Transition to Open Science: an historical, philosophical and sociological perspective

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Science and its Problems 1

- *Novelty and quantity* are dominant over quality, replication, relevance and impact
- Short-termism and risk aversion because of 4-year funding cycles
- Fields and research with high societal impact, but low impact in the metrics system suffer

Science and its Problems 2

- Universities outsource talent management to funders based on flawed metrics instead of having a profile and research strategy going with their mission

- Open Science (responsible) research practices, stakeholder engagement, preregistration, FAIR DATA and Open Access are just ‘nice to have’

- **The national and institutional research agenda is not properly reflecting societal (clinical) needs and disease burden**

Transition to Open Science: how?

Study the problems of the current science system, their main origins and what can be done about it:

The different and dominant 'images' of science and research
The different cultures and practices of research in academia
The institutional, national and international organization of science
The underlying assumptions and their distorting effects on the Incentives and Rewards system.

Transition to Open Science: how?

Understanding the main origins of problems of the current science system.

A closer look at The ‘Legend’…

The standard/popular image of Science and Research: the 'Legend'*

There is a unique 'scientific method' that quarantees objective truth of general, universal and timeless theories and claims.

These claims allow understanding, prediction and control of our world (nature/men).

The method is logical-empirical and has a firm timeless formal foundation.

*Kicher 1993; Ziman, 2000

The standard/popular image of Science and Research: the 'Legend'*

Facts and values; science and non-science are neatly separated, which makes science objective and neutral

The Legend 'explains' the succes of the 'hard' sciences; the 'soft' social sciences and humanities are methodologically problematic

***Kitcher 1993; Ziman, 2000 Real Science; Miedema, Science 3.0, 2012**

The ‘Legend’, a flawed, but still dominant image of science determines and distorts the practice of scientific inquiry.

1. This is reflected in the organization and the politics of academia (‘the credit cycle’)

2. This works through the still dominant criteria for excellence used in research evaluations throughout the ‘credit cycle’ by universities, funders & journals

scienceintransition.nl 2013, 2014

The 'Legend' distorts the practice of scientific inquiry through flawed academic hierarchies

1. Natural and biomedical science >> Social science >> humanities (**'physics envy'**)
2. Theoretical & pure science >> applied science and technology
3. Curiosity-driven research is the best for solving societal problems (the linear model)
4. Science should be autonomous, not interfered by external publics or politics and their problems
5. Scientific knowledge is neutral; scientists are not responsible for the knowledge they (don't) produce

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scienceintransition.nl 2013, 2014

The Scientific Field: Professional Interests, Elites, Stratification, Power Struggle, and Economics

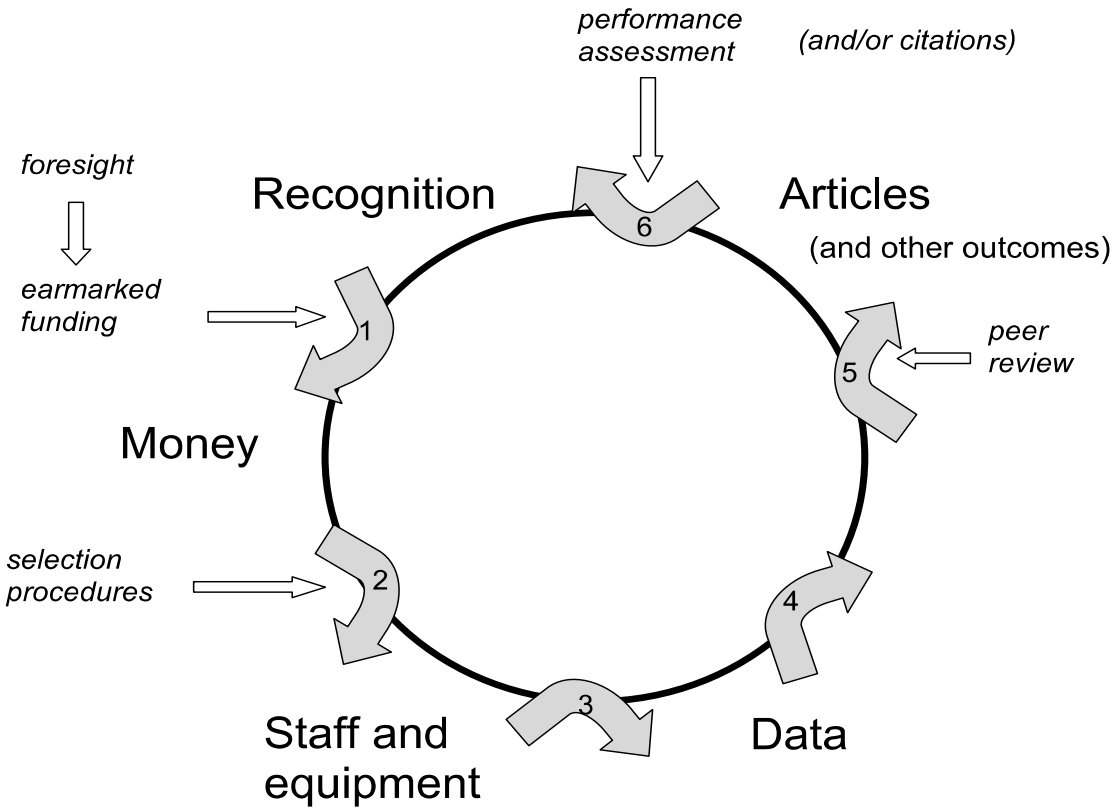


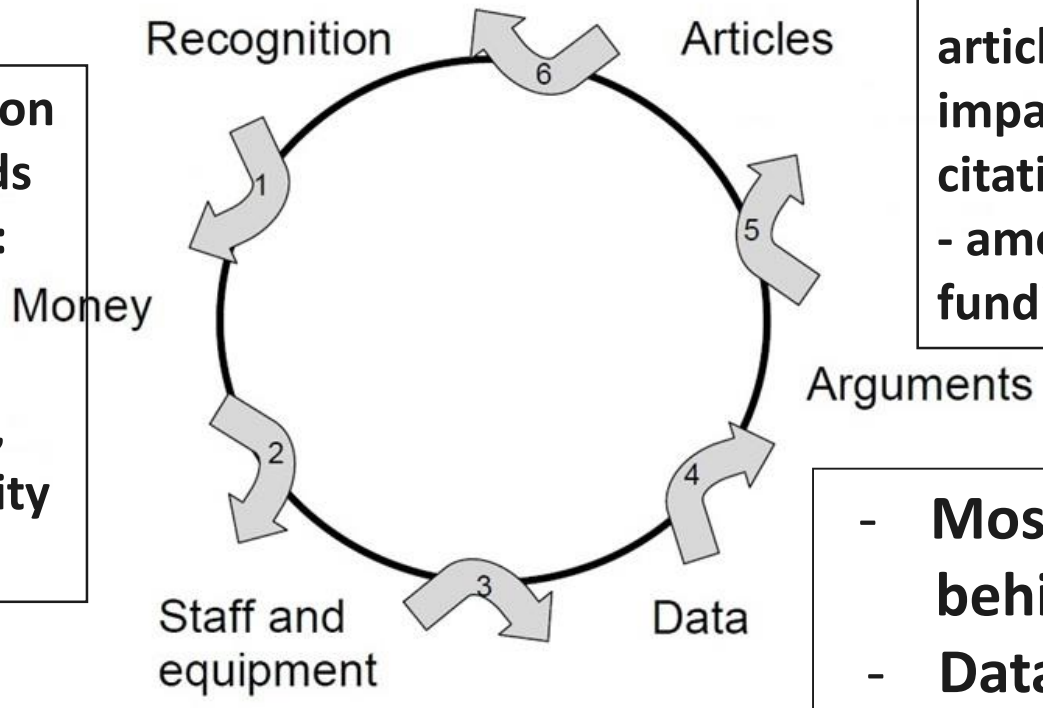
Figure 3. The credibility cycle, adapted from Latour and Woolgar (1986). Points at which organizational devices connect to the cycle are shown

Problems of the Current Reward System in Science

Society is largely absent from the *credibility cycle*

Hypercompetition for limited funds works against:

Team-Science, Multidisciplinarity & Diversity



Quality in Quantitative terms:
- number of articles, journal impact factor, citations, H-index
- amount of funding obtained

- **Most papers still behind paywalls**
- **Data not shared**

Demise of the ‘Legend’ (1970- ….) :

From the late 1960s philosophers, sociologists and historians of science gradually but definitly

showed the Legend to be untenable.

Demise of the 'Legend' (1970- ….) :

No ('given') Foundation

No Dichotomies: Values and Observations are entangled

No Formal Analytical Methods to reach claims

'Truth' is not absolute, but becomes apparent in action

Quine 1957; Kuhn 1962;Toulmin 1972; Shapin 1982, 1995; Habermas 1968, 1971; Latour 1987; Ziman 1978; Hacking 1983; Bernstein 1982; Putnam 1981; Kitcher 2001, 2012;

Towards a realistic (neopragmatist) view of science

Science and the natural sciences have no, never had, a unique formal method to produce ‘truth’, that is a persistent myth

Hypotheses are tested in experiments, discussed, improved and accepted by the community of inquiry, until a better alternative comes along

Claims are constrained by (natural and social) reality when tested in experiments and discussions with peers

Peirce, Dewey, James, Popper 1937, Quine, Toulmin 1958, Kuhn, Feyerabend, Putnam 1981; Hacking 1983.

Towards a realistic (neopragmatist) view of science

Inquiry is a social process producing reliable knowledge

Value of a claim (‘truth”) is shown and proven by its use in experiments and/or actions in the context of the problem the research started with

Research is guided by cognitive, but also by ethical, social, cultural values

The Promise of Open Science

Open Science will:

At the organizational level improve academic culture and the daily practice of research

Foster responsible research conduct and research integrity at several levels

Will improve the interaction with society and increase the impact of science

Open Science Evaluation: Incentives and Rewards

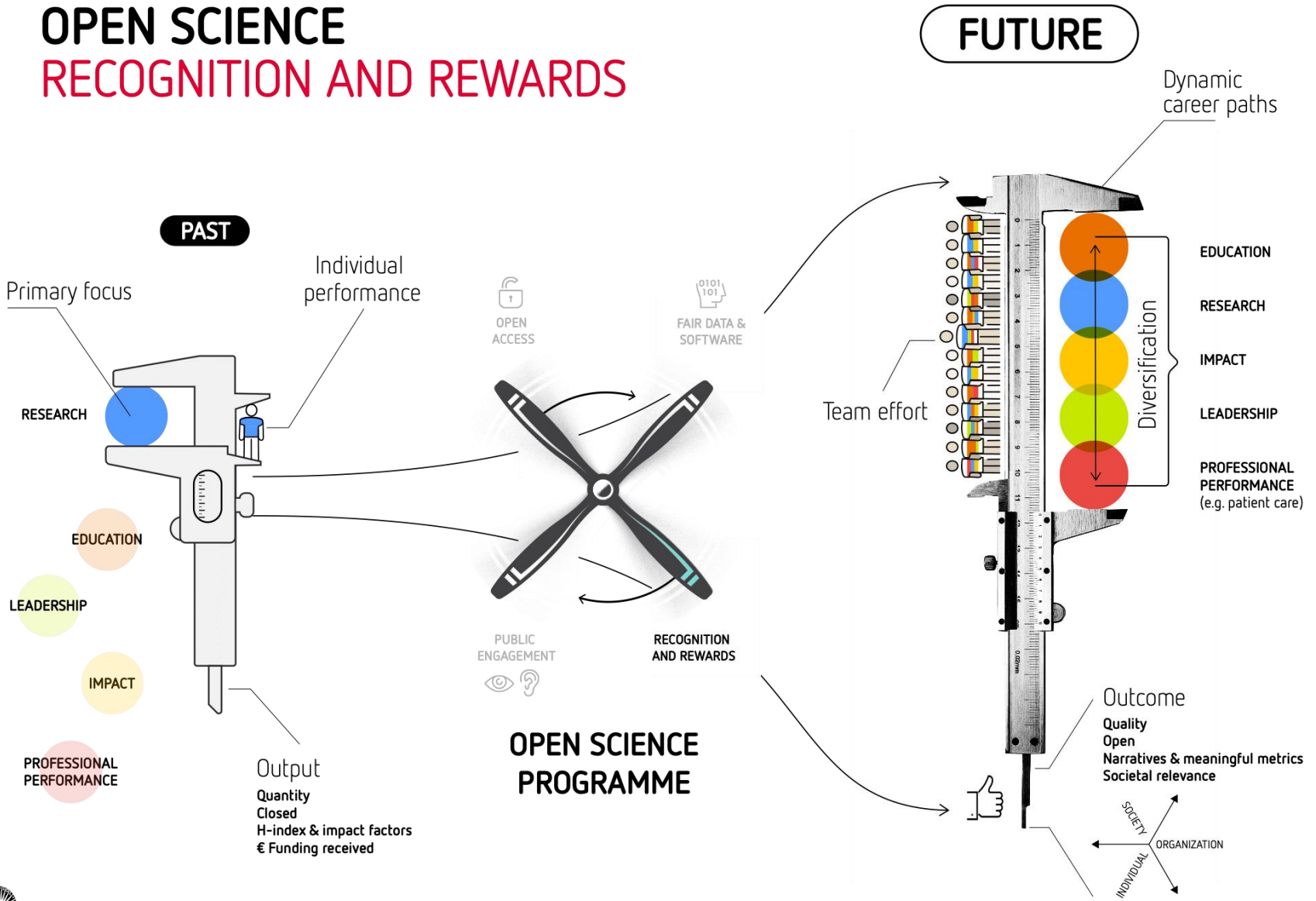
Pluriformity of quality indicators:

- **No JIF, no H-index, no numbers of publications (DORA)**
- **Engage Non-academic Stakeholders**
- **Diversity and inclusiveness**
- **Peer review, narratives (supported by data)**
- **Open Science practices and efforts rewarded**

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SKETCH AUTUMN 2020

OPEN SCIENCE
RECOGNITION AND REWARDS

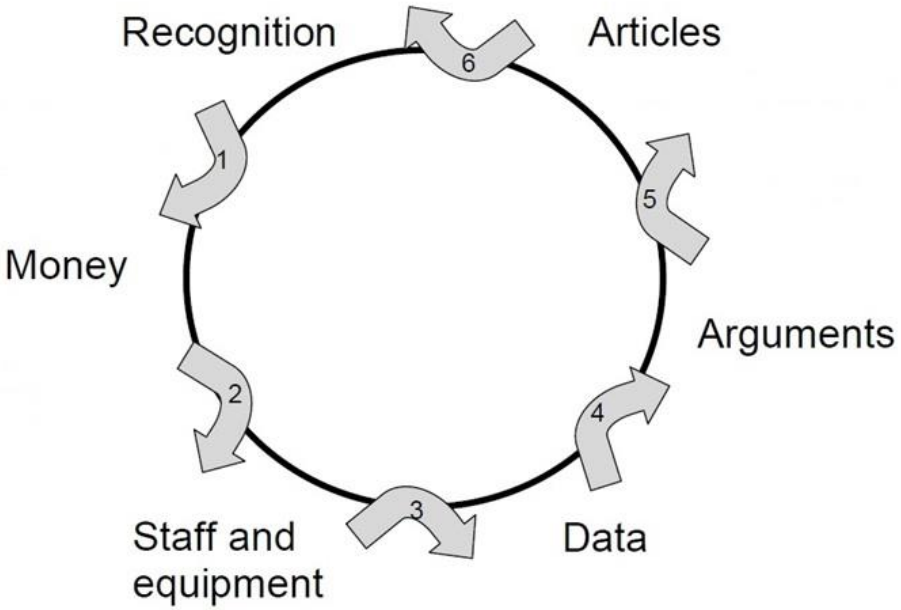


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Open Science: To improve quality and integrity at the personal level by systemic change

Engagement of societal stakeholders in problem choice and evaluation



Inclusive indicators

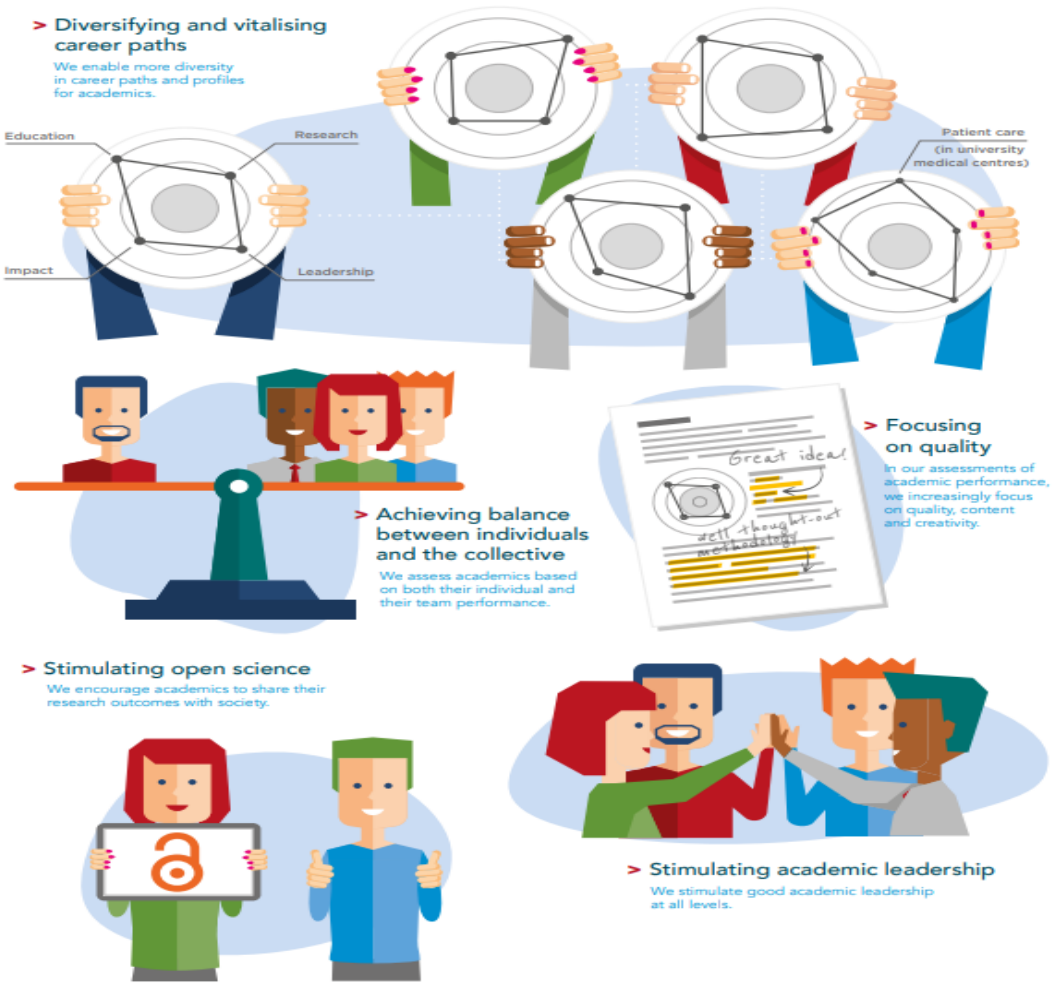
Quality
Societal Impact
Use in and outside academia
Process Indicators

OPEN PEER REVIEW
POST PUB PEER REVIEW

OA publishing
FAIR data sharing

Room for everyone's talent

towards a new balance in the recognition and rewards of academics



https://www.vsnu.nl/recognitionandrewards/wp-content/uploads/2019/11/Position-paper-Room-for-everyone%E2%80%99s-talent.pdf

National Strategic Evaluation Protocol The Netherlands 2021-2027

Evaluation is in relation to the unit's strategy

<u>Three criteria</u>:
Research Quality, Societal Impact and Viability

<u>Four Aspects</u>:

- **Open Science practices and efforts**
- **PhD policy and Training**
- **Academic Culture (Openess, Safety, Inclusiveness, Research Integrity)**
- **Human Resources Policy (Diversity, Talent Management)**

https://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/SEP_2021-2027.pdf

Open Science

Values, arguments and reason (phronesis / prudence) in balance with instrumental rationality, formal rules and quantitative methods

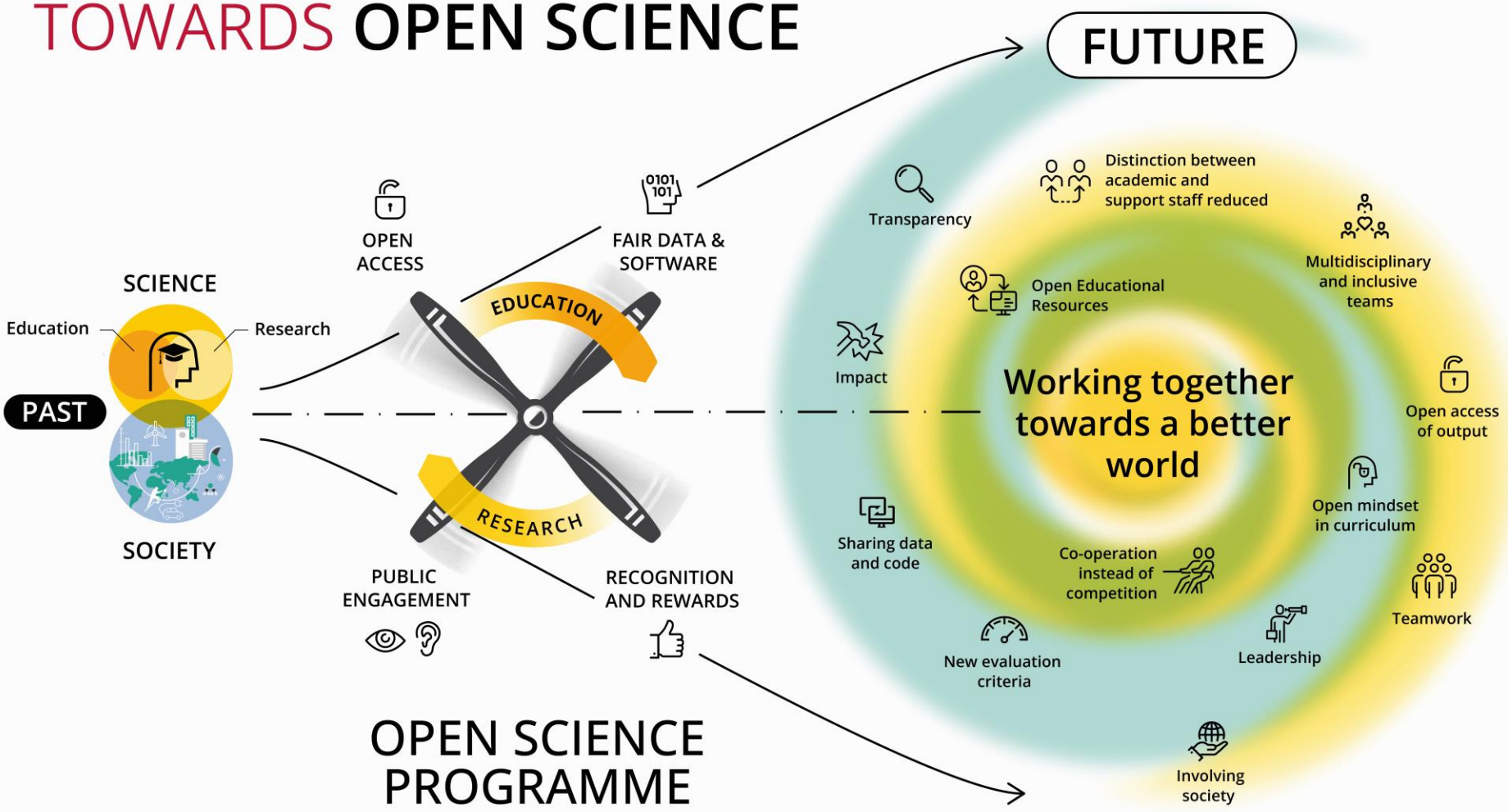
External moral and political values influence problem choice and growth of knowledge

Have to deal with power & lobby , conservative and progressive, private and public interests from outside and from within science

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www.uu.nl/openscience

TOWARDS OPEN SCIENCE



OPEN SCIENCE PROGRAMME