# Three Waves of Citizen Science

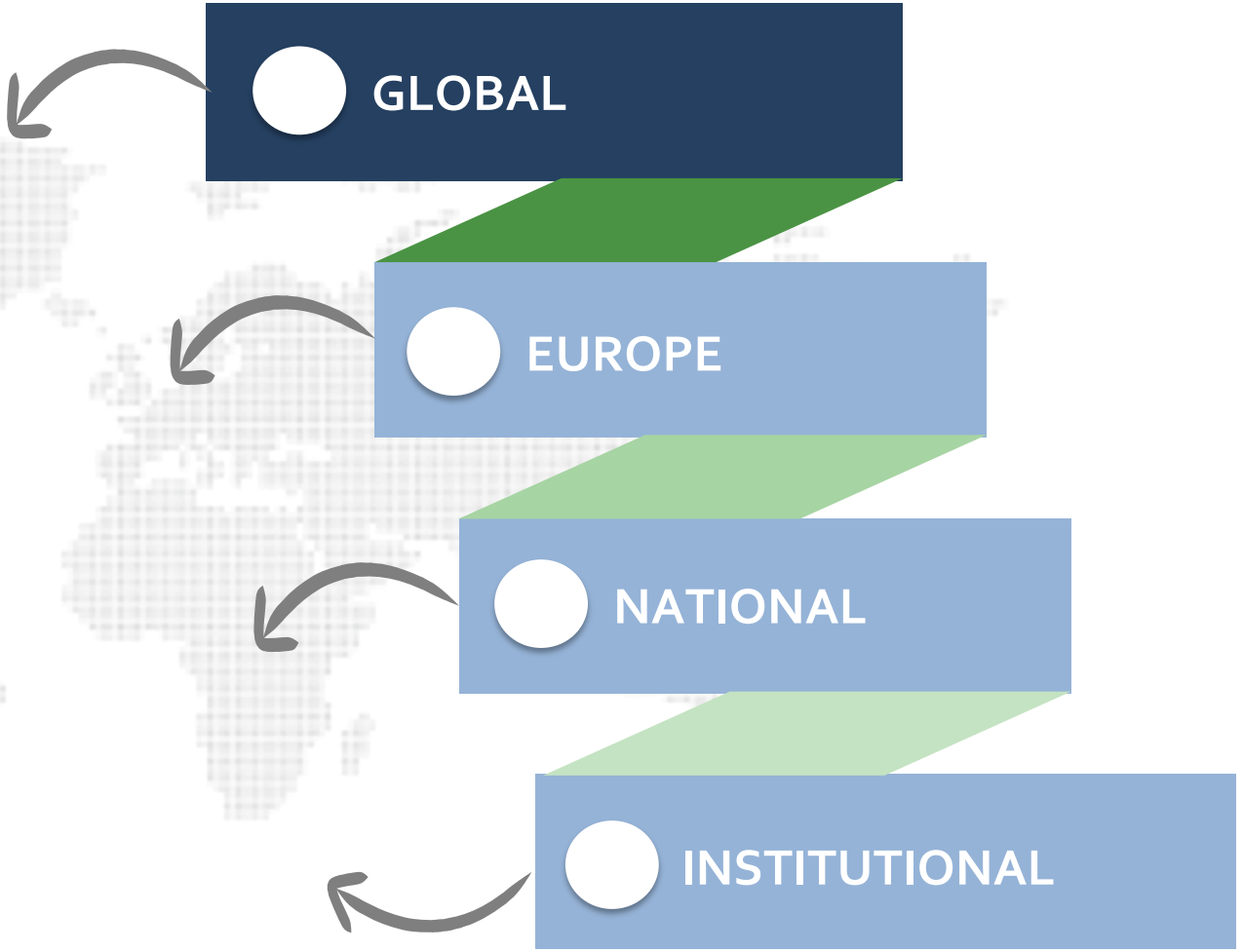
citizen science lab

Margaret Gold
m.j.gold@cwts.leidenuniv.nl

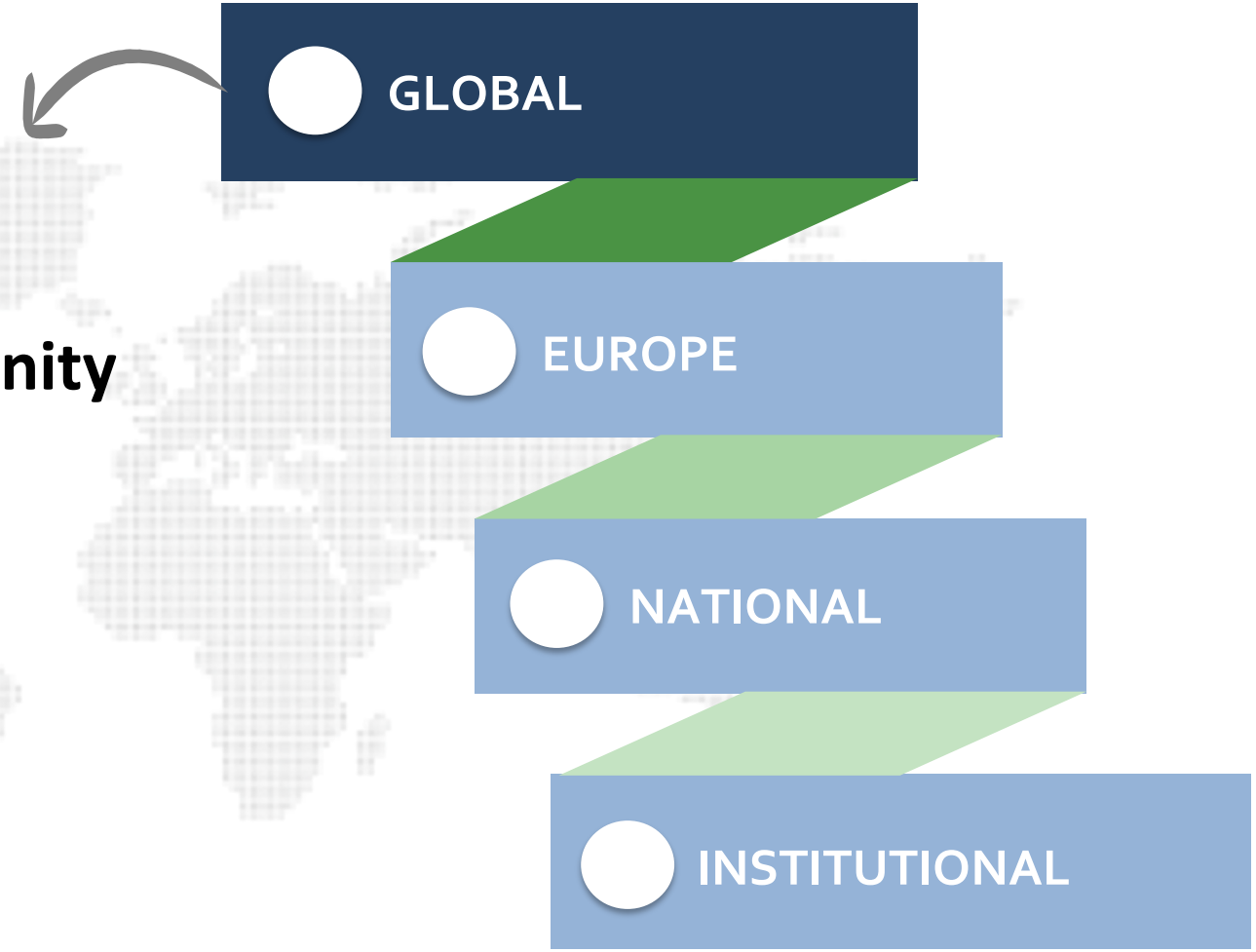
Unsplash: Jeremy Bishop

# Riding three waves of Citizen Science:

***...a global to national view of a field in motion...***



- **UNESCO**
- **Citizen Science Global Partnership**
- **UNESCO OS & CS Community of Practice**



United Nations
Educational, Scientific and
Cultural Organization

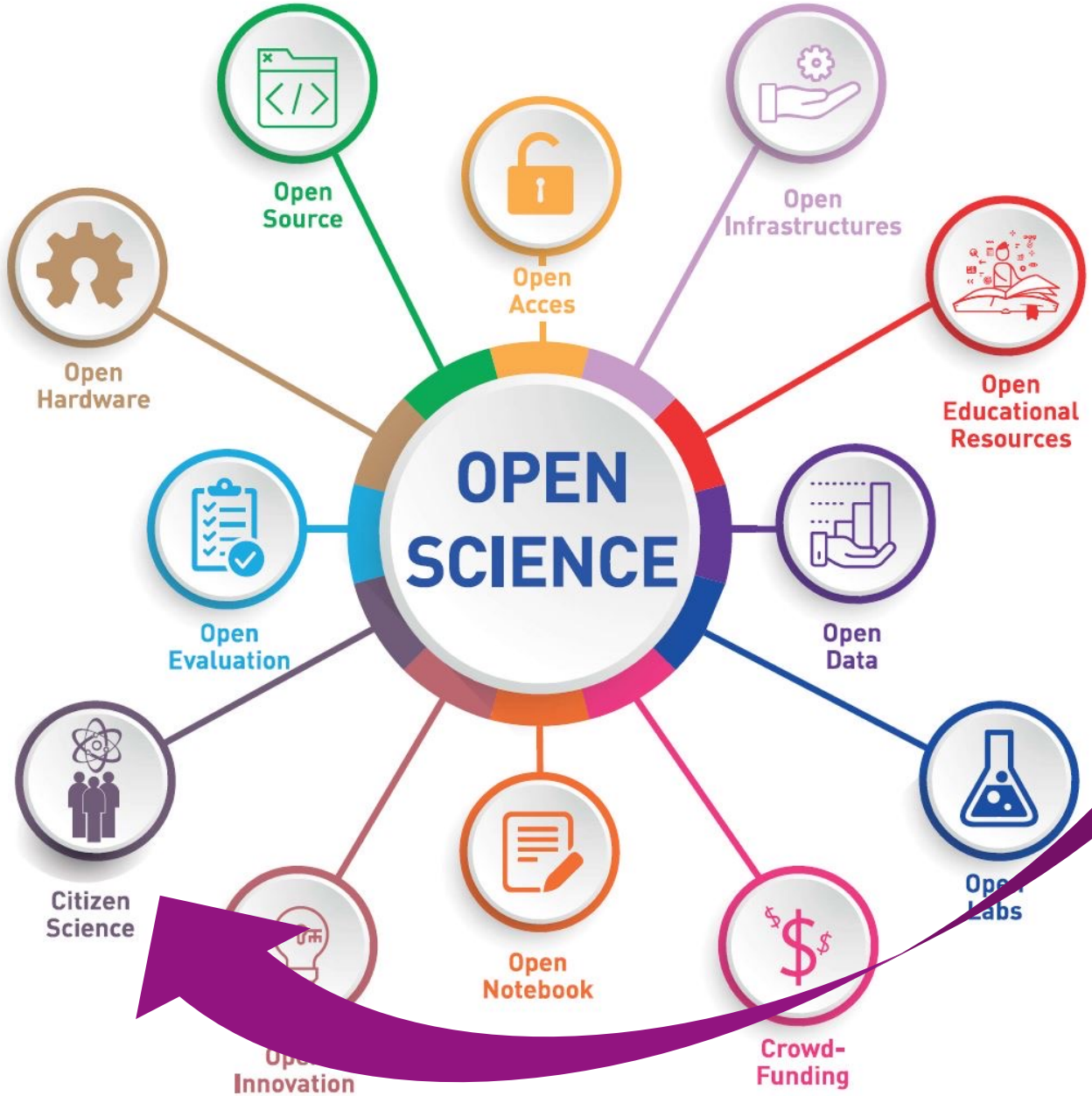
# Open Science


UNESCO, 2021

citizen science lab


***OPEN SCIENCE*** *is defined as an inclusive construct that combines various movements and practices aiming:*

- *To make multilingual scientific knowledge openly available, accessible and reusable for everyone,*
- *To increase scientific collaborations and sharing of information for the benefits of science and society, and*
- *To* ***open the processes of scientific knowledge creation, evaluation and communication***
- *To* ***societal actors beyond the traditional scientific community****.*
- *It builds on the following key pillars: open scientific knowledge, open science infrastructures, science communication,* ***open engagement of societal actors*** *and* ***open dialogue with other knowledge Systems***

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GLOBAL CITIZEN SCIENCE PARTNERSHIP

## Supporting Partners

ADEC INNOVATIONS USA

Australian Citizen Science Association

BOKU

citizen cyberlab

CitizenScienceAsia

CITIZEN SCIENCE ASSOCIATION

CITIZEN SCIENCE CENTER ZURICH

ecsa

GLOBAL CEO ALLIANCE FOUNDATION GCEOA FOUNDATION

International Institute for Applied Systems Analysis IIASA www.iiasa.ac.at

PMMP

SMART AND SUSTAINABLE ACTION ASSOCIATION

UN environment programme

UNESCO

UNIVERSITÉ DE GENÈVE

Wilson Center

CITIZEN SCIENCE | GLOBAL PARTNERSHIP

*citizenscienceglobal.org*

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Zenodo.org will be unavailable for 2 hours on September 29th from 06:00-08:00 UTC. See announcement.

November 25, 2022

Report Open Access

# Guidance for the implementation of the UNESCO Open Science Recommendation re. "Opening science to society" (FINAL)

Wehn, Uta; Hepburn, Libby

**Project member(s)**

Hsing; Ajates; Kragh; Mandeville; Somerwill; Kiefer; Haklay; Gold; Koley; Heinis la; Lehner; Morais; Per; Thakore; Gumiero; Alfaro-Ponce; Chandratreva; Roger; Ba ); Mendez; Michellier; Muniafu; Bonn

Guidance on successful approaches and mechanisms for embedding the op ) Science policy (Final version)

724 views

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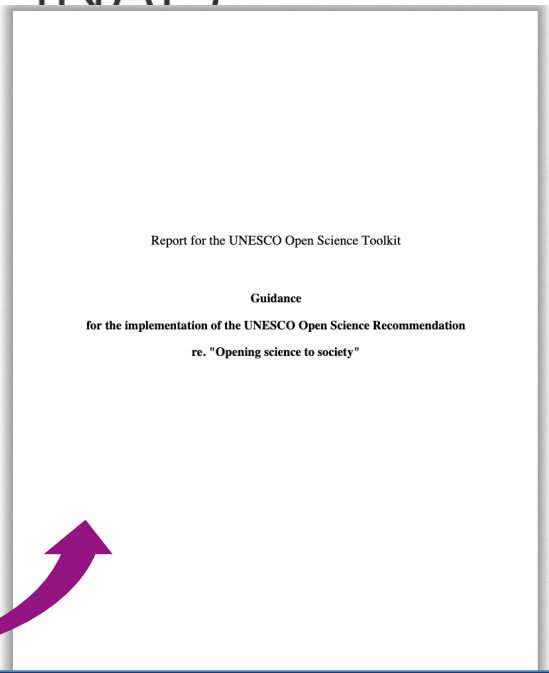
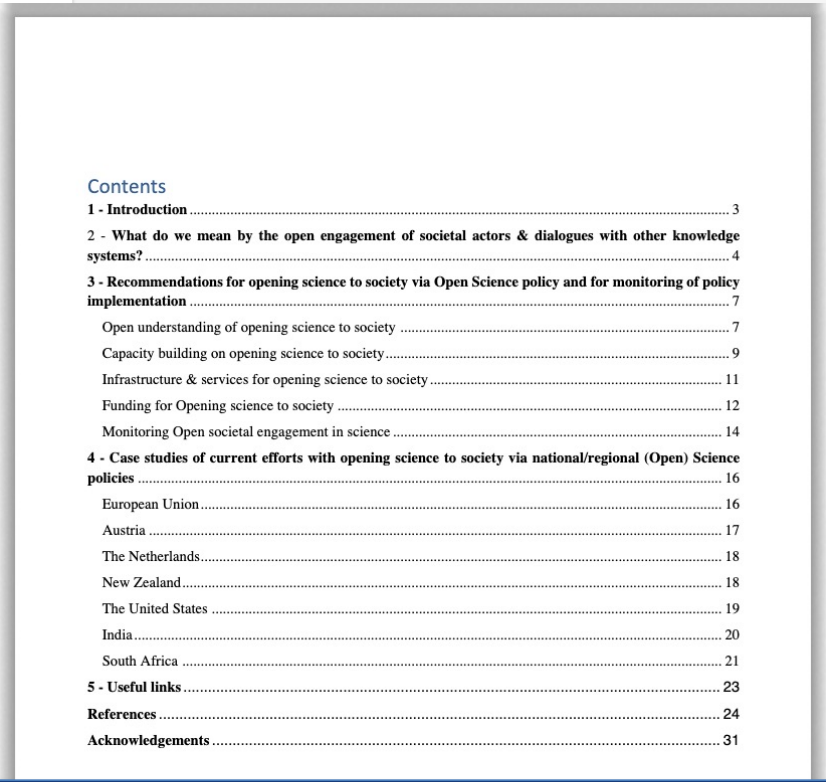


Report for the UNESCO Open Science Toolkit

**Guidance**

**for the implementation of the UNESCO Open Science Recommendation**

**re. "Opening science to society"**



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November 25, 2022

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Guidance on successful approaches and mechanisms for embe Science policy (Final version)

https://zenodo.org/record/7472827

*Table 2: Summary of recommendation for opening science to society via Open Science policy*

| | | |
|---|---|---|
| Open understanding of opening science to society | Empower and engage societal actors through open engagement | • Go beyond facilitating public participation in scientific processes that are led top down<br>• Foster transparent communication & long-term relationships with community partners<br>• Ensure free and open access to educational content, enhance science and data literacy |
| | Ensure diversity, equity, inclusion, & justice in opening science to society | • Ensure engagement of and partnerships with marginalised communities<br>• Support non-traditional venues for scientific activities and accessible communication<br>• Ensure benefits of societal engagement reach all involved stakeholders |
| Capacity building on opening science to society | National & policy-maker levels | • Create enabling environment that cut across governance levels<br>• Leverage existing resources<br>• Foster multi-level and multi-stakeholder policy connections |
| | Institutional & individual level | • Foster capacity building and academic recognition within Higher Education Institutions<br>• Foster societal engagement through (high) schools and life-long learning programmes<br>• Support informal training initiatives |
| | Knowledge exchange opportunities | • Prioritise impact at scales from local to global<br>• Support development of infrastructures for practitioners of open societal engagement<br>• Ensure accessible resources |
| Infrastructure & services for opening science to society | • Develo e infrastructure for societal engagement<br>• Incor Open Data sharing<br>• Encour eusability and interoperability by developing standards that require input from societal actors<br>• Suppo ttom-up development of infrastructure to allow societal actors to shape tools for engaging with science | |
| Funding for opening science to society | For wha | • Foster open societal engagement and dialogues with other knowledge systems<br>• Mainstream societal engagement in all funding |
| | F whom | Financial support for a wide range of actors |
| | For how long | Funding models to focus on creating diverse, long term relationships & community building |
| | By whom | Collaboration between public and private funding agencies |
| | Fit-for-purpose instruments & evaluation | Specifically address quality criteria of good societal engagement & co-create fit-for-purpose funding & evaluation instruments |

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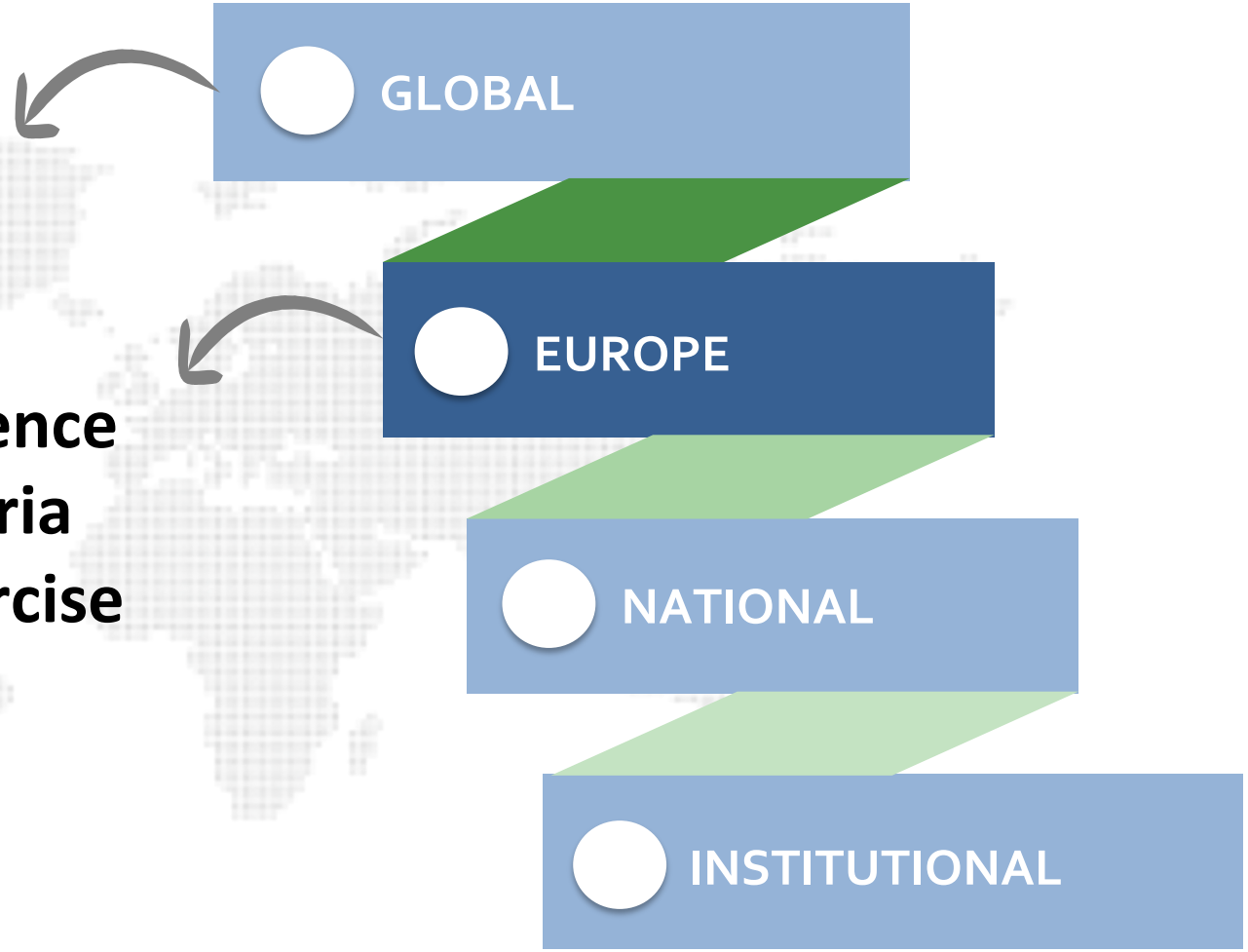
**Enabling Environment**

- **EU-Citizen.Science / European Citizen Science**
- **Horizon Europe Criteria**
- **Mutual Learning Exercise**



# eu-citizen.science

Welcome to the platform for sharing citizen science projects, resources, tools, training and much more

Search...

Projects Resources Training Organisations Platforms Users Our Gold Star Selection

join the community
and participate


The overall objective of ECS is to widen and strengthen the European Citizen Science community through capacity building and awareness raising activities such as the creation of a European Citizen Science Academy and the establishment of a network of 28 ECS Ambassadors. ECS will capitalise on EU-funded actions such as the EU-Citizen.Science platform and Cos4Cloud to support links and collaboration between members of the European Citizen Science community, who will be involved in the co-design and co-creation of a large variety of services, strategic priorities, training opportunities and policy recommendations. A key focus is on inclusivity, which will be achieved through dedicated actions such as engaging libraries affiliated to the Public Libraries 2030 network to attract underrepresented publics, as well as ad-hoc support to countries/regions lacking citizen science networks, platforms and policy recognition. ECS will create extensive capacity building opportunities by engaging in particular excellent researchers in a variety of disciplines, for example through the involvement of the Marie Curie Alumni Association, and emerging Horizon Europe Missions, Clusters, and wider ERA activities, to allow easy access for newcomers in citizen science activities.

ecs european citizen science

# Capacity Building

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European Commission

# CITIZEN SCIENCE
## ELEVATING RESEARCH & INNOVATION THROUGH SOCIETAL ENGAGEMENT

*Interaction between citizens, scientists and policy makers is essential to enrich research and innovation, and reinforce trust of society in science. I am proud of the hundreds of thousands involved citizens that already contributed to research and innovation and look forward to continue opening up research towards society and the world.*

**Mariya Gabriel** *Commissioner for Innovation, Research, Culture, Education and Youth*

# Citizen Science in the European R&I policy

## Citizen Science (CS) is a core dimension of


the **Pact for R&I in Europe** that lists **societal responsibility** as a main principle and **active citizen and societal engagement in R&I** as a priority area for joint actions


the **open science policy** of the **European Commission,** embedded in the **new European Research Area (ERA)** policy agenda **to achieve greater societal impact and increased trust in science**


**the Horizon Europe Programme**, with the aim of deepening science-society relations and maximising the benefits of their interactions by ***engaging and involving all societal actors such as citizens and civil society organisations in co-designing and co-creating*** *responsible research and innovation agendas and contents,* ***promoting science education***, ***making scientific knowledge publicly accessible***, *and* ***facilitating participation by citizens and civil society organisations in its activities***"

European Commission

# Citizen Engagement in HORIZON EUROPE

**Open science**, which includes citizen science and citizen/societal engagement, **is the *modus operandi* of the HE programme**

**Co-design and co-creation**, and **engagement of citizens and civil society organisations**, are **mainstreamed** across the programme, notably in the **Cluster** and **EU R&I Missions programmes**

**EU R&I Missions: Portfolio of actions intended to achieve a set of goals within a given timeframe with impact for science and technology and civil society**

**Citizen and societal engagement** is a key part of ***co-design, co-creation*** and ***co-assessment*** **activities** in the **EU R&I missions**

A number of **participatory instruments** are foreseen by the **Mission Implementation Plan**

**HE workprogramme in 5 mission areas:**

- **Adaptation to Climate Change**
- **Cancer**
- **Restore our Oceans and Waters by 2030**
- **100 Climate-Neutral and Smart Cities by 2030**
- **A Soil Deal for Europe**

European Commission


# Mutual Learning Exercise on Citizen Science

**Mutual learning exercises (MLE)** focus on **specific R&I challenge** of interest to **MSs and ACs**


**MLE on Citizen Science (CS)** proposed from MSs to

- ✓ **strengthen their CS national policies and initiative** by exchanging lesson learnt and best practice
- ✓ exploit synergies and **upscale suitable (cross-) national CS initiatives** across the ERA

**Exercise supported by EC Policy Support Facility and external experts**

**11 MSs/ACs:** Germany, Slovenia, Austria, Belgium, France, Hungary, Portugal, Romania, Italy, Sweden and Norway

**CS MLE Topics:**

1. Introduction and overview on citizen science
2. Ensuring good practices and impacts
3. Maximising the relevance and excellence of citizen science
4. Enabling environments and sustaining citizen science
5. Scaling up citizen science

European Commission

European Commission

# Citizen Science initiatives

## Policy and Practice

#HorizonEU

PSF CHALLENGE – MUTUAL LEARNING EXERCISE (MLE)

An increasing number of citizen science projects and initiatives are being implemented across Europe. This rapidly emerging mode of research and innovation shows substantial potential in terms of achieving greater societal impact and increasing trust in science, by leveraging collective societal capabilities, by enlarging the scope of the R&I, and by increasing relevance, responsiveness and transparency. The following topics of interest have been identified for the MLE:

- Topic 1: Introduction and overview on citizen science
- Topic 2: Ensuring good practices and impacts
- Topic 3: Maximising the relevance and excellence of citizen science
- Topic 4: Enabling environments and sustaining citizen science
- Topic 5: Scaling up citizen science

Visit the website for more information: https://ec.europa.eu/research-and-innovation/en/statistics/policy-support-facility

Participating countries: Austria, Belgium, France, Germany, Hungary, Italy, Norway, Portugal, Romania, Slovenia and Sweden.

**Chair**
Alan Irwin

**Rapporteur**
**Margaret Gold** (Rapporteur and Expert on Topic 4)

**Independent Experts**
**Muki Haklay** (Expert on Topic 1)
**Rosa Arias** (Expert on Topic 2)
**Marzia Mazzonetto** (Expert on Topic 3)
**Antonella Radicchi** (Expert on Topic 5)
**Ingeborg Meijer** (Support Rapporteur and Support Expert on Topic 4)

**DG RTD Policy Officer**
**Annamaria Zonno**
(Annamaria.ZONNO@ec.europa.eu)

## Scheduled meetings

**January 2022** – Topic 1 meeting
**March 2022** – Topic 2 meeting
**June and September 2022** – Topic 4 meeting
**October 2022** – Topic 3 meeting
**November 2022** – Topic 5 meeting
**December 2022** – Final Meeting
**Early 2023** – Dissemination event

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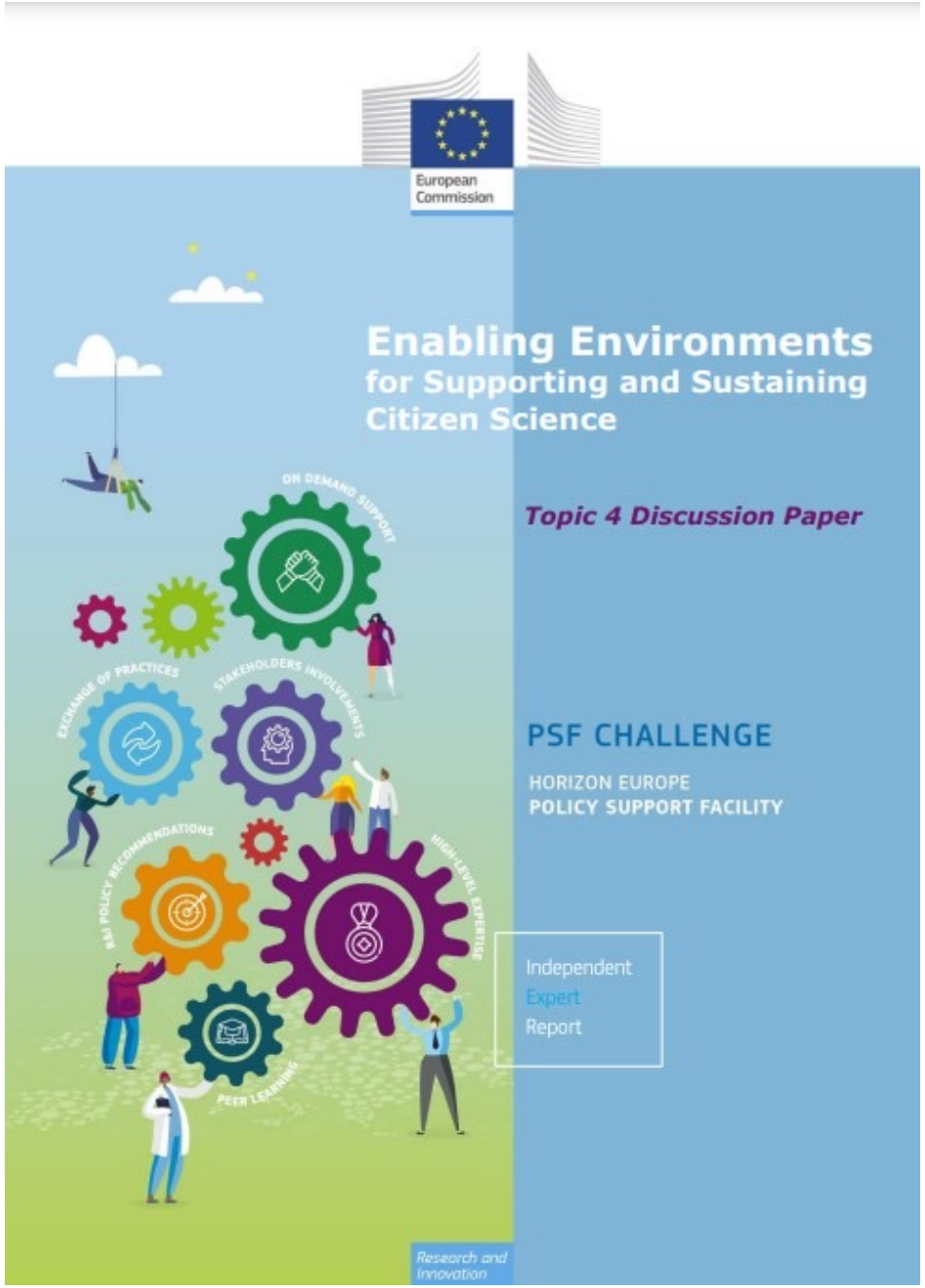
ISBN 978-92-76-53090-9, doi:10.2777/847700, KI-AX-22-007-EN-N

*Research and Innovation*

https://tinyurl.com/3xs986c6

I believe the work and reports of the MLE on Citizen Science come at a perfect conjuncture in European policy, where the national implementation of ERA Actions and the course setting towards FP10 meet the efforts towards a research assessment reform. Citizen Science stakeholders have now really valuable tools and knowledge to use this opportunity and establish Citizen Science at the centre of the debate in all three of those processes.

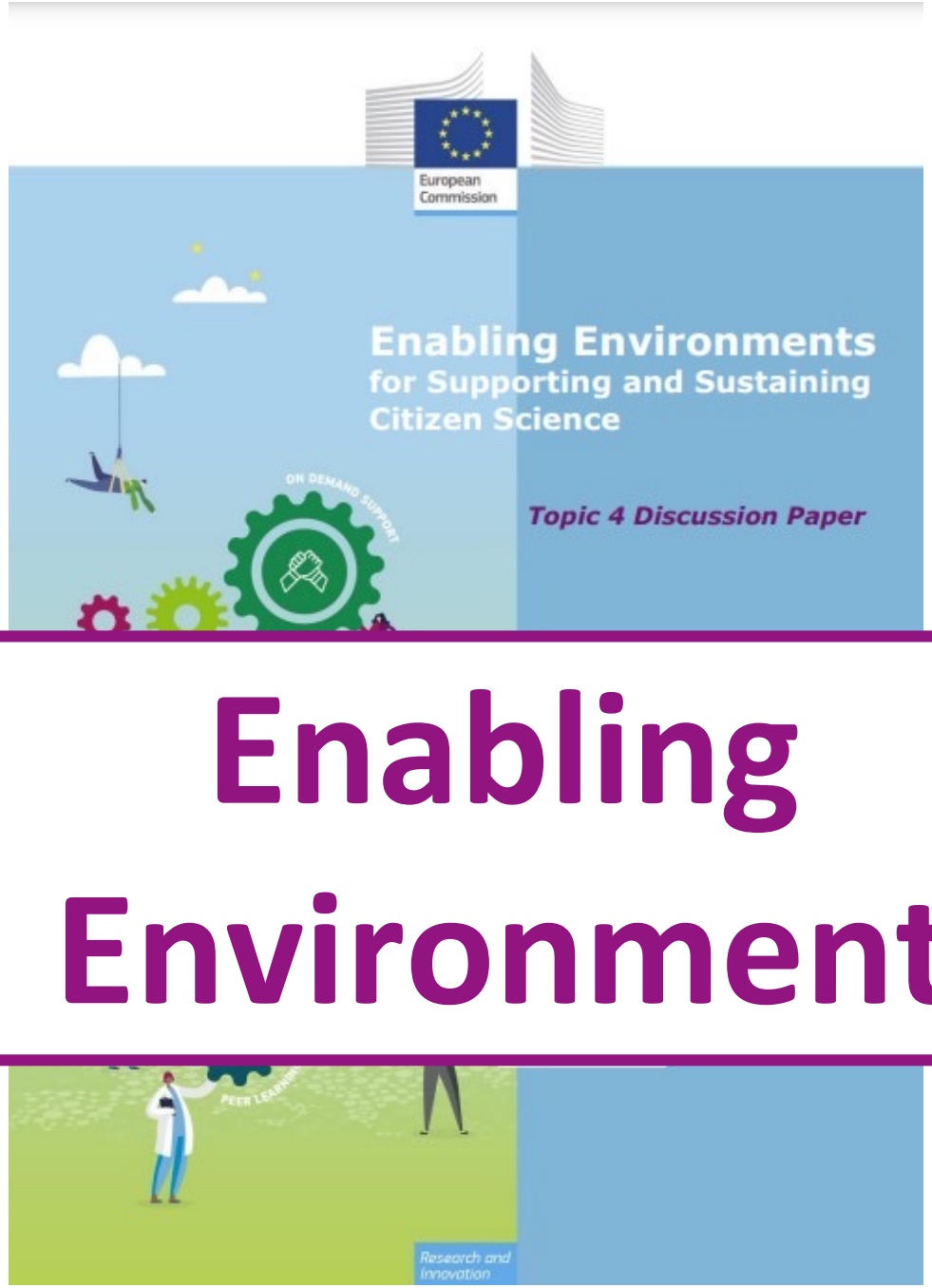
**Michalis Tzatzanis**
*Participant from Austria*




# *Topic 4 - discussion paper:*

# *Enabling Environments for Supporting and Sustaining citizen science*

*For Citizen Science to fully live up to its potential to achieve real societal impact as well as new scientific knowledge and insights, it is essential for Member States to put an enabling environment in place that will allow Citizen Science initiatives to be sustained and thrive, and Citizen Science practices to be supported and promoted.*




# Enabling Environment

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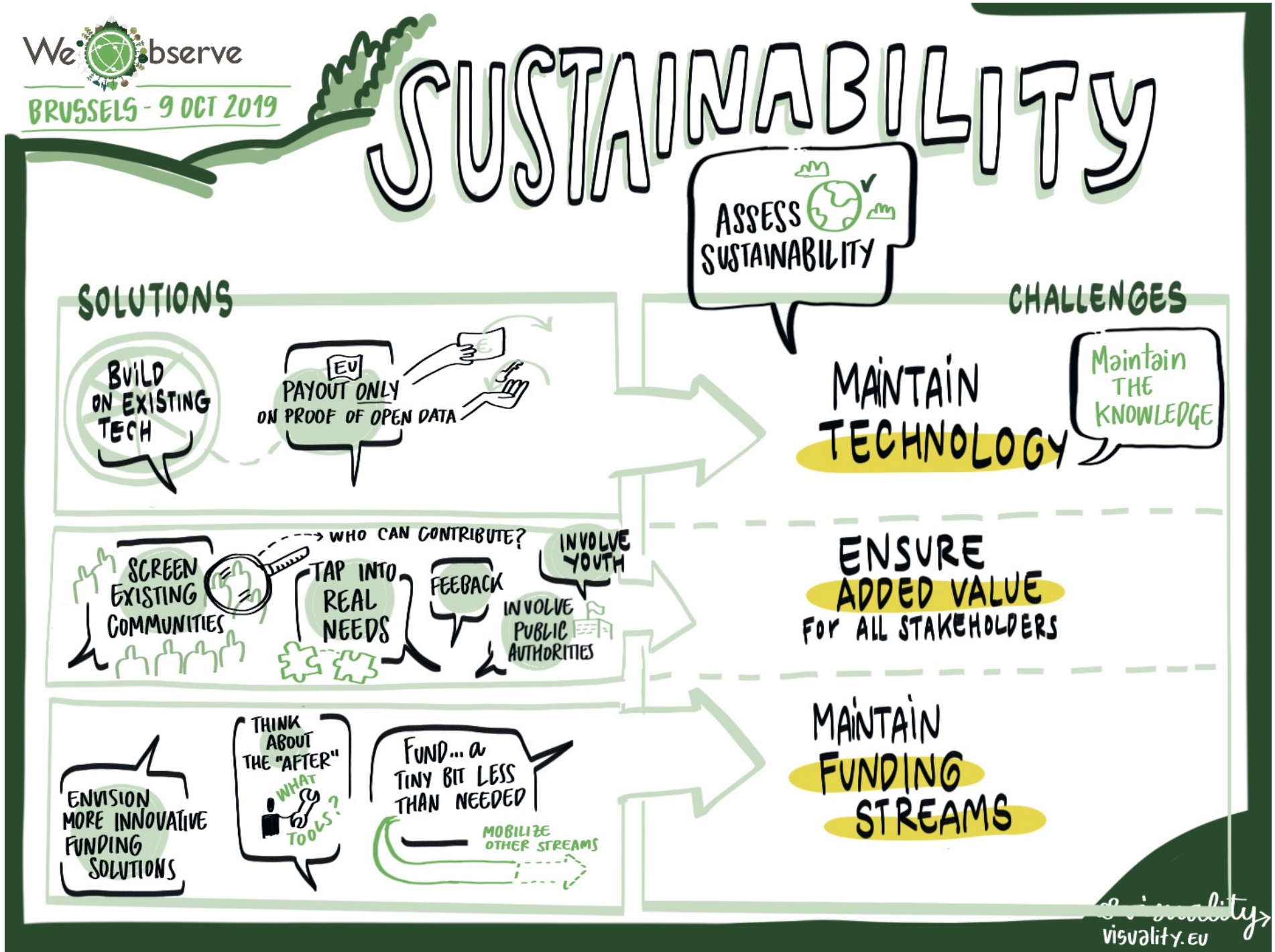
# What is an Enabling Environment?

**the factors that enable Citizen Science initiatives to be launched, sustained, grow and thrive – and ultimately achieve their aimed-for impacts and outcomes**


We Observe
BRUSSELS - 9 OCT 2019
SUSTAINABILITY
ASSESS SUSTAINABILITY
SOLUTIONS
BUILD ON EXISTING TECH
EU
PAYOUT ONLY ON PROOF OF OPEN DATA
WHO CAN CONTRIBUTE?
SCREEN EXISTING COMMUNITIES
TAP INTO REAL NEEDS
FEEBACK
INVOLVE YOUTH
INVOLVE PUBLIC AUTHORITIES
ENVISION MORE INNOVATIVE FUNDING SOLUTIONS
THINK ABOUT THE "AFTER"
WHAT TOOLS?
FUND... a TINY BIT LESS THAN NEEDED
MOBILIZE OTHER STREAMS
CHALLENGES
MAINTAIN TECHNOLOGY
Maintain THE KNOWLEDGE
ENSURE ADDED VALUE For ALL STAKEHOLDERS
MAINTAIN FUNDING STREAMS
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Legal & Policy Frameworks

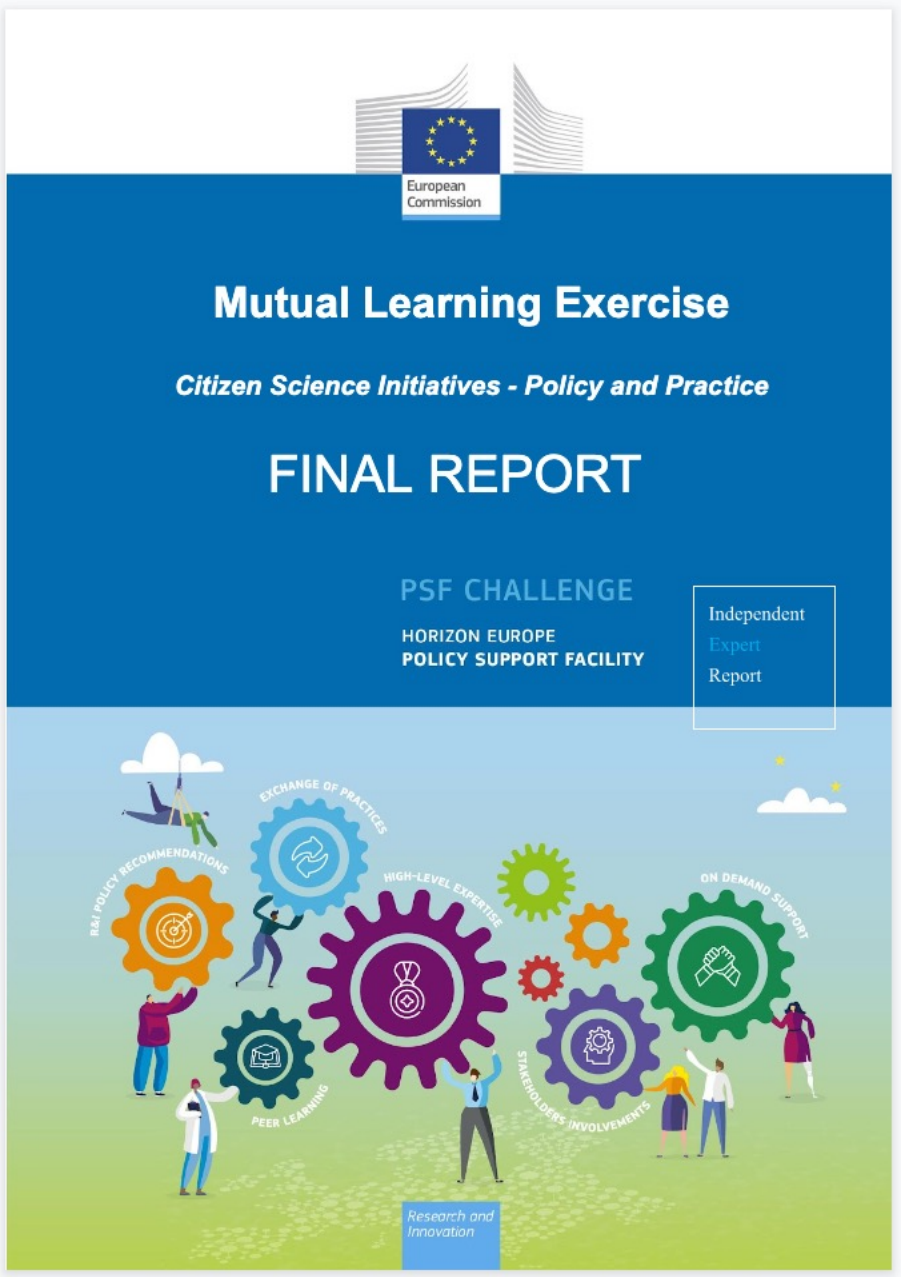
Internal Policies & Culture

Capacity Building & Networks

Supporting (Data) Infrastructure

Societal Dialogue

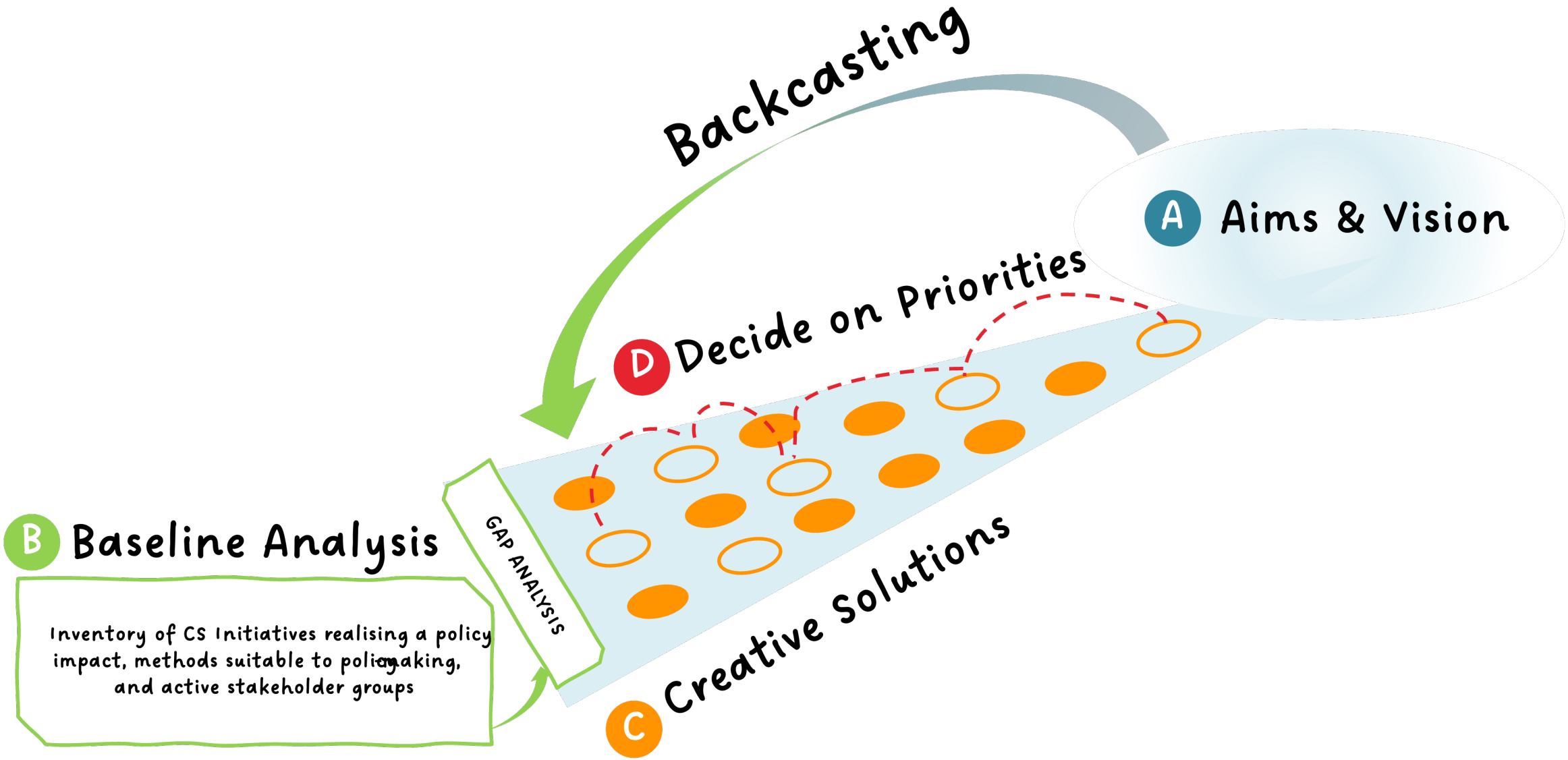
FUNDING

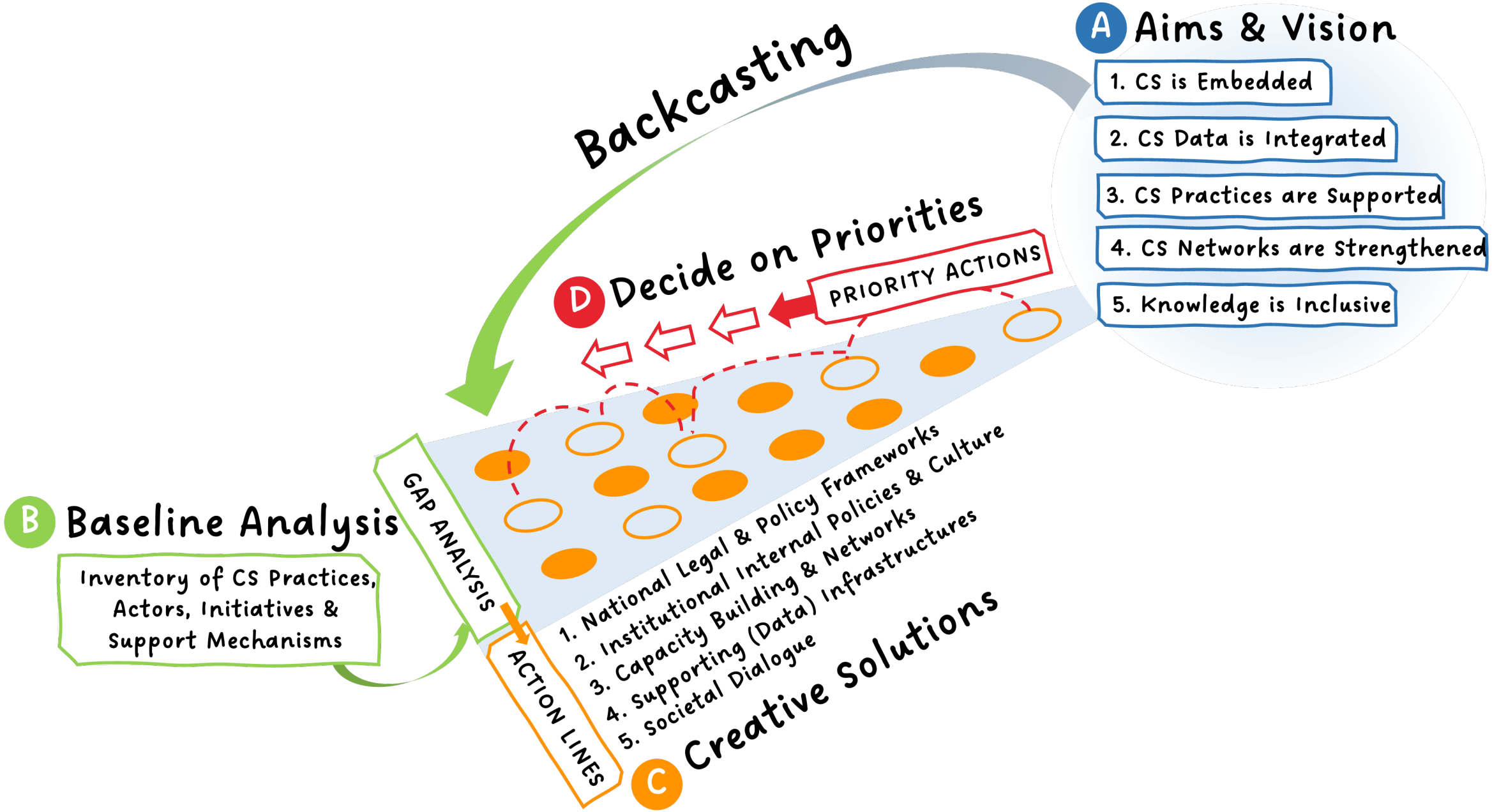



Of all of these recommendations for action, the four most impactful recommendations that have been supported across all of the thematic topics of the MLE are to:

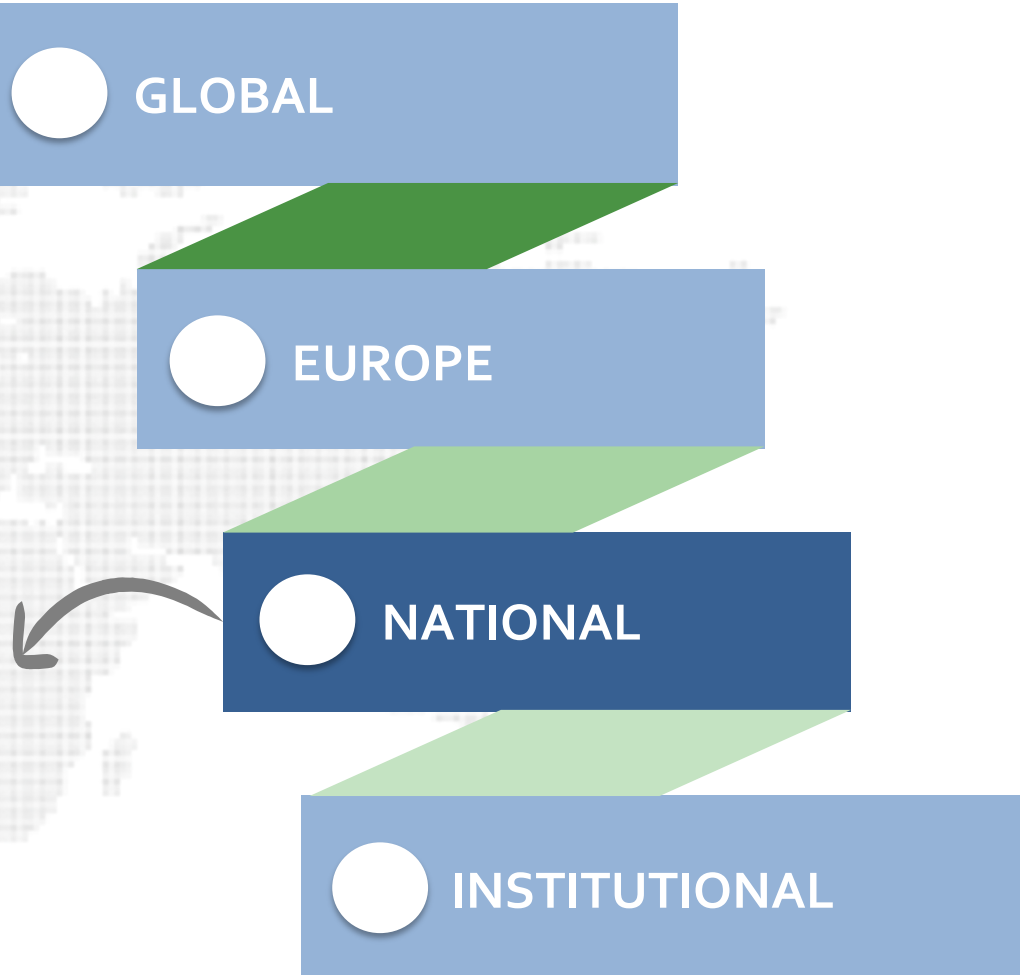
1. Ensure that Citizen Science practitioners - in academia (top-down), in society (bottom-up), in policy (collaborative) and in the private sector (collaborative) - are supported by a **national network of practitioners** to share knowledge, form partnerships, and further develop best practice.
2. Ensure that **dedicated funding instruments** can provide financial support to the places where it is most needed (especially to societal partners) in order to enable new initiatives to get off the ground and to provide ongoing funding or scaling-up funding for successful initiatives. These instruments should allow sufficient flexibility for co-creational approaches to be implemented.
3. Enable the **culture change** required to open-up science and the scientific process more fully to the participation of citizens, societal actors, and civil society organisations for the benefit of research quality, policy impact, and improved societal welfare.
4. Enable the establishment and ongoing iterative development of key **supportive infrastructure** such as data-gathering tools and platforms, data analysis and visualisation tools, data hosting and archiving, and domain-specific research infrastructures.

**https://tinyurl.com/MLEcsfinal**


Backcasting
A Aims & Vision
D Decide on Priorities
B Baseline Analysis
Inventory of CS Initiatives realising a policy impact, methods suitable to policymaking, and active stakeholder groups
GAP ANALYSIS
C Creative Solutions


Backcasting
A Aims & Vision
1. CS is Embedded
2. CS Data is Integrated
3. CS Practices are Supported
4. CS Networks are Strengthened
5. Knowledge is Inclusive
D Decide on Priorities
PRIORITY ACTIONS
B Baseline Analysis
Inventory of CS Practices, Actors, Initiatives & Support Mechanisms
GAP ANALYSIS
ACTION LINES
1. National Legal & Policy Frameworks
2. Institutional Internal Policies & Culture
3. Capacity Building & Networks
4. Supporting (Data) Infrastructures
5. Societal Dialogue
C Creative Solutions

- **NPOS – National Programme Open Science**
- **CS-NL – Citizen Science Nederland**
- **Rewards & Recognition Movement**



# The Netherlands National Programme Open Science

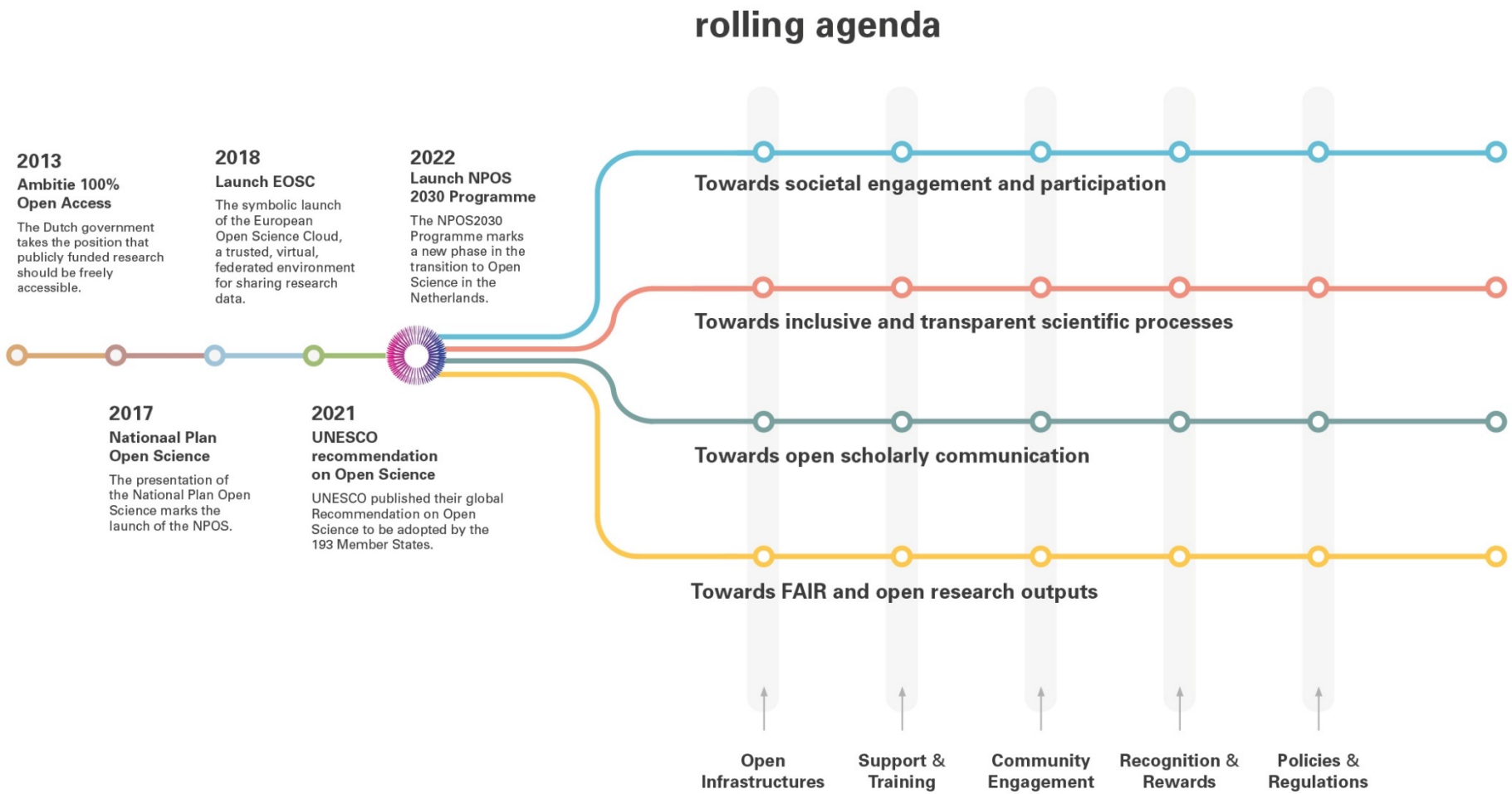
Towards a NPOS 2030 Multi Annual Plan

# NPOS Ambition 2030

2013 - 2021

2022 - 2030

2030




## strategic goals

Close collaboration between knowledge institutions, government, industry, and citizens to strengthen science and optimise the processes of creating, sharing, and communicating knowledge for the benefit of society.

Inclusive, efficient, and transparent processes of scientific (co-)creation, evaluation, quality assurance and communication

Removal of barriers to reading and reusing all scientific output, so everyone can access sci-entific knowledge in a sustainable way and benefit from it

Products of and for knowledge creation, like data and software, being findable, accessible, interoperable, and reusable (FAIR), and open in as far regulations allow

IM-STUDIO.EU

## 2013
### Ambitie 100% Open Access

The Dutch government takes the position that publicly funded research should be freely accessible.

## 2017
### Nationaal Plan Open Science

The presentation of the National Plan Open Science marks the launch of the NPOS.

## 2018
### Launch EOSC

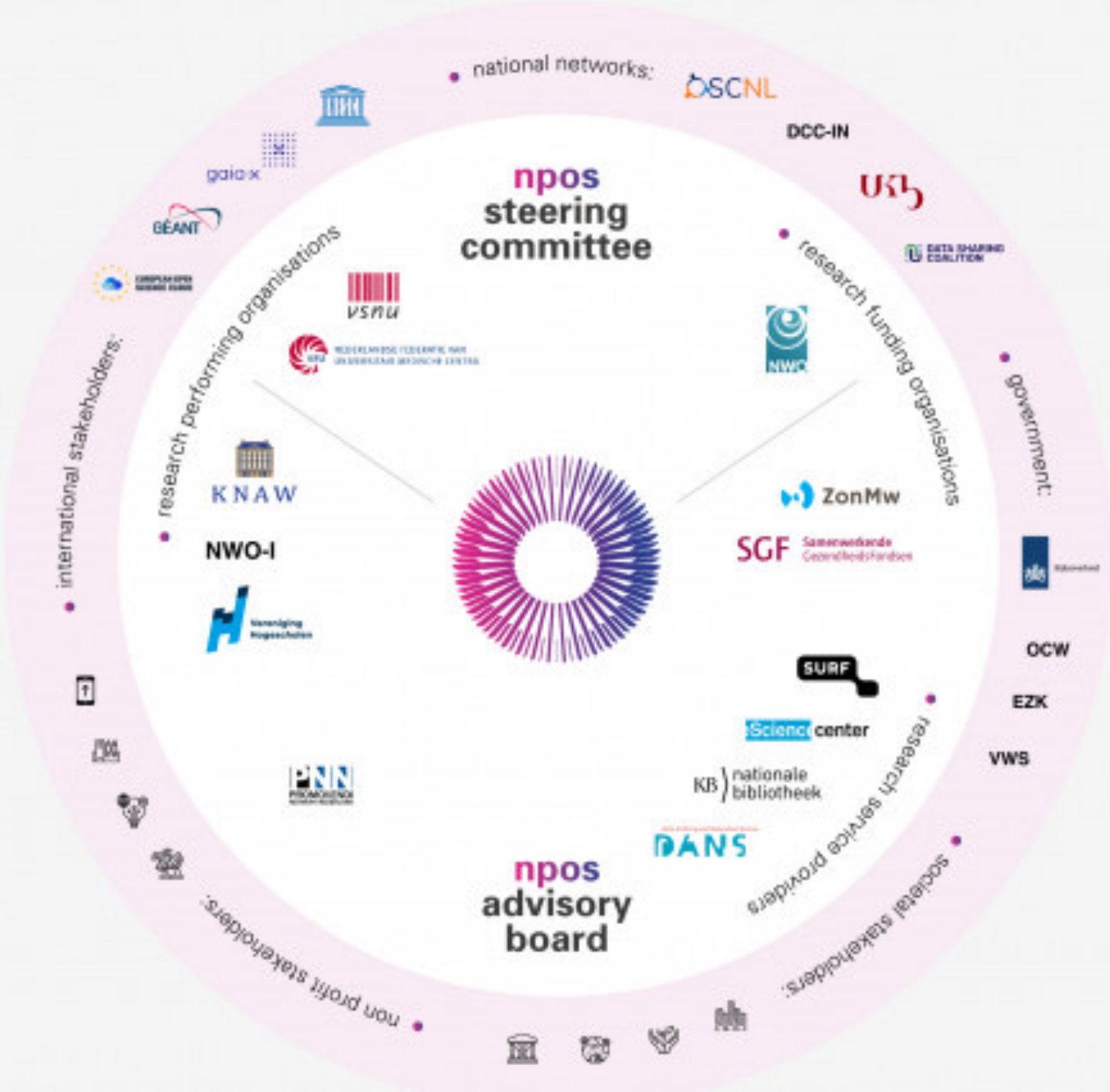
The symbolic launch of the European Open Science Cloud, a trusted, virtual, federated environment for sharing research data.

## 2021
### UNESCO recommendation on Open Science

UNESCO published their global Recommendation on Open Science to be adopted by the 193 Member States.

## 2022
### Launch NPOS 2030 Programme

The NPOS2030 Programme marks a new phase in the transition to Open Science in the Netherlands.

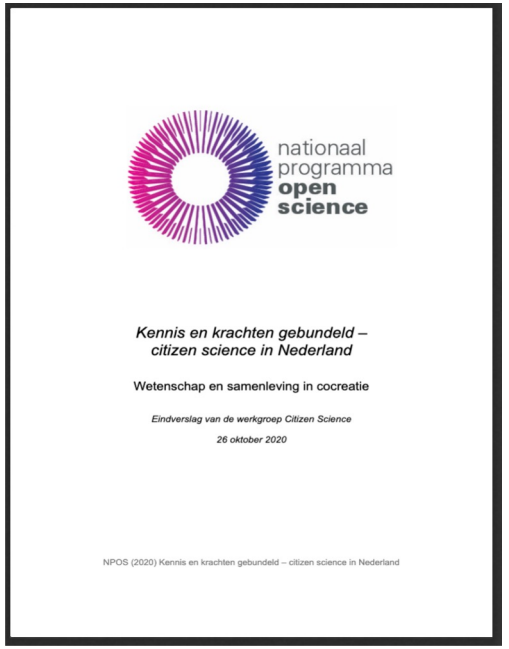


KNAW

de jonge akademie

## NPOS Citizen Science Werkgroep

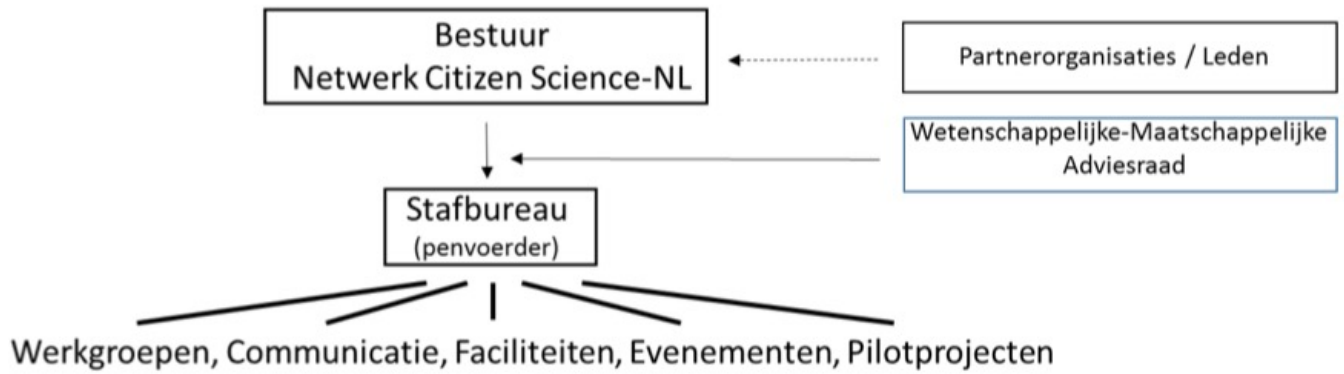
2019



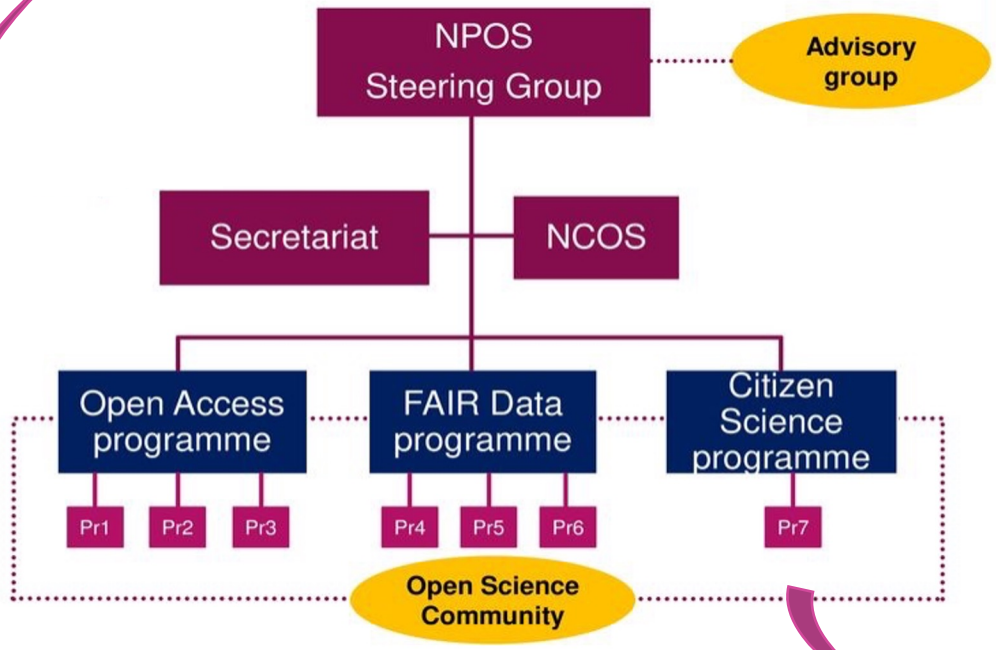

2020

De voorstellen van de werkgroep moeten ertoe leiden dat in 2022:

1. Een **ondersteuningsstructuur** (netwerkstructuur) is ontstaan die
   - Onderzoekers houvast biedt
   - Initiatieven en actoren verbindt
   - Innovatie stimuleert (m.n. het verbinden van wetenschap en samenleving)
   - Verbindingen versterkt
   - Kansen biedt voor nieuwe verbindingen in de vorm van symposia, werkgroepen, onderzoek naar citizen science, en pilotprojecten (vanuit wetenschap en samenleving).



# 2021




## key lines of action

**FAIR DATA**

- Build a professional community of data stewards
- Incentivise FAIR digital research outputs and metadata
- Enable sustainable interoperable networks of FAIR data services
- Develop a national FAIR data trust framework with societal stakeholders

**OPEN ACCESS**

- Make all scholarly output Open Access
- Enable full Open Access without additional costs
- Maintain high quality and research integrity
- Get control over ownership, public values, academic and digital sovereignty
- Enable novel ways of recognition & rewards
- Grow towards less dependency on publishers

**CITIZEN SCIENCE**

- Raise awareness
- Consolidate and further develop best practice
- Build capacity
- Enhance transdisciplinary collaboration
- Develop Supporting infrastructures

CS-NL
Citizen Science Nederland

# NPOS Ambition 2030

2013 - 2021

2022 - 2030

2030

**2013**
**Ambitie 100% Open Access**
The Dutch government takes the position that publicly funded research should be freely accessible.

**2017**
**Nationaal Plan Open Science**
The presentation of the National Plan Open Science marks the launch of the NPOS.

**2018**
**Launch EOSC**
The symbolic launch of the European Open Science Cloud, a trusted, virtual, federated environment for sharing research data.

**2021**
**UNESCO recommendation on Open Science**
UNESCO published their global Recommendation on Open Science to be adopted by the 193 Member States.

**2022**
**Launch NPOS 2030 Programme**
The NPOS2030 Programme marks a new phase in the transition to Open Science in the Netherlands.

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## vision

**2030**
**OPEN SCIENCE**
Better science
Connection science and society

1. Scientific knowledge freely available, accessible, and reusable for everyone
2. Strong link with societal challenges and sustainable development goals
3. Transparent, diverse and transdisciplinary scientific knowledge-sharing
4. Distinction between data and publications is fluid
5. Novel digital services based on academic sovereignty
6. Protected sharing according to FAIR principles with enriched meta data

**2021**

engagement, coordination and support

IM-STUDIO.EU

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**2022**

**rolling agenda**

- Towards societal engagement and participation — *Citizen Science*
- Towards inclusive and transparent scientific processes
- Towards open scholarly communication
- Towards FAIR and open research outputs

*Citizen Science*

*Research*

Open Infrastructures | Support & Training | Community Engagement | Recognition & Rewards | Policies & Regulations

## strategic goals

Close collaboration between knowledge institutions, government, industry, and citizens to strengthen science and optimise the processes of creating, sharing, and communicating knowledge for the benefit of society.

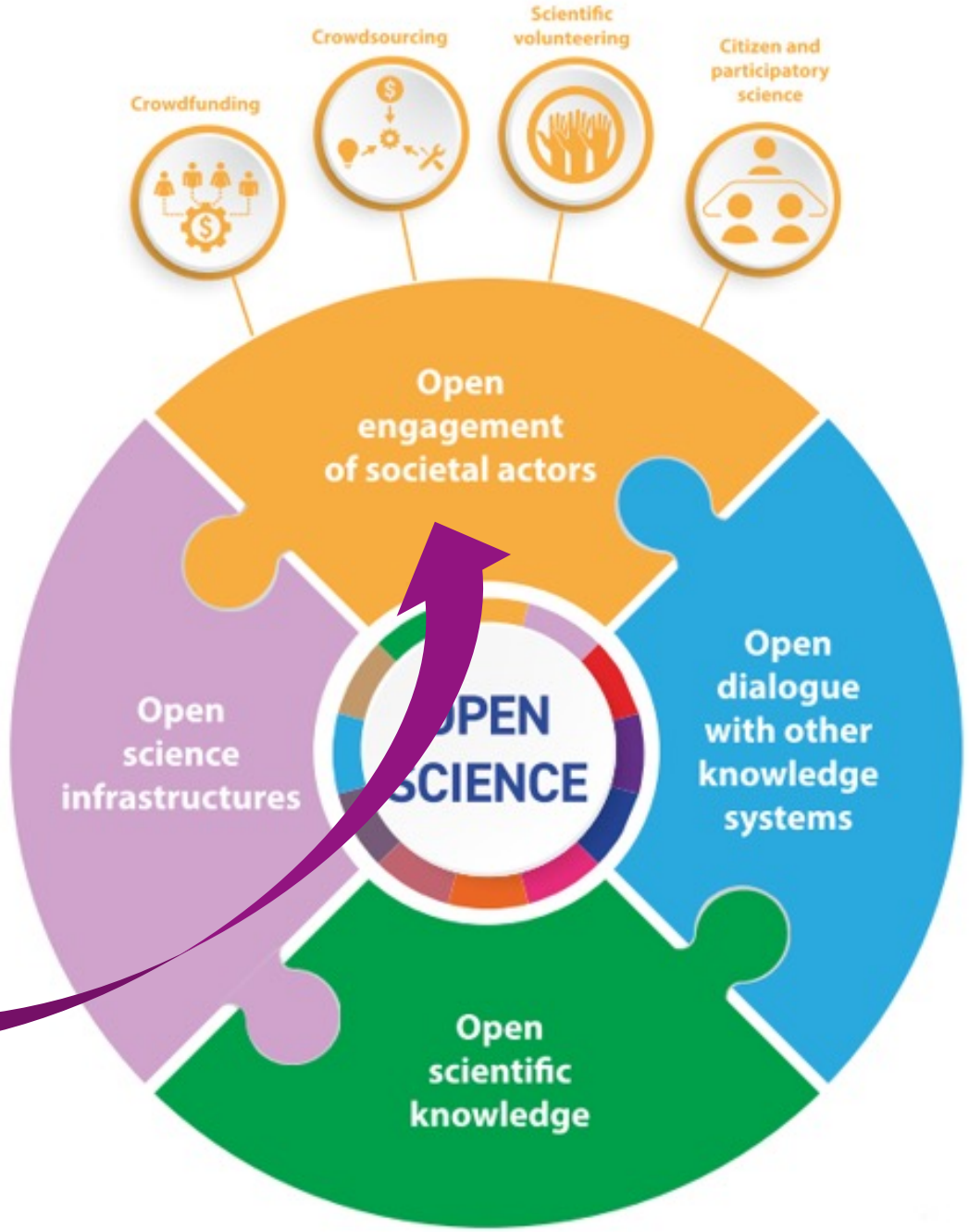
Inclusive, efficient, and transparent processes of scientific (co-)creation, evaluation, quality assurance and communication

Removal of barriers to reading and reusing all scientific output, so everyone can access sci-entific knowledge in a sustainable way and benefit from it

Products of and for knowledge creation, like data and software, being findable, accessible, interoperable, and reusable (FAIR), and open in as far regulations allow

IM-STUDIO.EU


# Open Engagement of Societal Actors



CS-NL
Citizen Science Nederland

400+ members

info@cs-nl.network

@CitSciNL

zenodo.org/communities/cs-nl/

tinyurl.com/CSNL-NIEUWSBRIEF

tinyurl.com/CSNL-LINKEDIN

# Regieorgaan Open Science officially launched as Open Science NL

23 March 2023

**Representatives of fifteen knowledge institutions and the Ministry of Education, Culture and Science have signed the covenant for Open Science NL. It contains further agreements about the newly established Regieorgaan Open Science at NWO, which is called Open Science NL. The festive signing took place during a meeting at TU Delft, which was entirely dedicated to open science.**


With the signing of the covenant, the newly establishe
Science NL is to further accelerate the transition to o

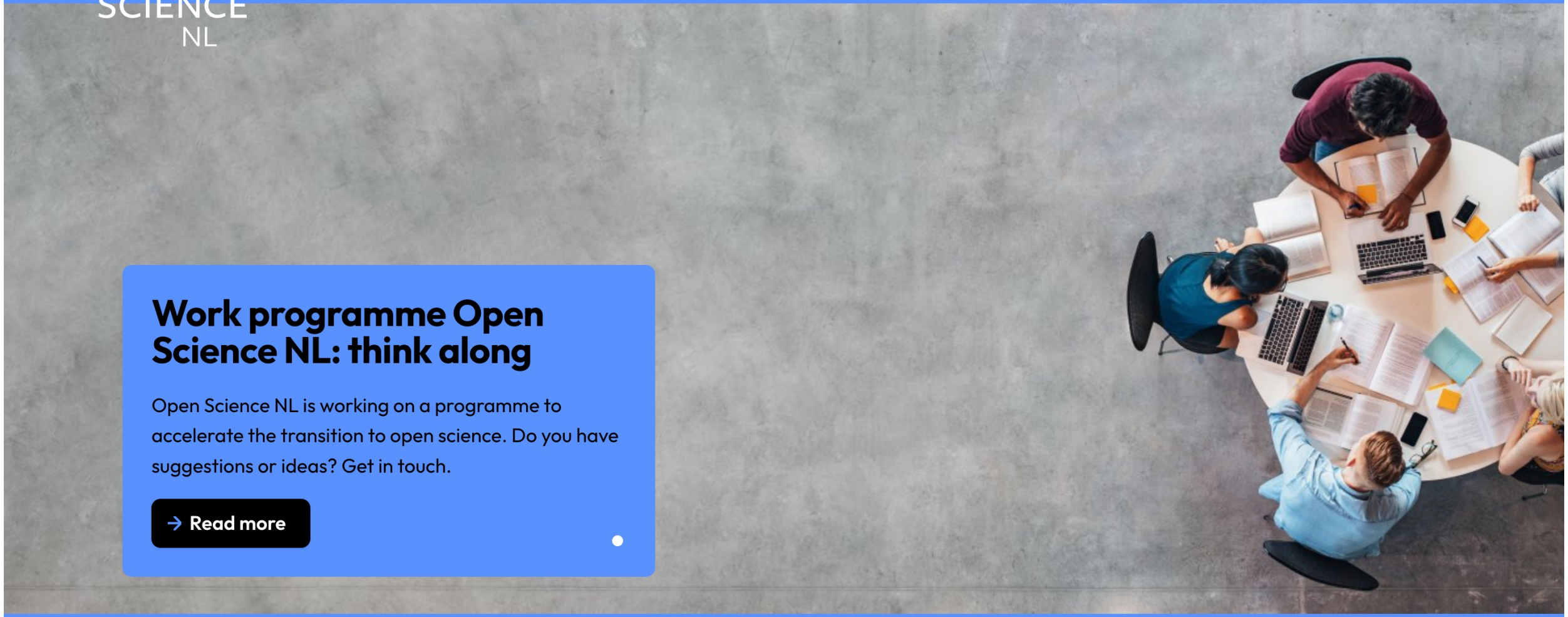
## Characteristics

**Theme**

Open Science

**Type**

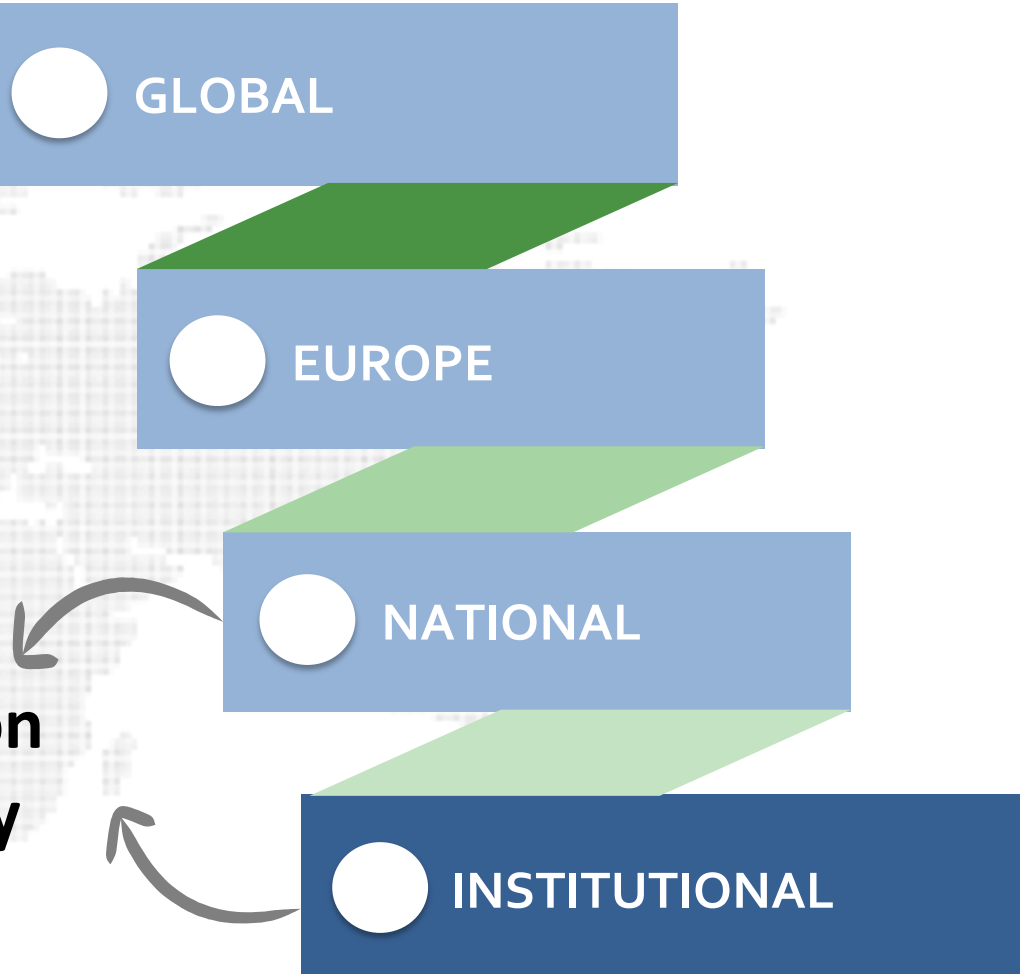
Organisation



## Work programme Open Science NL: think along

Open Science NL is working on a programme to accelerate the transition to open science. Do you have suggestions or ideas? Get in touch.

→ Read more



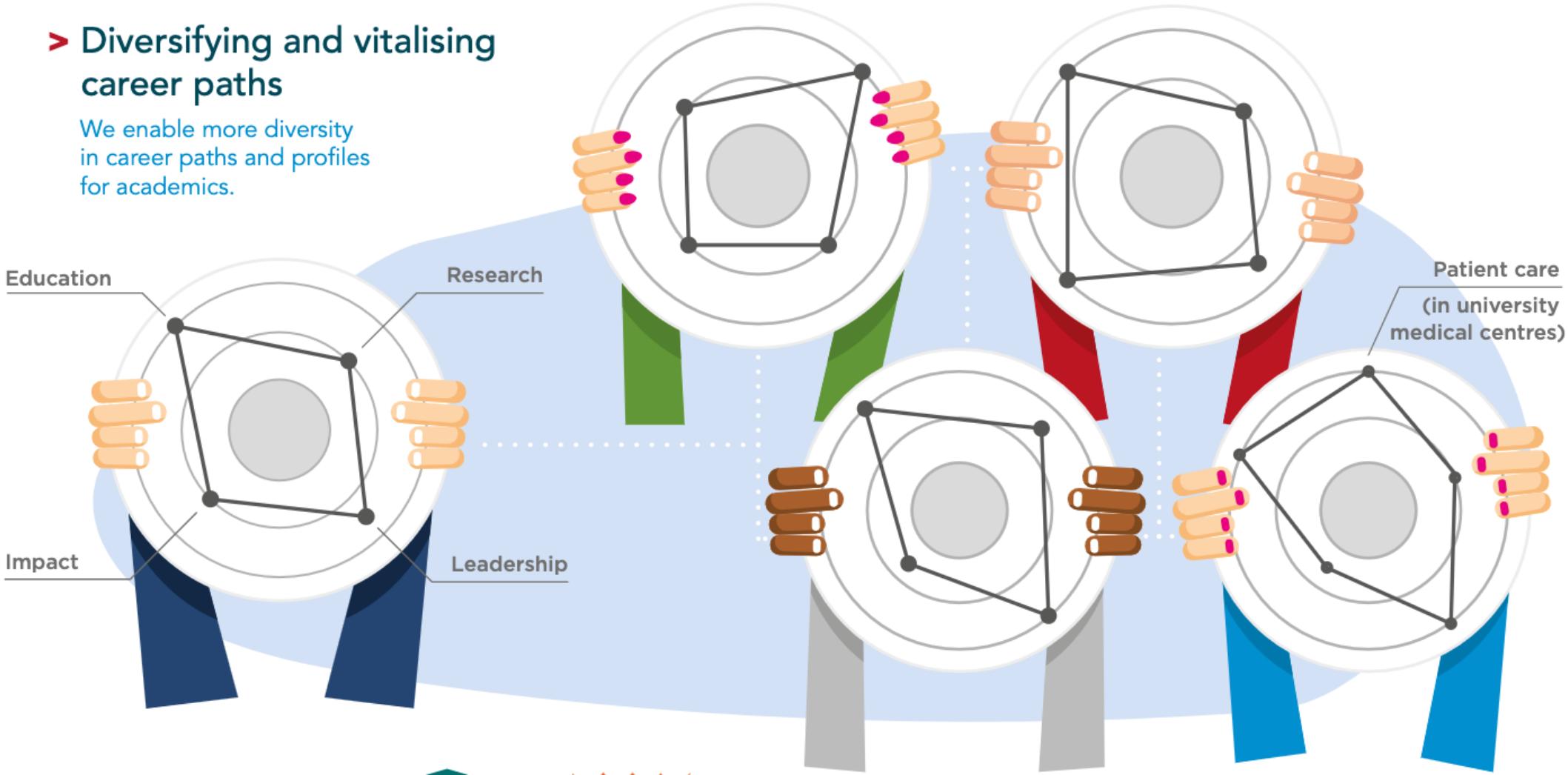

- **Rewards & Recognition**
- **The Utrecht University example**

# Room for everyone's talent

*towards a new balance in the recognition and rewards of academics*

## > Diversifying and vitalising career paths

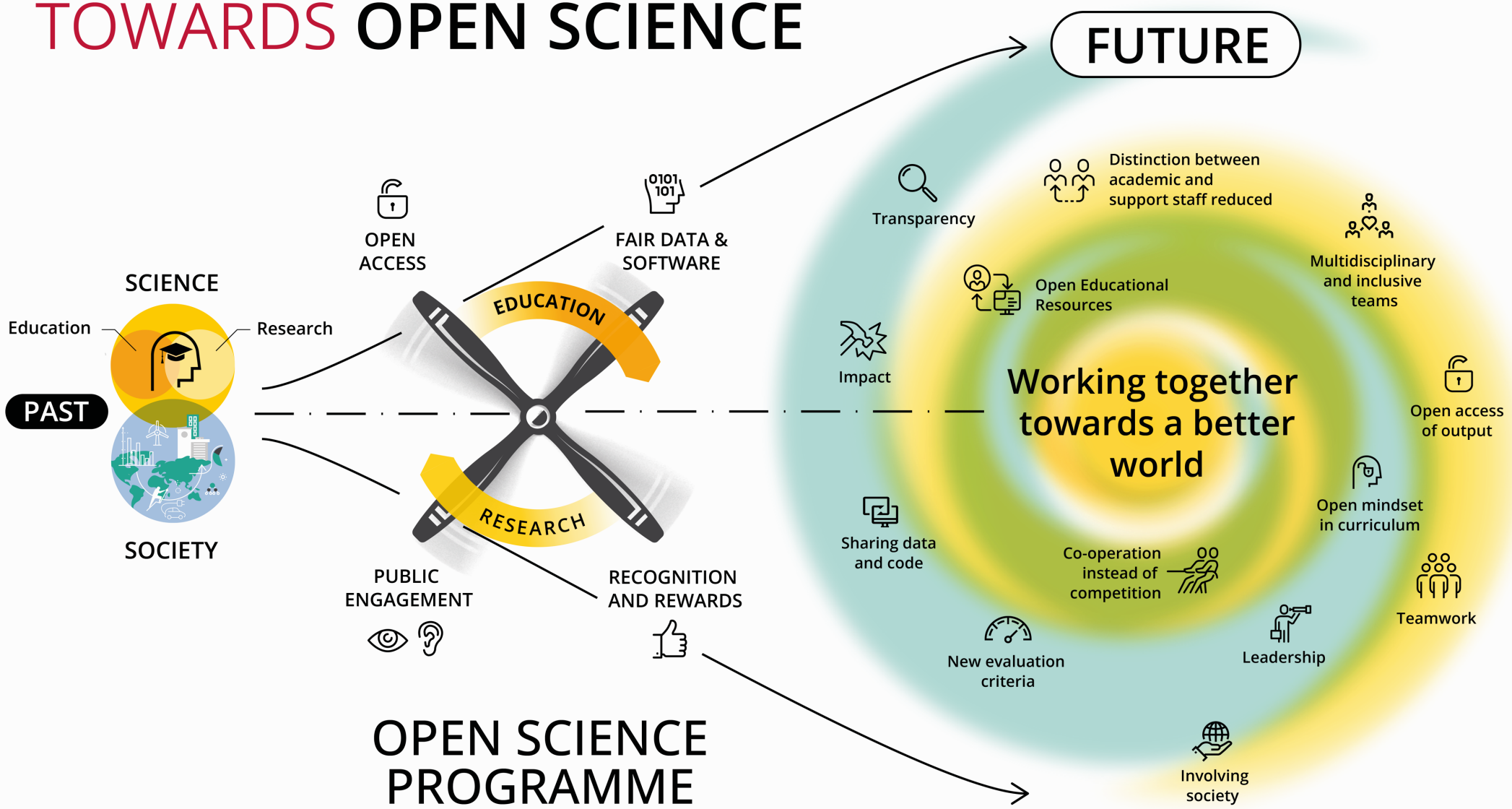
We enable more diversity in career paths and profiles for academics.



Utrecht University

www.uu.nl/openscience

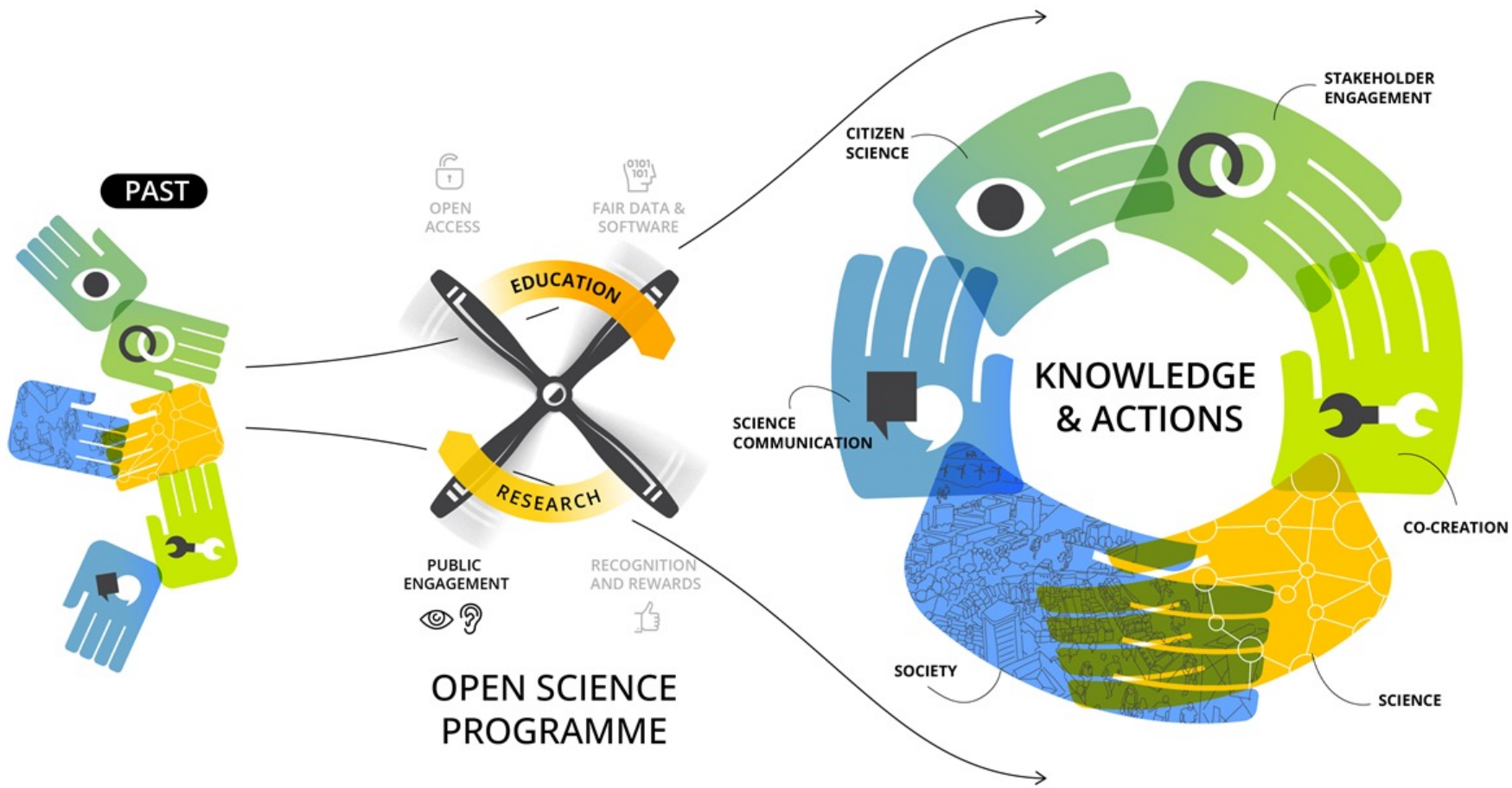
# TOWARDS OPEN SCIENCE




OPEN SCIENCE PROGRAMME

Utrecht University

# OPEN SCIENCE
## PUBLIC ENGAGEMENT

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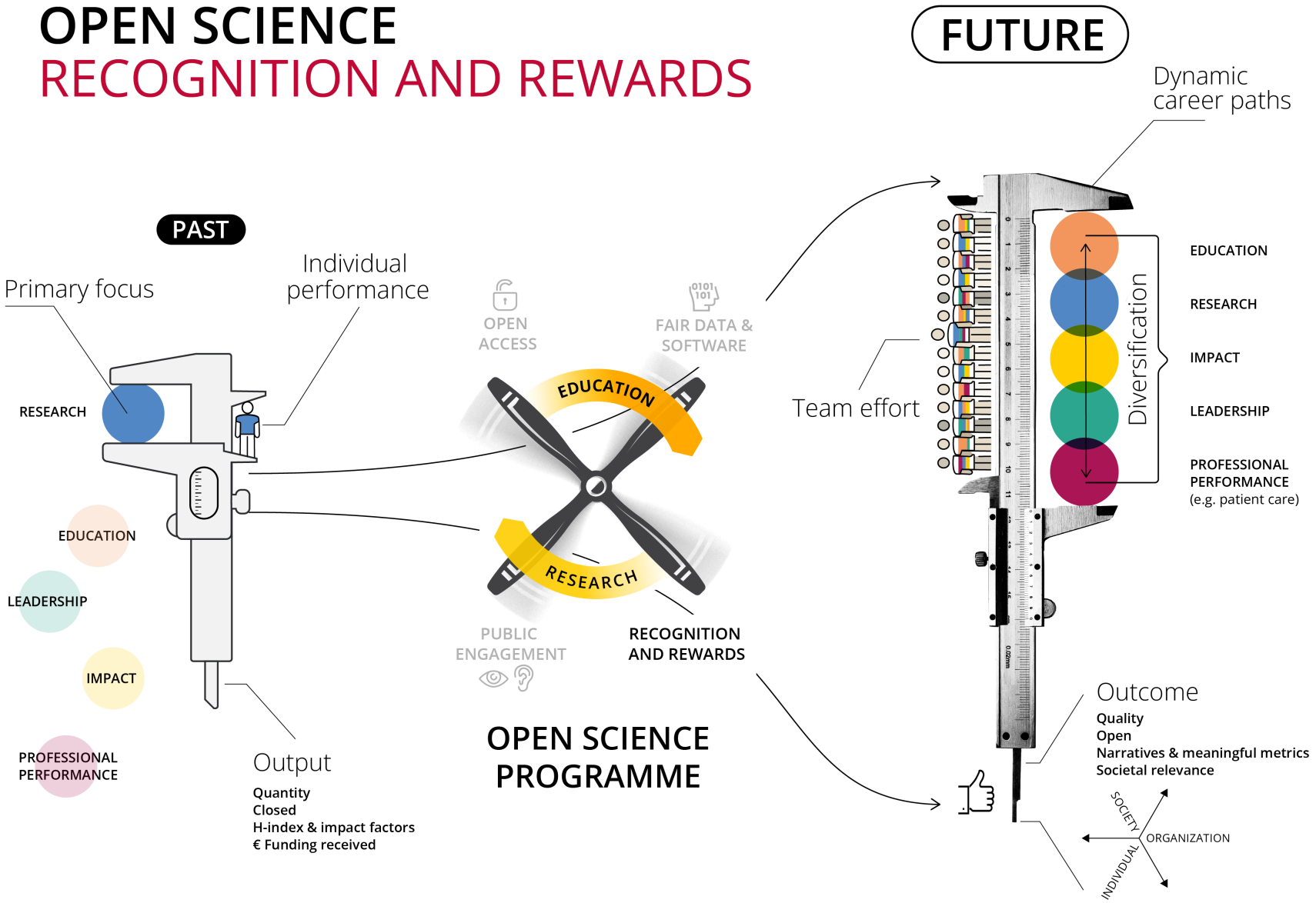
Utrecht University

SKETCH AUTUMN 2020

# OPEN SCIENCE
# RECOGNITION AND REWARDS

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citizen
science lab

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