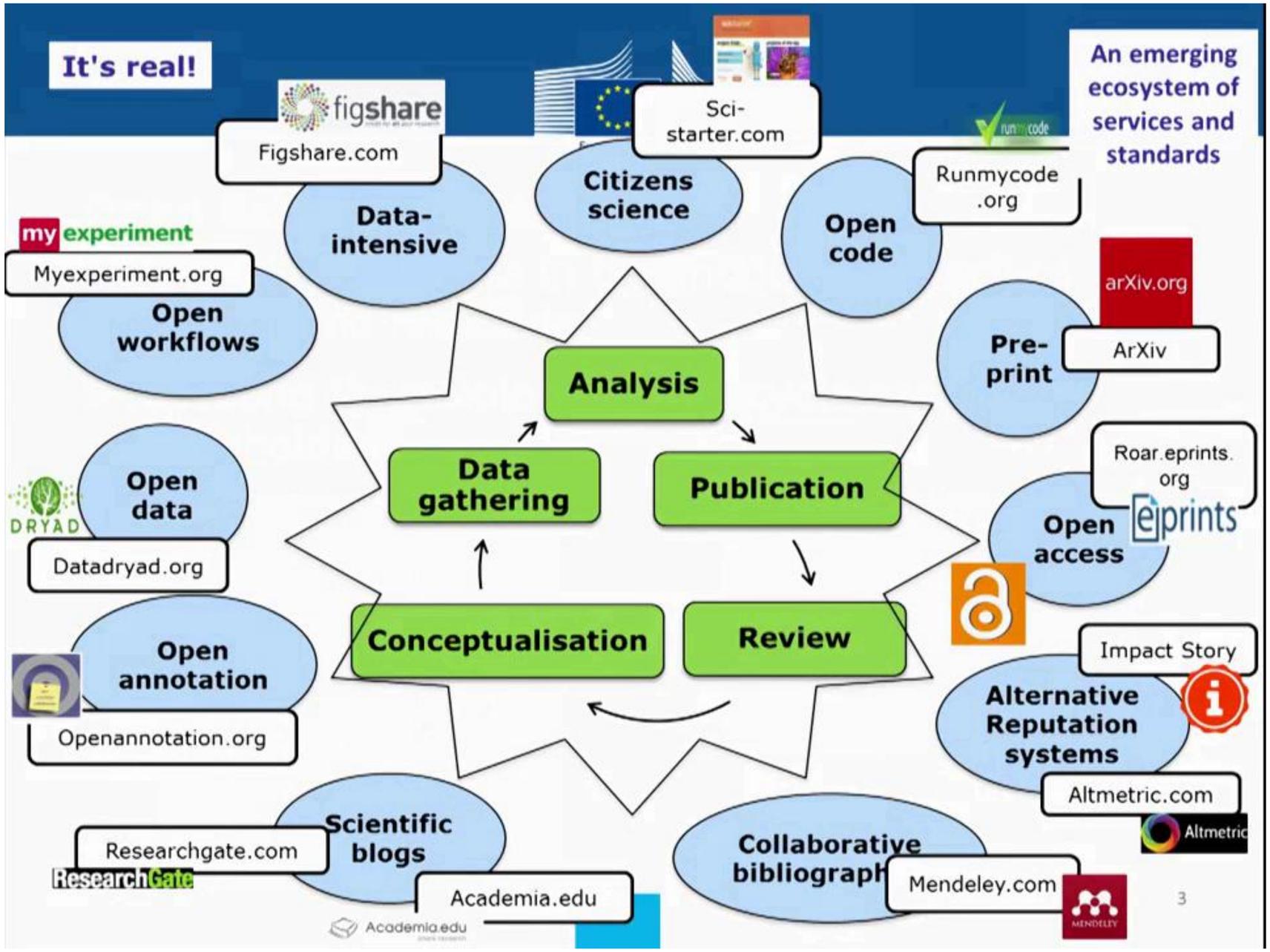
Open Science Ecosystem



Open Science Ecosystem



source: Jean-Claude Burgelman (EC, DG Research and Innovation)

What is already being measured?

ALTMETRICS

- Viewed – HTML views
- Downloaded/saved – as viewed plus saved, including saved on sites like CiteULike, Mendeley, and other social bookmarks
- Discussed – journal comments, science blogs, Twitter, etc.
- Recommended – F1000Prime
- cited – citations captured by PubMed, Wikipedia, CrossRef, Web of Science, Scopus, etc.

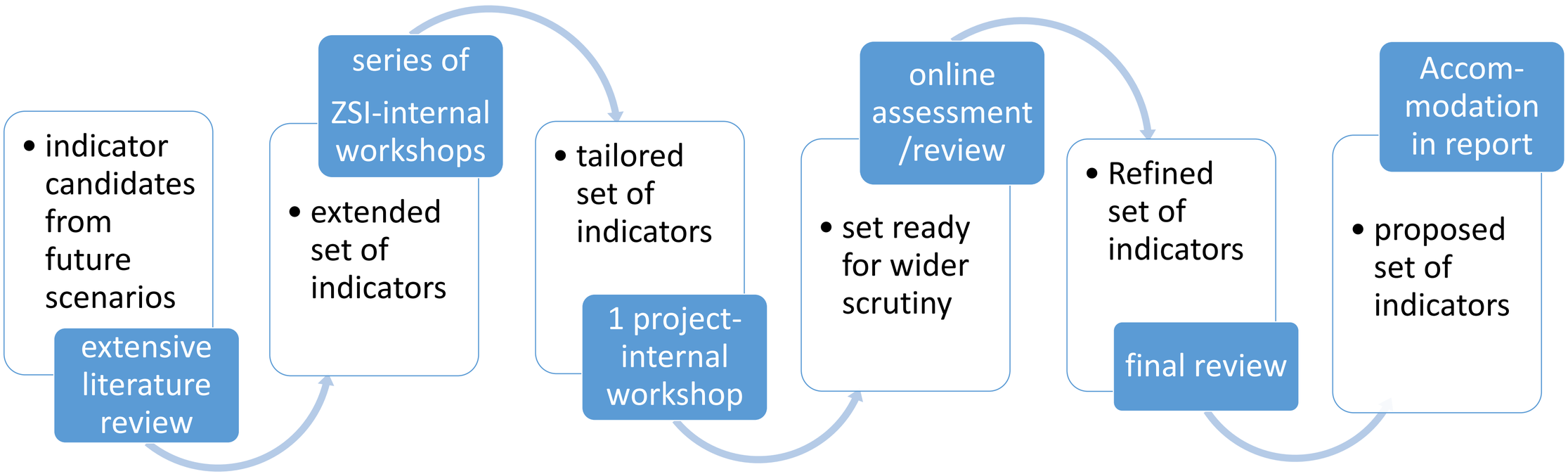
What do we want to measure?

⇨ the uptake and impact of Open Science

Guiding questions:

- How widely is OS accepted/adopted in practice?
- How have different phases in the scientific process changed due to OS?
- What changes are being perceived on the system level?

How we developed the indicators



Results of the process

+more than 60 indicators developed

+Categorised into two dimensions

+clustered into seven sub-dimensions

+attributed responsibility to major stakeholder groups

- policy-makers
- research funders
- research organisation
- (individual) researchers
- publishers

Results of the process

Dimensions (2) and sub-dimensions (7)

A) the scientific process:

- **conceptualisation and data gathering/creation**
- analysis
- diffusion of results
- **review and evaluation**

B) the system level:

- **reputation system, recognition of contributions, trust**
- open science skills and awareness
- science with society

Conceptualisation & data gathering/creation

Requirements from research funders	mean rating (0..10 max.)
% of research funders that mandate the provision of the data / software code produced in the context of the funded activity AND who mandate the conformity to data (exchange) standards	7.9
RFO PM	

Accessibility	mean rating (0..10 max.)
accessibility of open data / code as % of all data / code produced by publicly (co-)funded projects	9.1
R RO RFO	

Machine-readable	mean rating (0..10 max.)
% of machine-readable data / metadata	7.9
PU R RFO	

Review and Evaluation

Openness in calls for proposals	mean rating (0..10 max.)
openness in call for proposals (open proposals, open submissions, open review)	7.8
	PM **RFO** **RO**

Review criteria	mean rating (0..10 max.)
% of peer reviews that include reproducibility and transparency as review criteria	7.7
	RFO **PU**

Review and Evaluation

Further potential indicators

- % of reviews performed by non-scientists (meaning people who are not academic or scientific staff of universities or research centres)
- % of peer reviewers considering Open Science as an asset
- For research funders: % of open access publications referenced in publication lists submitted for evaluation
- For journals: % of open access publications present in reference lists of submitted manuscripts

Reputation System, Recognition of Contributions – Roles in the Scientific Process

Term	Definition
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims
Methodology	Development or design of methodology; creation of models
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components
Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs
Formal Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools
Data curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse
Writing – Original Draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation)
Writing – Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team
Project Administration	Management and coordination responsibility for the research activity planning and execution
Funding acquisition	Acquisition of the financial support for the project leading to this publication.

sources:
Amy Brand, Liz Allen, Micah Altman et al. (2015): Beyond authorship: attribution, contribution, collaboration, and credit .
Liz Allen et al. (2014): Credit where credit is due.

Reputation system, recognition of contributions, and trust

Data communication as valued scientific contribution	mean rating (0..10 max.)		
data communication recognised as criterion for career progression (yes/no)	7.5		
	RO	R	PM

Suggestions of new indicators on the basis of survey comments:

- % of publications in Open Access Journals
- % of publications in Open Access Journals with no Impact Factor
- availability of means to easily publish negative results

Challenges / Conclusions

- Developing adequate indicators is challenging
- Initial literature review showed that little has been done so far
- Altmetrics of some use but have not taken off (yet?)

⇨ little substance to build on => adapted project approach

- More conceptual work + evidence gathering required

⇨ Appeal to evaluation community: <u>get yourself involved!</u>

Open discussion

Thank you for your attention!

Thoughts / Questions / Ideas?

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Literature

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