Benefits and Obstacles of Open Science:
An analytical framework illustrated with case study evidence from Argentina

Valeria Arza and Mariano Fressoli
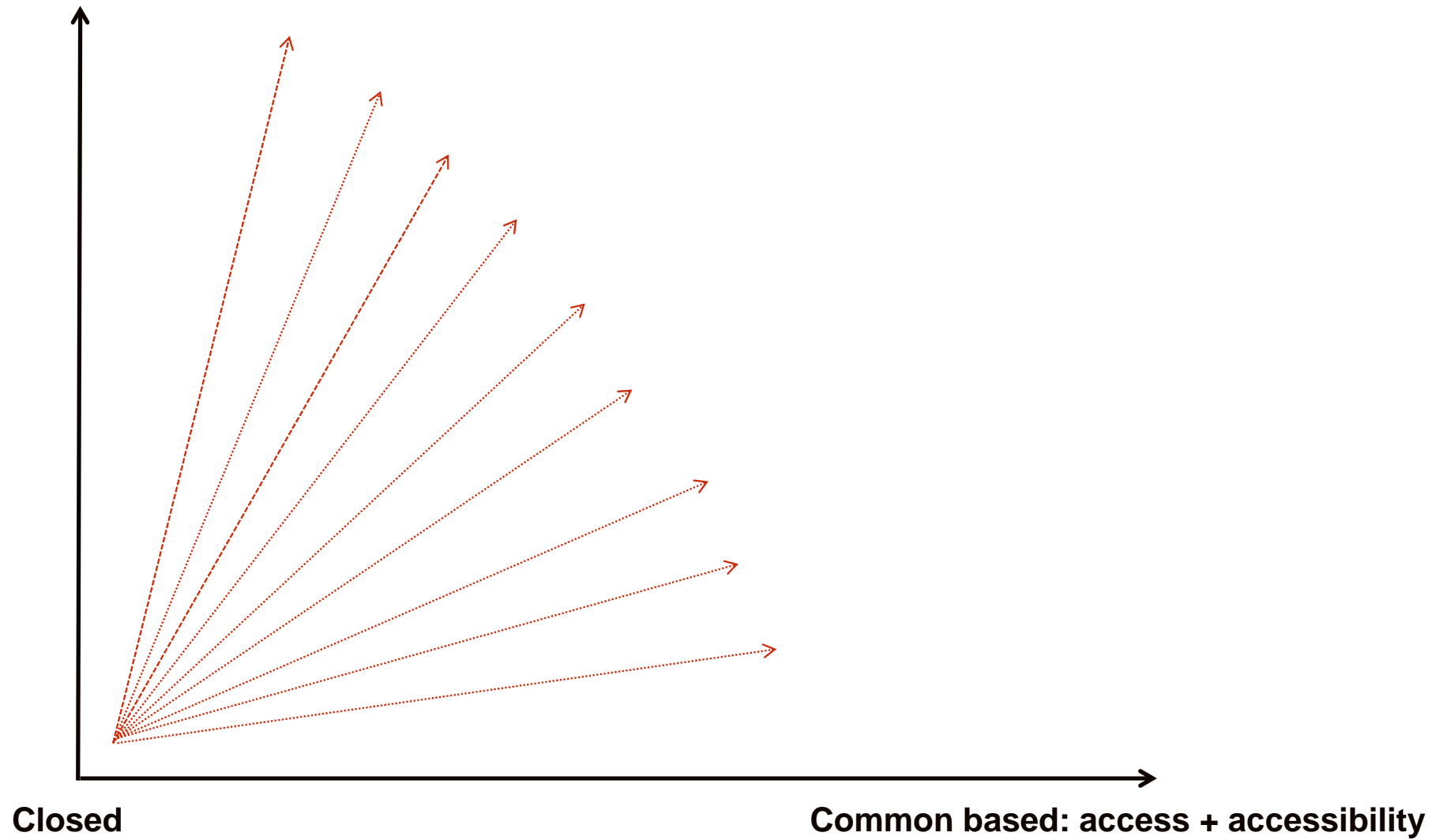
CONICET, CENIT and STEPS AMERICA

LATINA

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Peer common based production of scientific knowledge

Collaboration: Participation + Interaction + Diversity

Closed

Common based: access + accessibility

Public
Communication
of Science

Utilizando medios tradicionales y nuevos formatos como blogs, video juegos, hackatones, etc.

Reserach Design and Proposals

Recollecction and Analysis

Citizen
Science

Actores sociales participan en la recolección, clasificación y análisis del conocimiento científico.

Public Communication Intervention

Documentation and Description

Evaluation and Publication

Instrumental Infrastructure

Open
Digital
Repository

Permiten acceder libremente a datos y publicaciones científicas.

Scientific Online
Collaboration

Nuevas herramientas digitales facilitan la interacción y la producción colectiva usando Internet.

Benefits of Open Science

Improving Knowledge Production
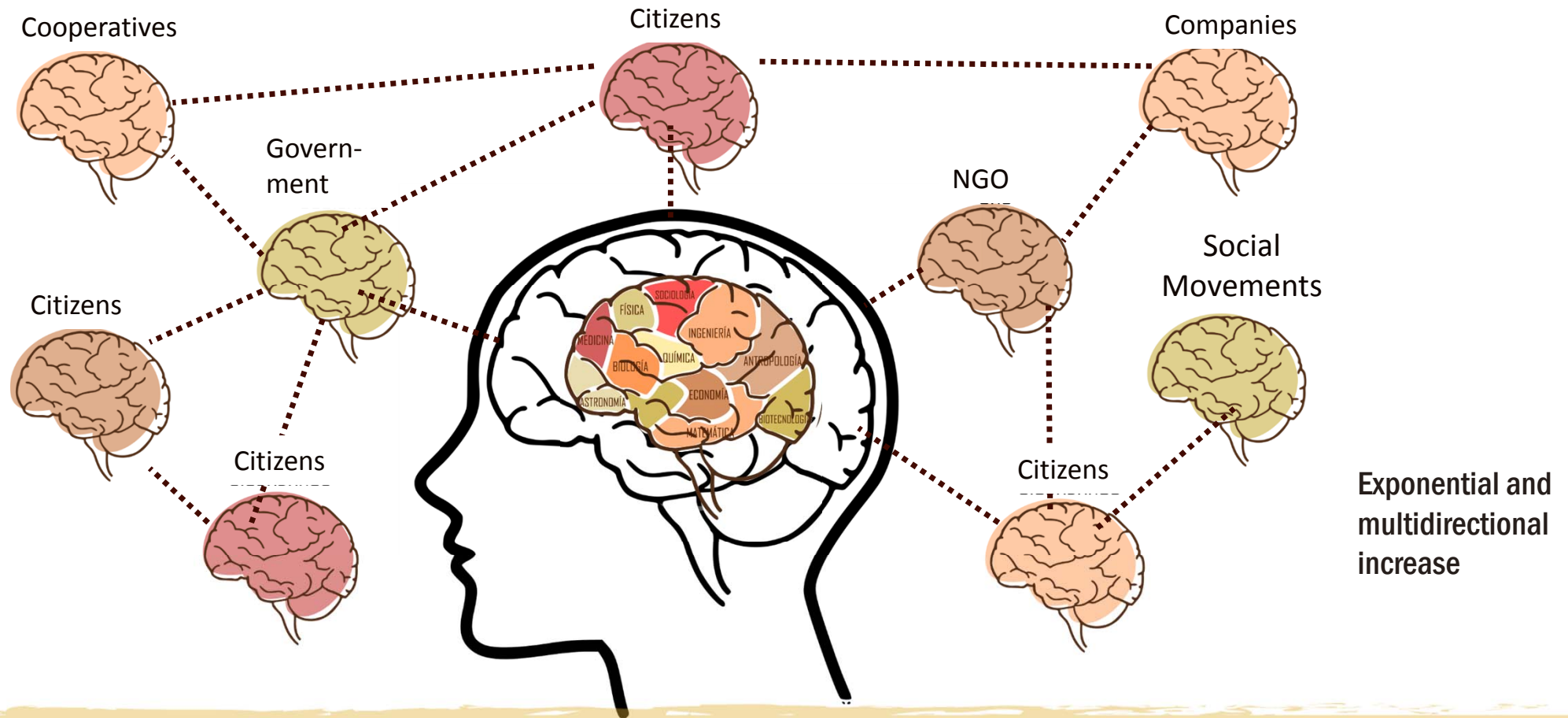**Democratization**
Empowerment

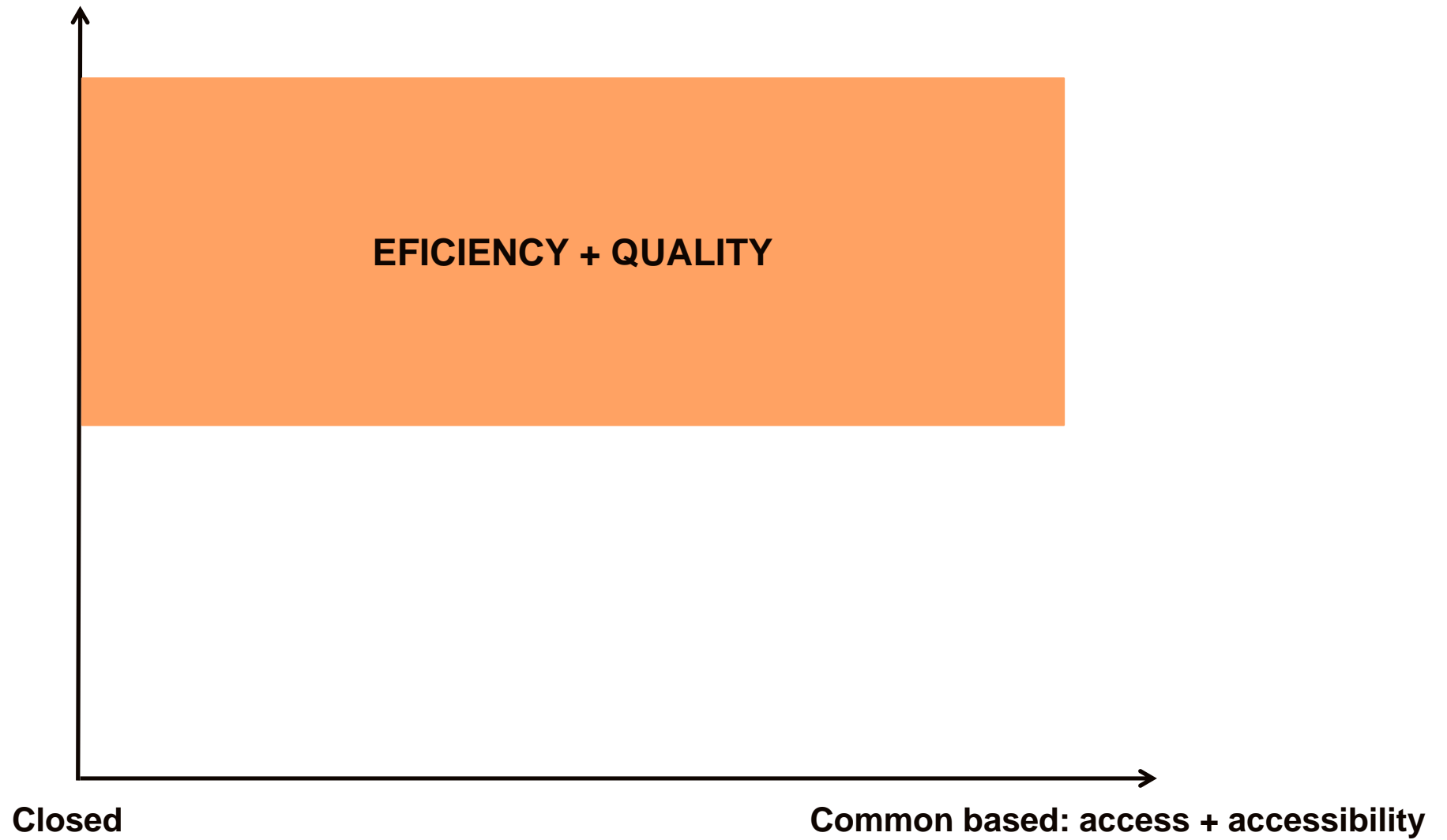**Efficiency**
Quality
Creativity

Objectives of the Work

1. **Producing an analytical framework relating the different dimensions of openness with benefits**

2. **Anticipating the obstacles actors face when attempting to opening up**
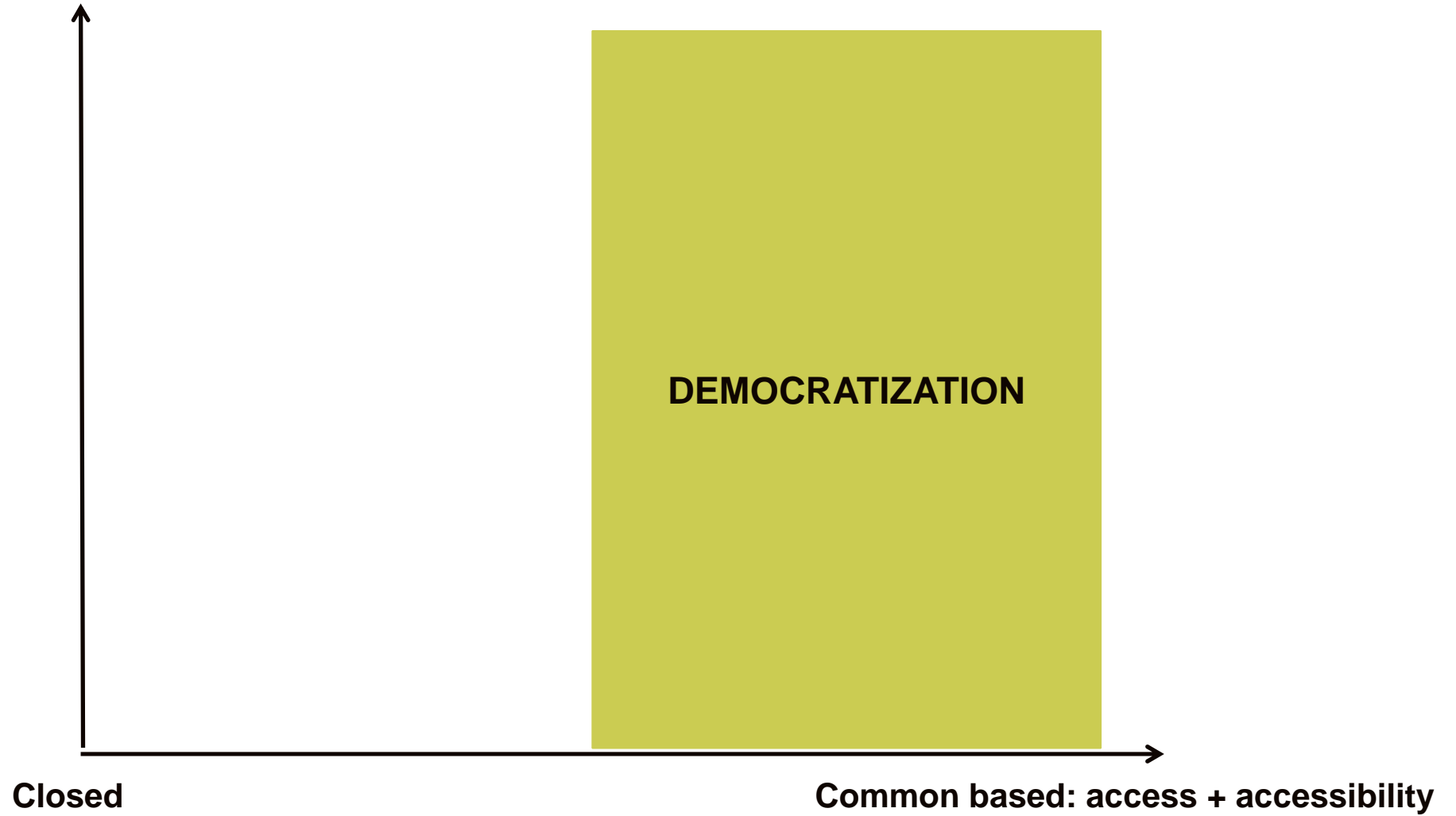
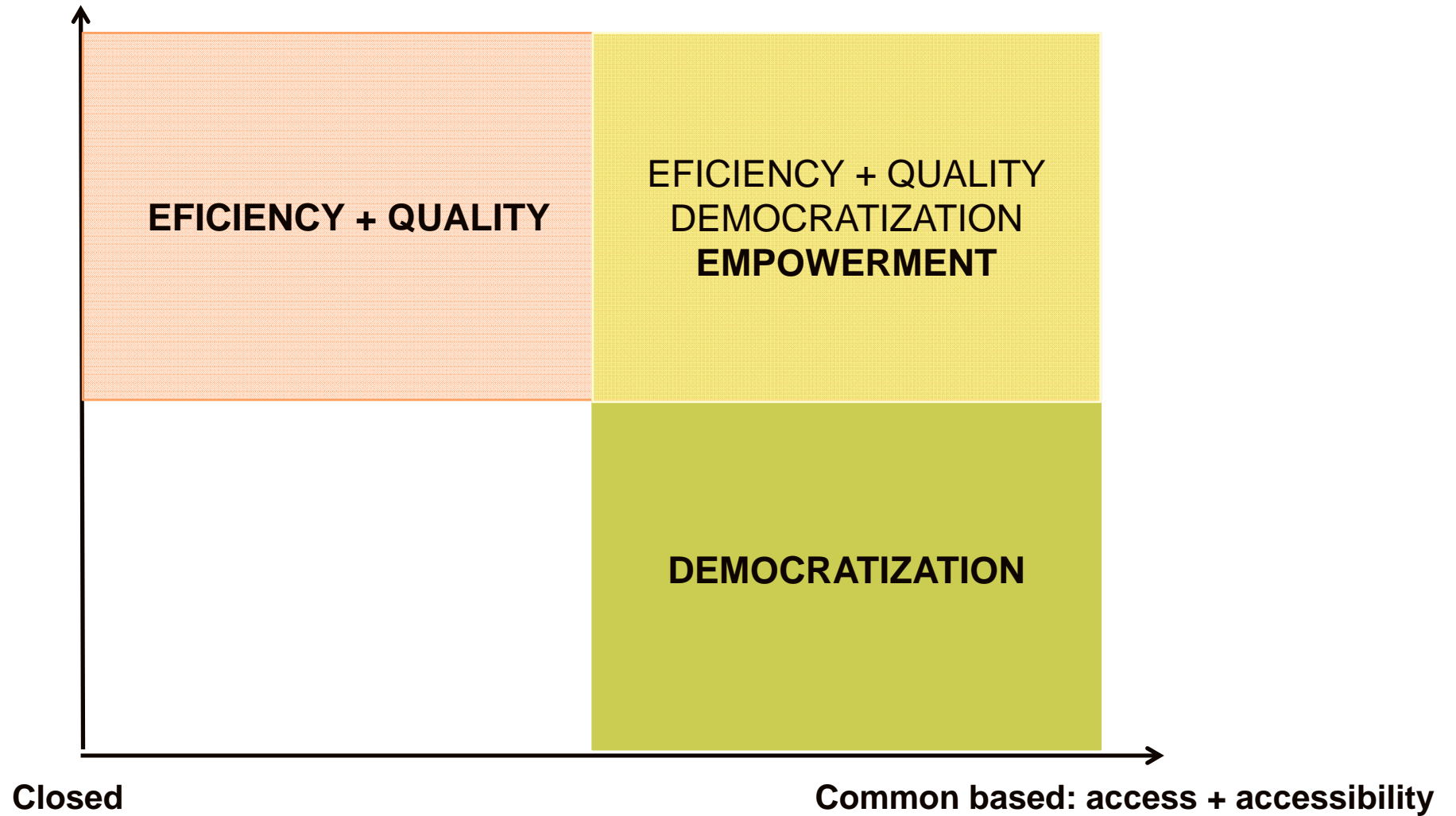Forms of **Collaboration** Production of Scientific Knowledge

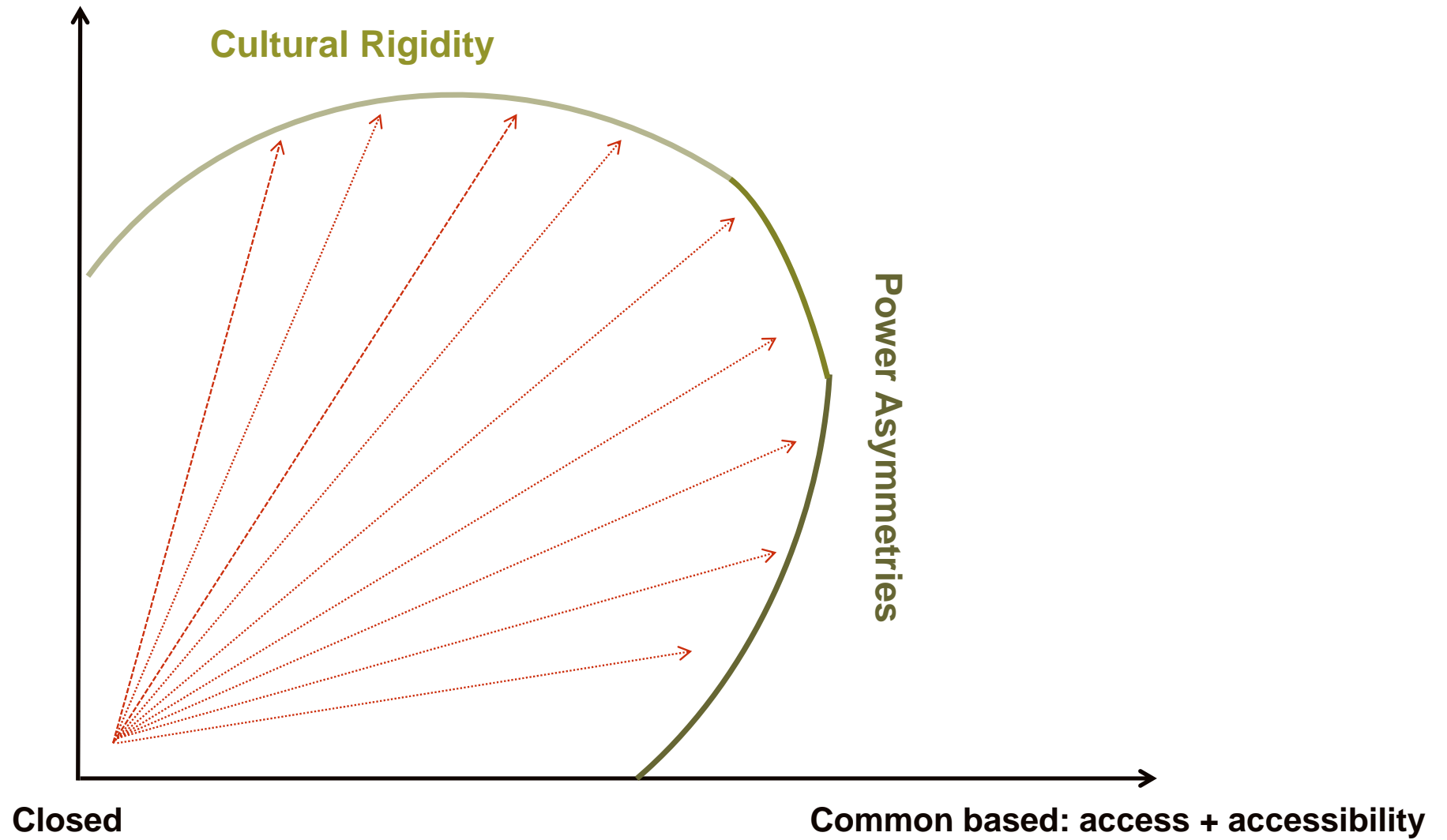**Collaboration: Participation + Interaction + Diversity**

EFICIENCY + QUALITY

Closed

Common based: access + accessibility

Collaboration: Participation + Interaction + Diversity

DEMOCRATIZATION

Closed

Common based: access + accessibility

Collaboration: Participation + Interaction + Diversity

EFICIENCY + QUALITY

EFICIENCY + QUALITY
DEMOCRATIZATION
EMPOWERMENT

DEMOCRATIZATION

Closed

Common based: access + accessibility

Collaboration: Participation + Interaction + Diversity

Cultural Rigidity

Power Asymmetries

Closed

Common based: access + accessibility

Methodology: Case Studies

- Selection Criteria

  - Disciplines, processes of knowledge production, techniques of participation, new infrastructure

- 4 Cases:
  - NOVA (astronomy)
  - PAMPA2 (limnology)
  - eBird (ornithology)
  - Territorial Intelligence (geography – chemistry)

- At least 3 semi-structured interviews per case

- Structured interview with project leader to assess openness in a 4-point Likert scale (dimensions+stages)

PAMPA2: Lakes as sentinels

Argentinean Project of Monitoring and Prospecting the Aquatic Environment

Multidisciplinary team

Water behavior in the face of natural or human events

Sensors in buoys (Prize Innovar 2011) Open data

SAFER: Monitoring with the community
Sensing the Americas ´Freshwater Ecosystem Risk from Climate Change

- Lagoons as sentinels of climate change
- Culturally acceptable mitigation strategies
- Generating tools for the evaluation of climate change and health conditions as a means of reducing poverty
  - Work with Secondary Schools
  - Educational kit for periodic monitoring

Collaboration: Participation + Interaction + Diversity
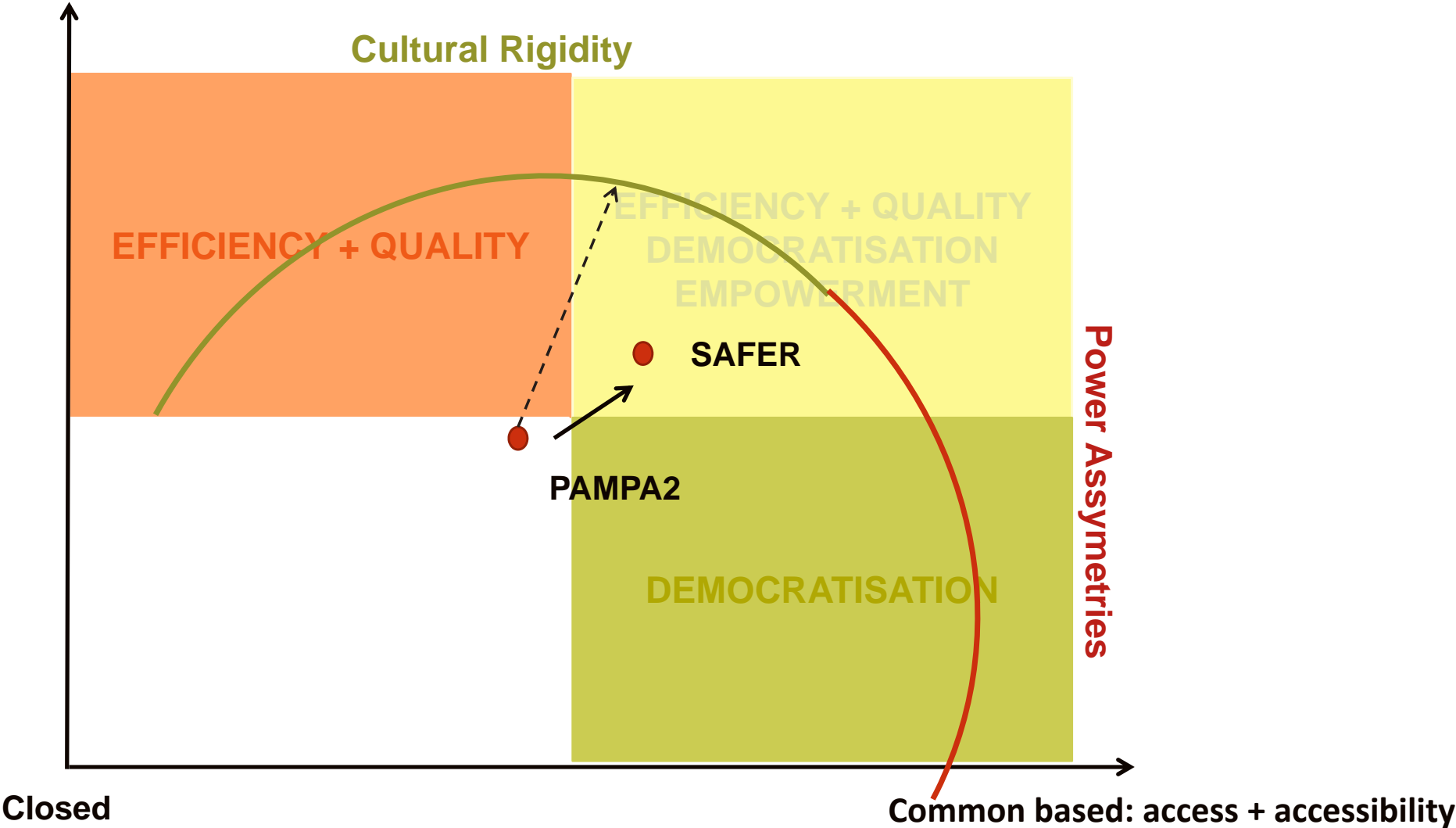
Territorial Intelligence
Integral Management of the Territory
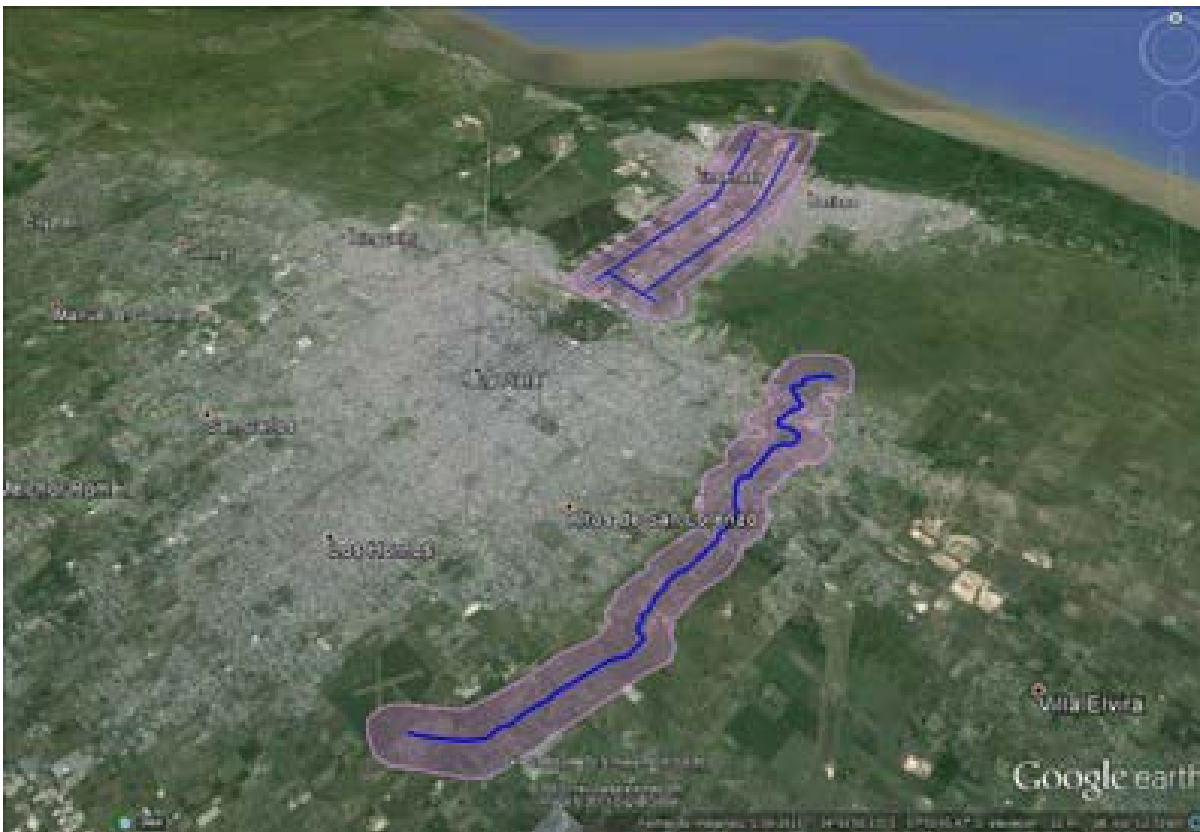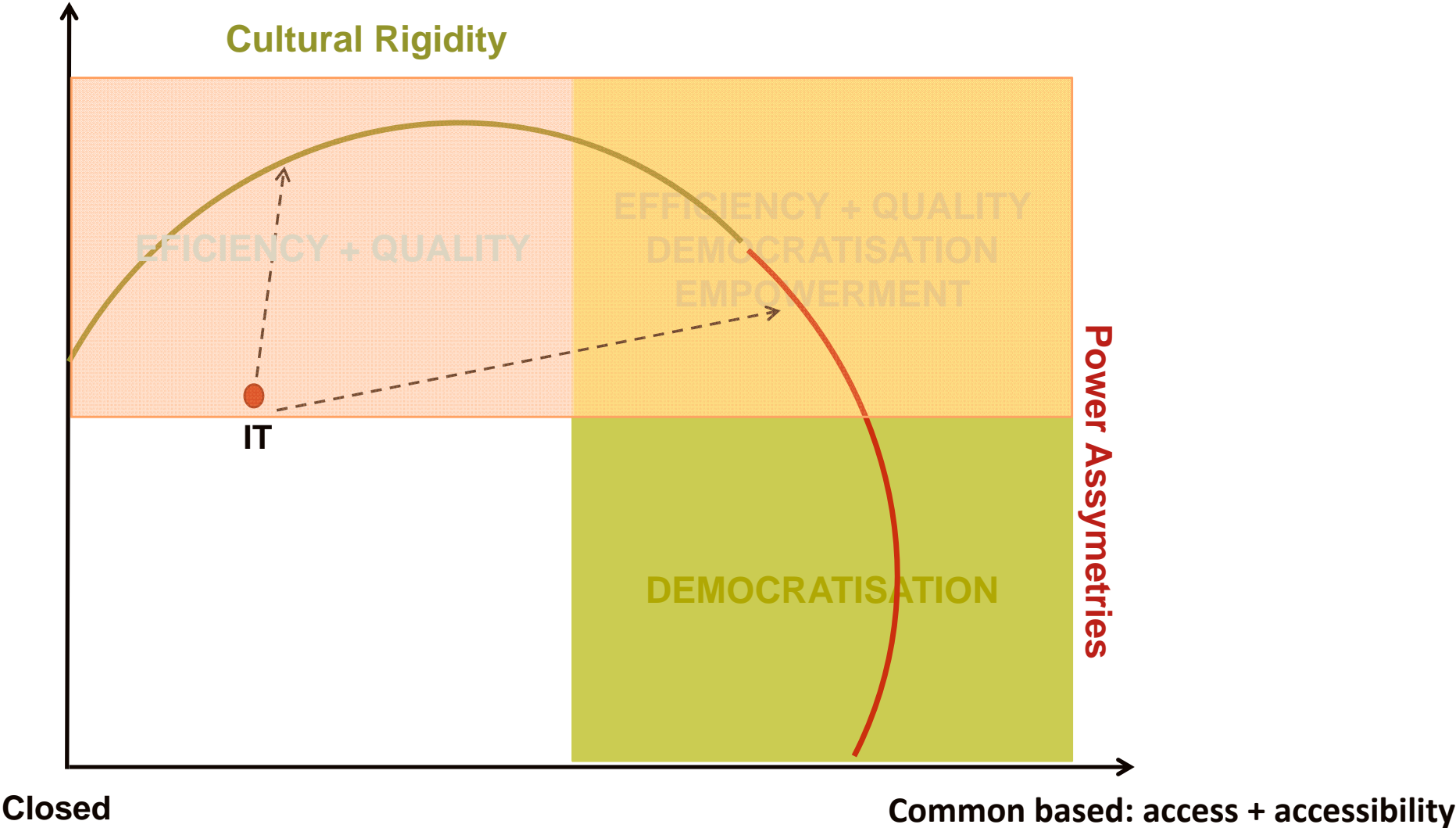

Zones affected by the floods of 2013
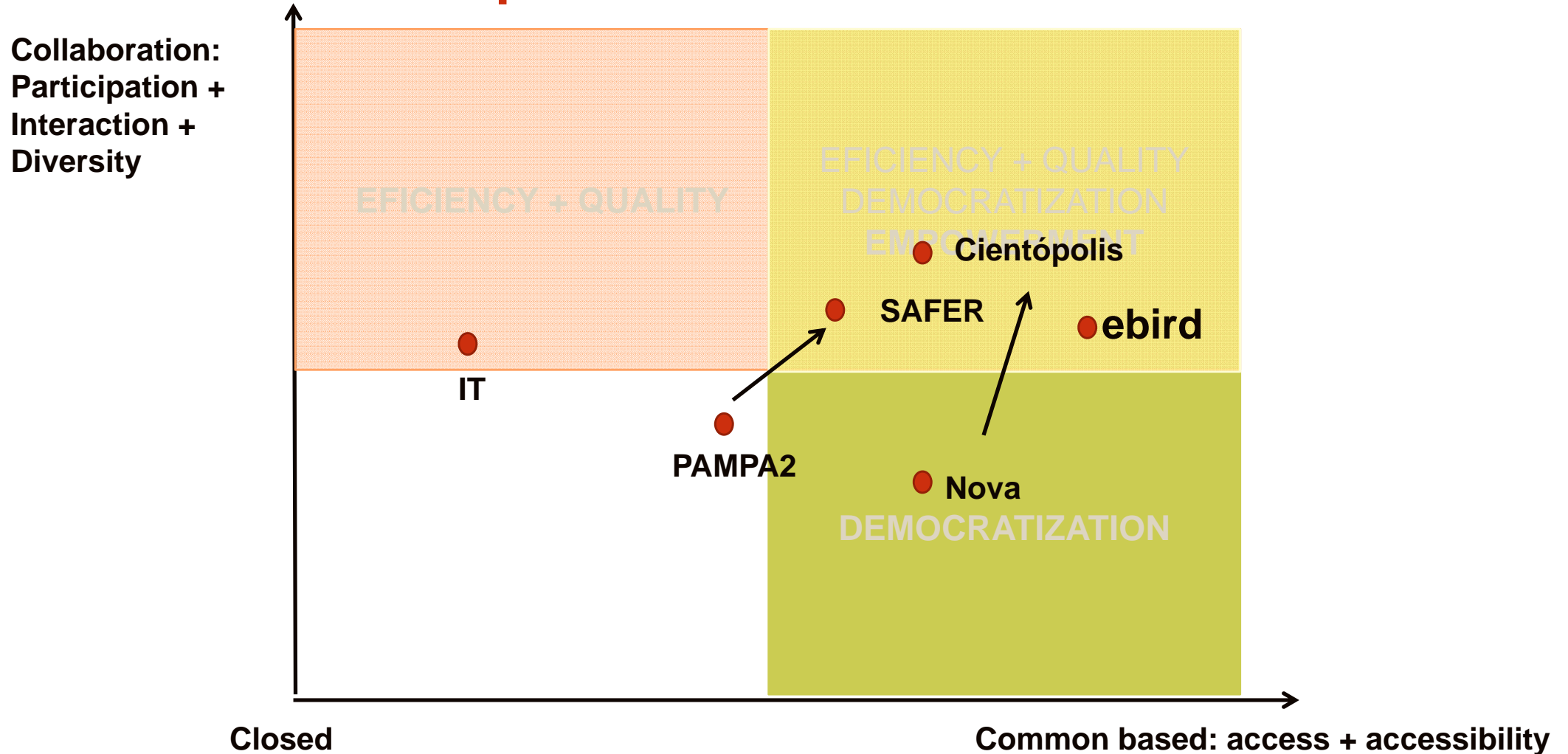
Two phases :

1. Diagnosis

Neighbors participate: questionnaire design and water samples

2. Implementing solutions

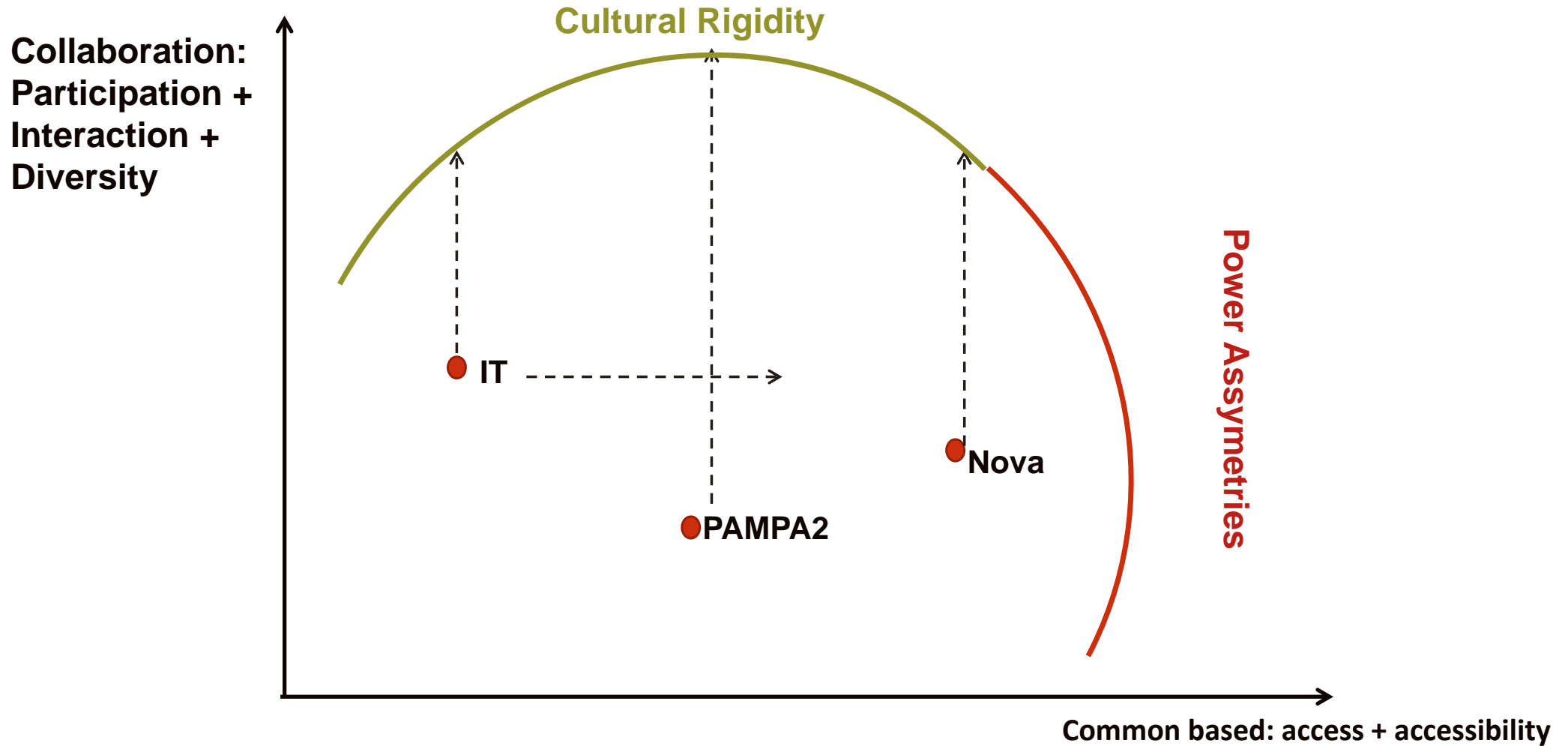# Collaboration: Participation + Interaction + Diversity

Conclusion 1: Benefits are related to dimensions of openness

Collaboration: Participation + Interaction + Diversity

EFICIENCY + QUALITY

EFICIENCY + QUALITY
DEMOCRATIZATION
EMPOWERMENT

Cientópolis

SAFER

ebird

IT

PAMPA2

Nova

DEMOCRATIZATION

Closed

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Conclusion 2: Opening-up on different dimensions face different challenges

THANK YOU

Valeria Arza CONICET, CENIT and STEPS

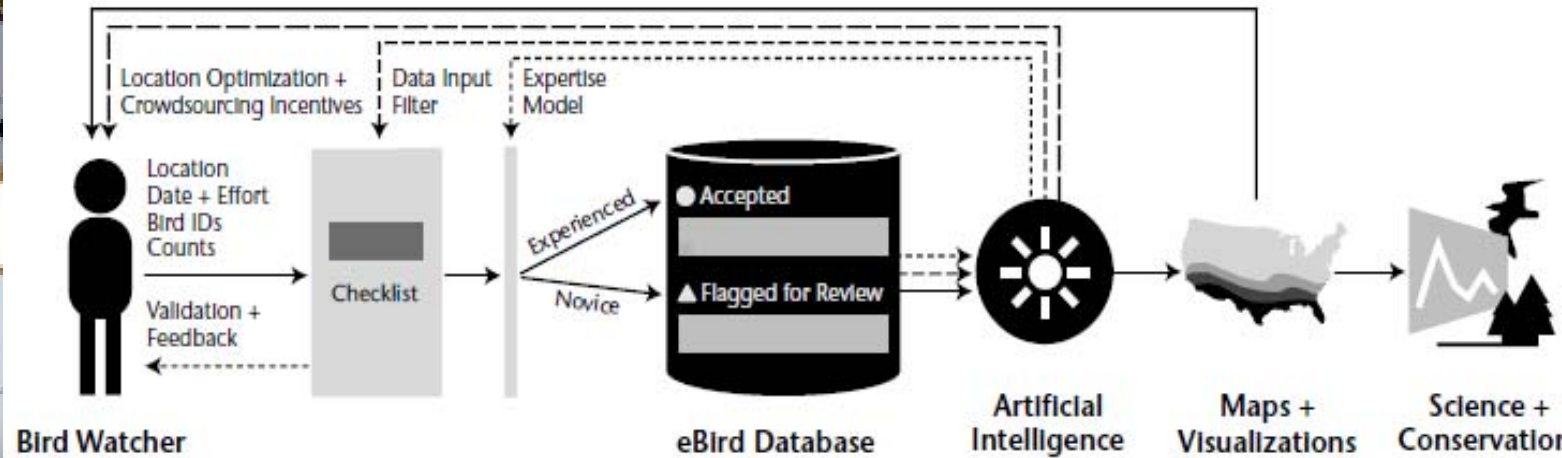AMERICA LATINA

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eBird Argentina

SI LO VE, AVISE

Aves Argentinas está recabando información sobre bandadas de
CHARLATANES (Dolichonyx Oryzivorus)
Avise donde los ve a Ayelén Muchiutti (Coord.)
Correo: muchiutti@avesargentinas.org.ar

Location Optimization + Crowdsourcing Incentives | Data Input Filter | Expertise Model

Bird Watcher

Location
Date + Effort
Bird IDs
Counts

Validation + Feedback

Checklist

Experienced

Novice

● Accepted

▲ Flagged for Review

eBird Database

Artificial Intelligence

Maps + Visualizations

Science + Conservation

CITIZEN SCIENCE
Bird watching
Semi-automatic processing of the data

EFFICIENCY
Decreased costs / Exponential increase in observations

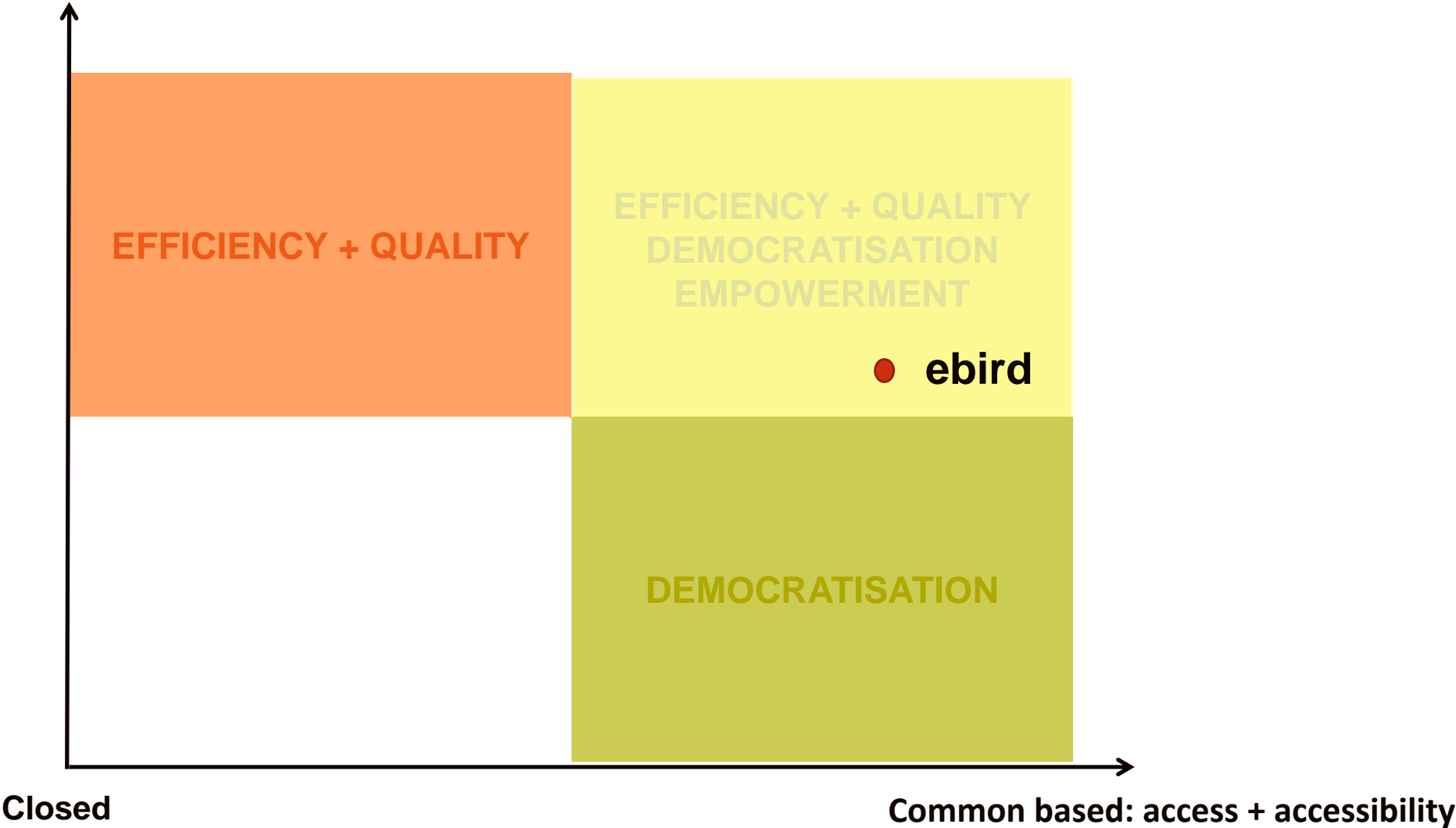**DEMOCRATIZATION**
Platform and open data.
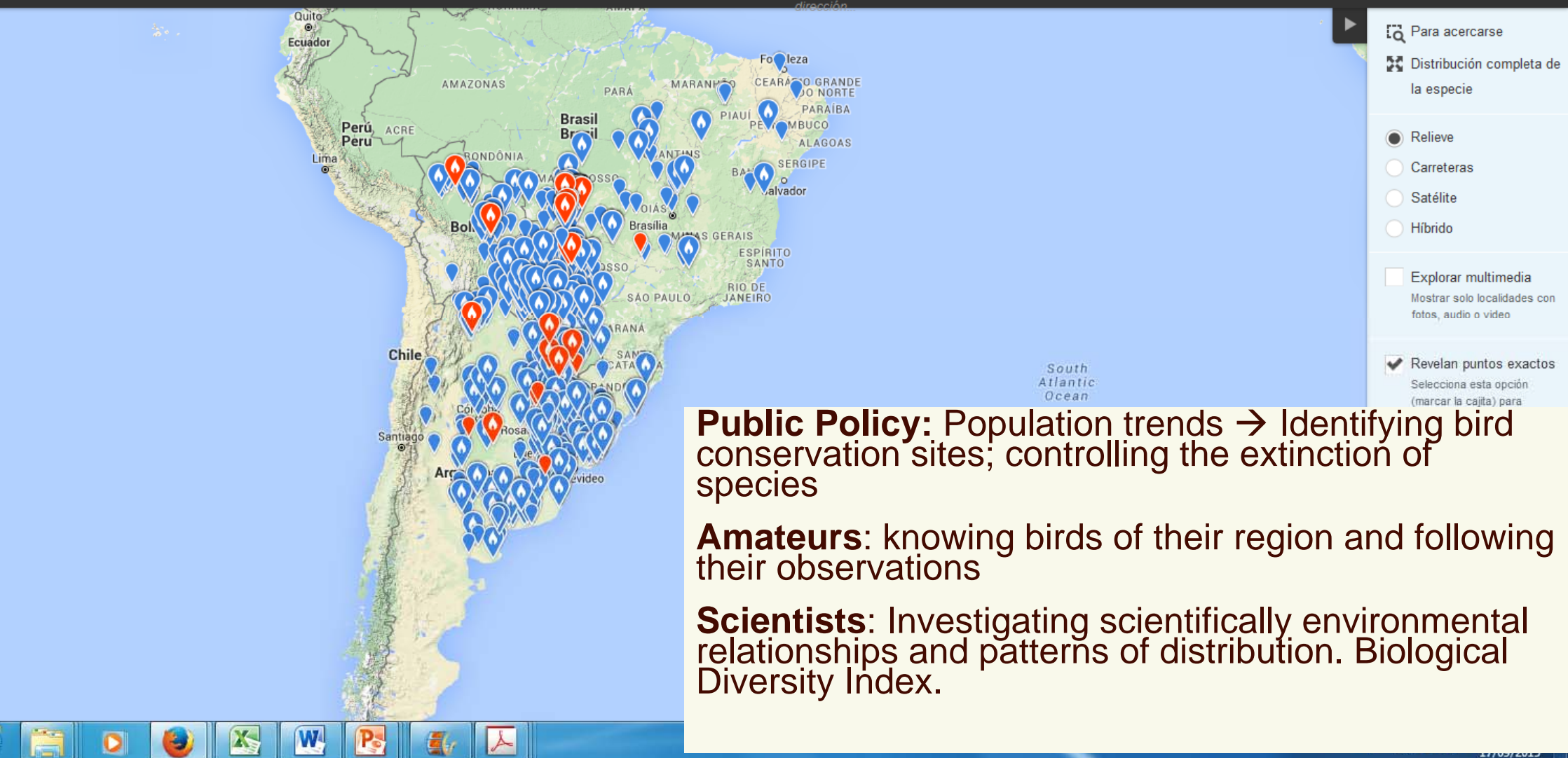
Public Policy: Population trends → Identifying bird conservation sites; controlling the extinction of species

Amateurs: knowing birds of their region and following their observations
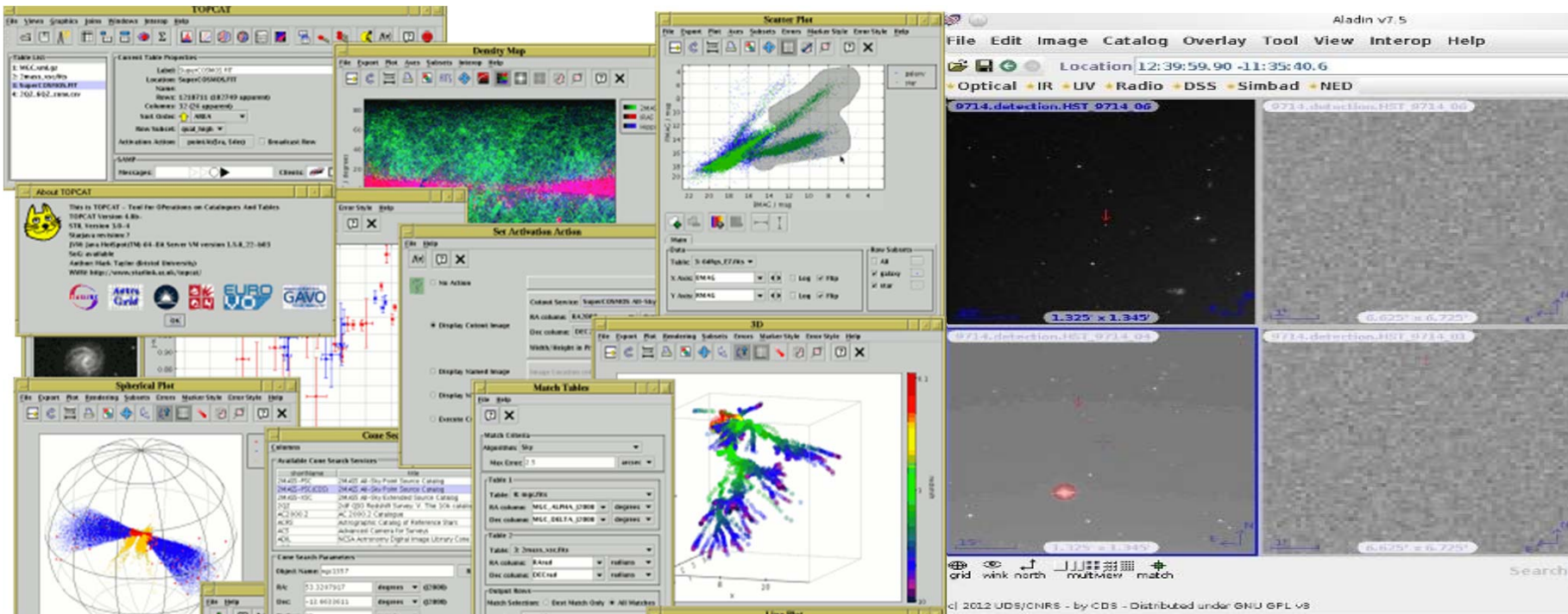
Scientists: Investigating scientifically environmental relationships and patterns of distribution. Biological Diversity Index.

Collaboration: Participation + Interaction + Diversity

EFFICIENCY + QUALITY

EFFICIENCY + QUALITY
DEMOCRATISATION
EMPOWERMENT

● ebird

DEMOCRATISATION

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Nuevo Observatorio Virtual Argentino NOVA

(New Argentinean Virtual Observatory)

Collaboration among local and international astronomical community **Documentation, digitalization and open access to the data**

Galaxy conqueror

Cientópolis
Plataforma para la ciencia ciudadana

Runaway stars

-**Platform** for scientists to implement their projects of citizen science

- **Strengthening the link between scientific institutions and the community.**

-Encouraging citizens to participate in science

-**Galaxy Conqueror + Runaway stars**: Gaming: invite citizens to identify galaxies and runaway stars

Collaboration: Participation + Interaction + Diversity

EFFICIENCY + QUALITY

EFFICIENCY + QUALITY
DEMOCRATISATION
EMPOWERMENT

● **Cientópolis**

● **Nova**

DEMOCRATISATION

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