Manuel Heitor

TIP@50: Technology and Innovation Policy

Human-centered policy design and implementation

TIP@50: Lessons learned

1. **People, people, people…**

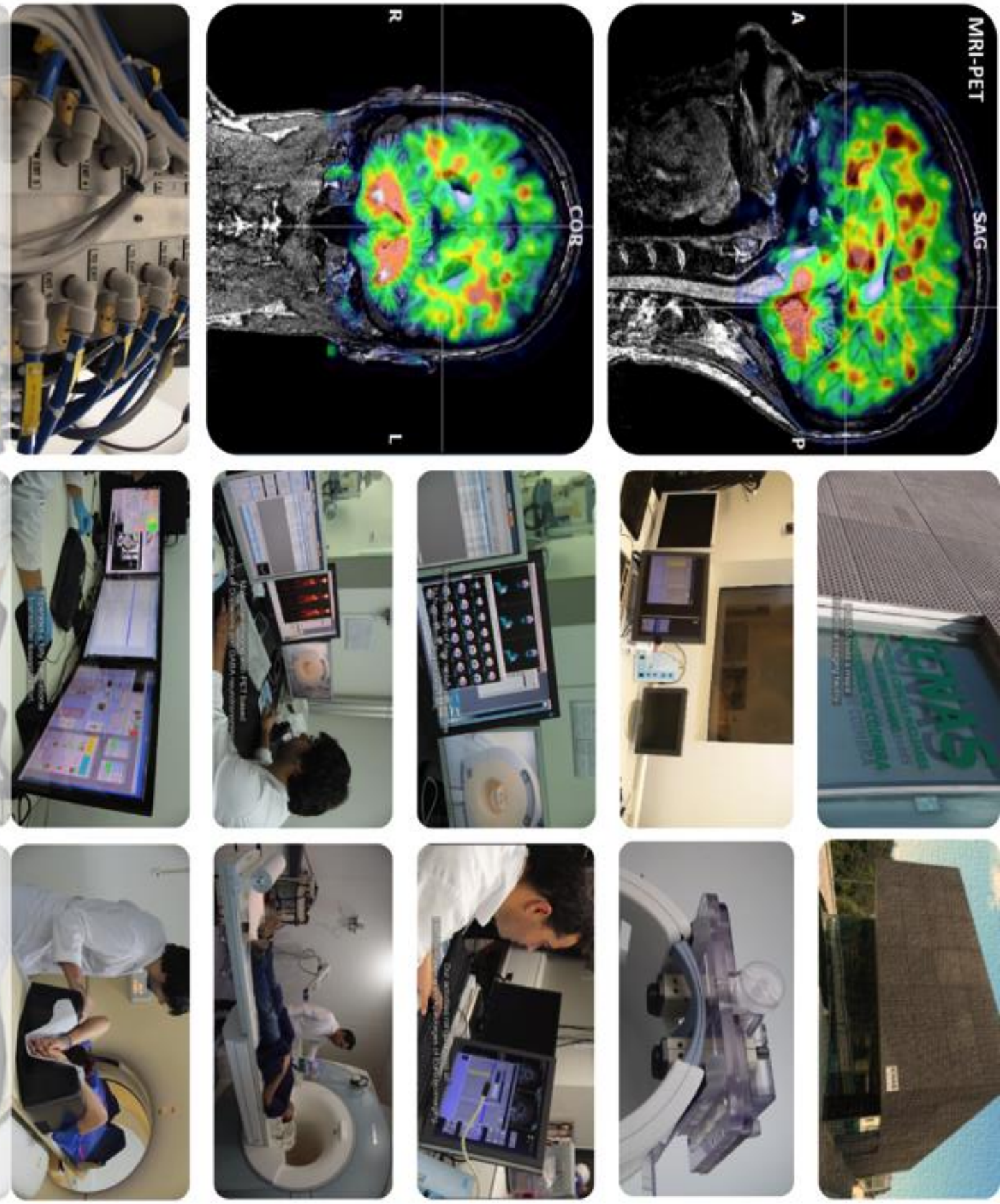
- *Promote policies to help massifying skill development and foster collective learning, democratizing the access to knowledge*

2. **On the *collective action* of institutions and a system approach to technology and innovation**:

- *Promote policies to foster institutional and R&D diversification, together with the role of intermediaries*

3. **Diversifying the structure of the economies and the level of incentives, to enlarge access to innovation**:

- *Which policies to enlarge gross expenditure in R&D and avoid further concentration of funding?*



A case study: cancer diagnosis and treatment…

The case of "EU Cancer Core": Future directions

A mission oriented approach to cancer in Europe for 2030

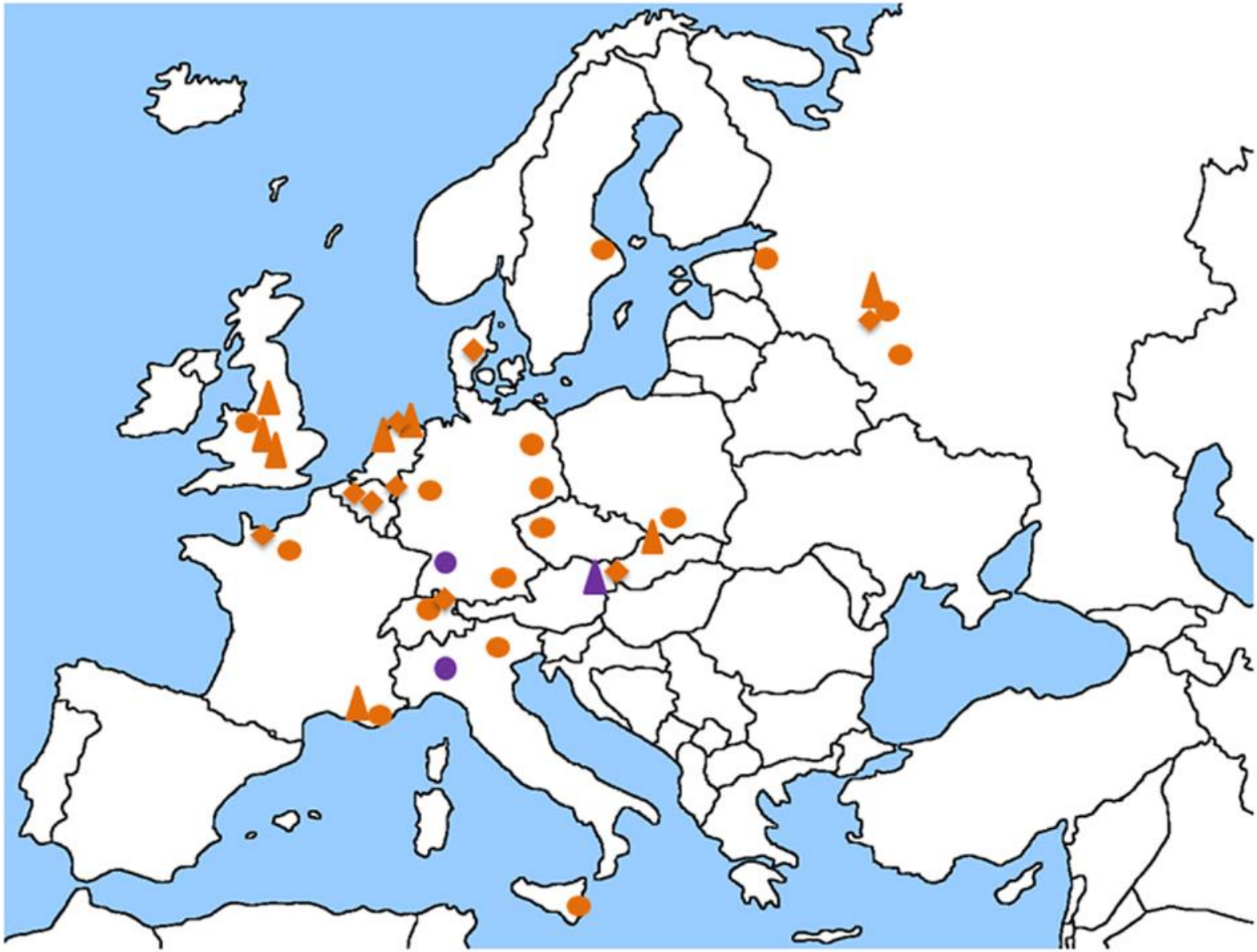
(source: Celis & Pavalkis, Molecular Oncology, Nov, 2017)

To achieve a long term survival of 3 out 4 cancer patients

The issues:

Where?...How?

Particle therapy centres in Europe - 2015



In operation:

- Proton
- Carbon
- Dual Ion

Under construction:

- Proton
- Carbon
- Dual Ion

Being planned:

- Proton
- Carbon
- Dual Ion

Source: PTCOG, October 2015

An example: “mobility”…

Democratizing mobility,

… new horizons for innovation?

Three main driving factors:

- **Connectivity**
- **Electrification**
- **Ambition…**


Flow.me
CEIIA

Albert Robida,
Leaving the Opera in Year 2000 (La Sortie de l'Opéra en l'An 2000), 1882

Gramazio & Kohler's ballet of flying machines for their Vertical Village is actually rooted in a long tradition of science-fiction images of future aerial urban life. This one by French illustrator Albert Robida represents fashionable society leaving the Paris opera at night after a show.

How to use technology to leverage citizens' expertise and promote learning??

Consider Knowledge as our common future:
...by promoting **participatory actions** rooted in people's knowledge, know-how and needs/goals,
and oriented to foster **collective learning**, **democratizing the access to knowledge** and **create new** solutions for all.

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Any knowledge is necessarily personal and social…

“indwelling” : …learn by experiencing?

Polanyi (1966, 1969)

A new culture of learning? …**Becoming!**

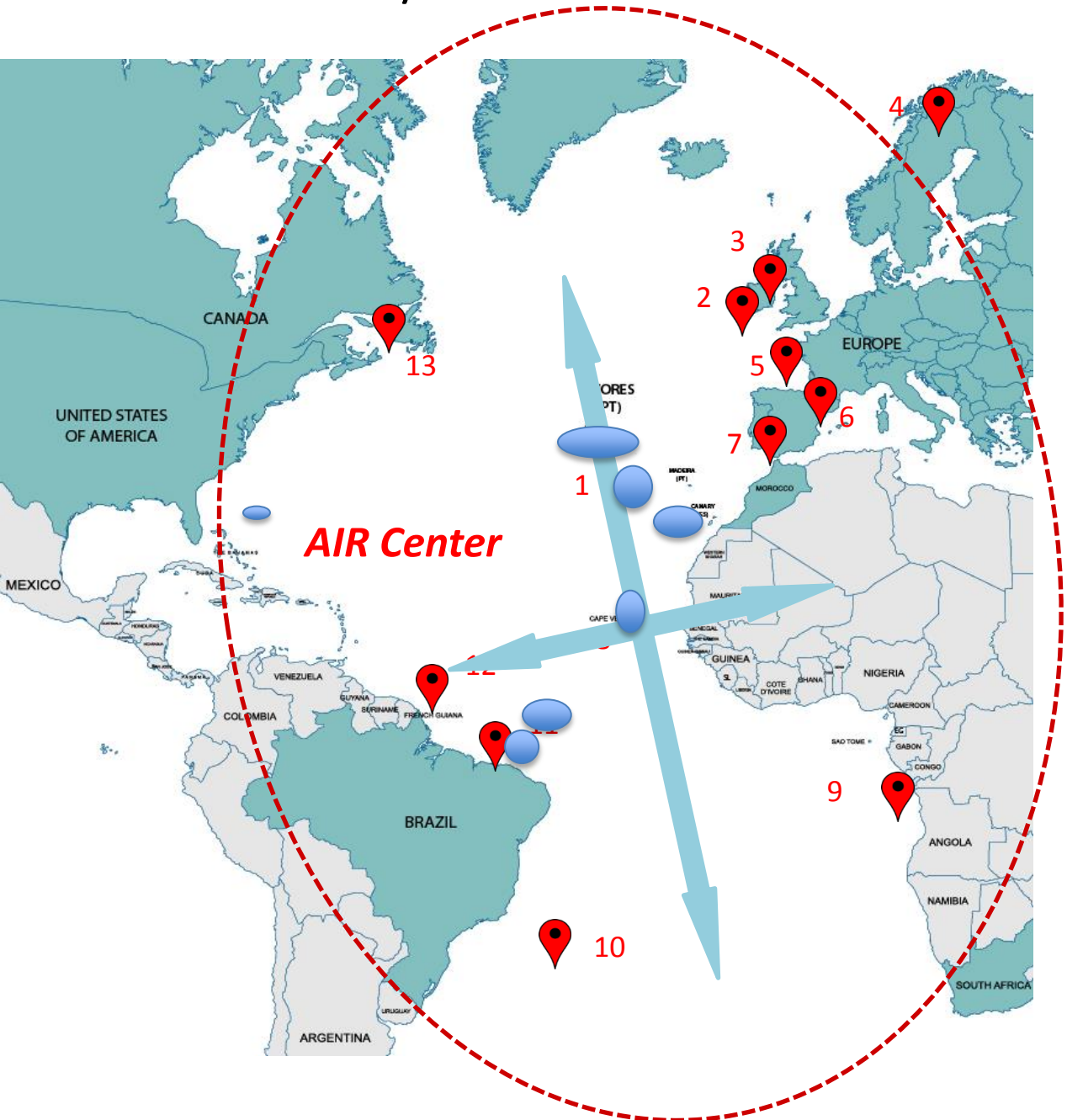
People learn how to embrace change, collaboratively, through ***knowing, making and playing***

Thomas and Brown (2010, 2011)

The process (from June 2016): Connecting scientists to policy to build new horizons for entrepreneurs around the world!

Atlantic Interactions – AIR Center, Terceira, Azores, 20-21 April 2017

SOUTH-NORTH / NORTH-SOUTH ATLANTIC INNOVATION INFRASTRUCTURE



AIR Center

2. "Porcupine" EMSO Marine Observatory (UK)
3. Galway Bay EMSO Marine Observatory (IR)
4. Kiruna ESA Station (SW)
5. Molene Isl. EMSO Marine Observatory (FR)
6. Villafranca ESA Station (ES)
7. Cadiz Gulf EMSO Obs. (PT)
8. Cape Verde (CV)
9. Deep-Ocean FixO3 Observatory (UK/US/AN)
10. South Atlantic FixO3 Observatory (UK)
11. Alcântara Launch Center, (BR)
12. Kourou ESA Station, French Guiana (FR)
13. Bay of Fundy Observatory, (CA)

Which questions?

- **WHAT** will these new technologies be like?
- On **WHICH** research we should invest in?
- **WHAT** engineering courses should we teach in our schools and universities?

These are relevant issues,
but the wrong questions …

We can look, instead, at the process...

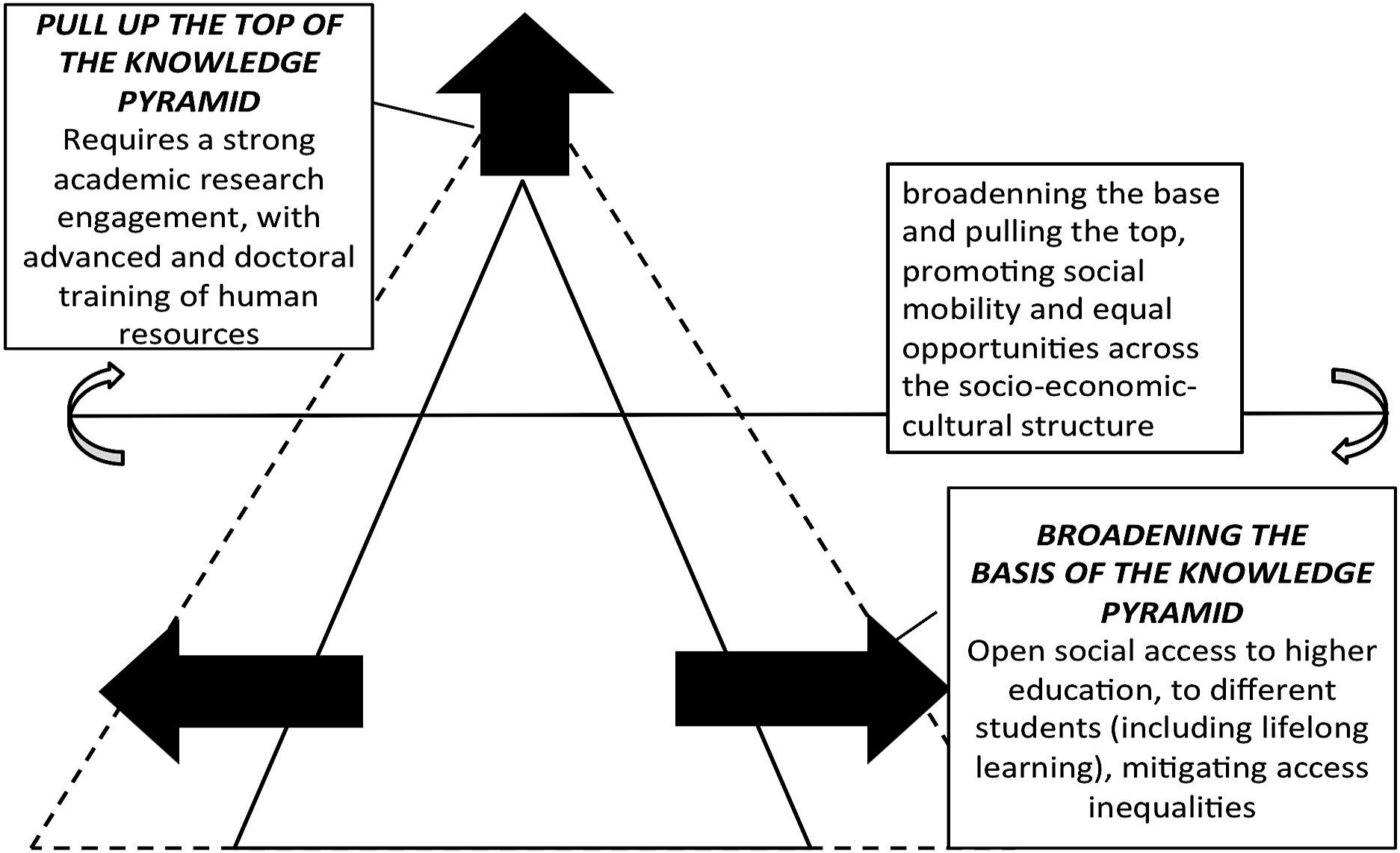
How people, institutions and incentives can be effectively oriented, transmitted and assimilated **to better connect scientist and policy** in order to allow all our societies, at large, to move towards a socially responsable, sustainable and entrepreneurial world?

Learning from TIP@50: *the hypothesis*

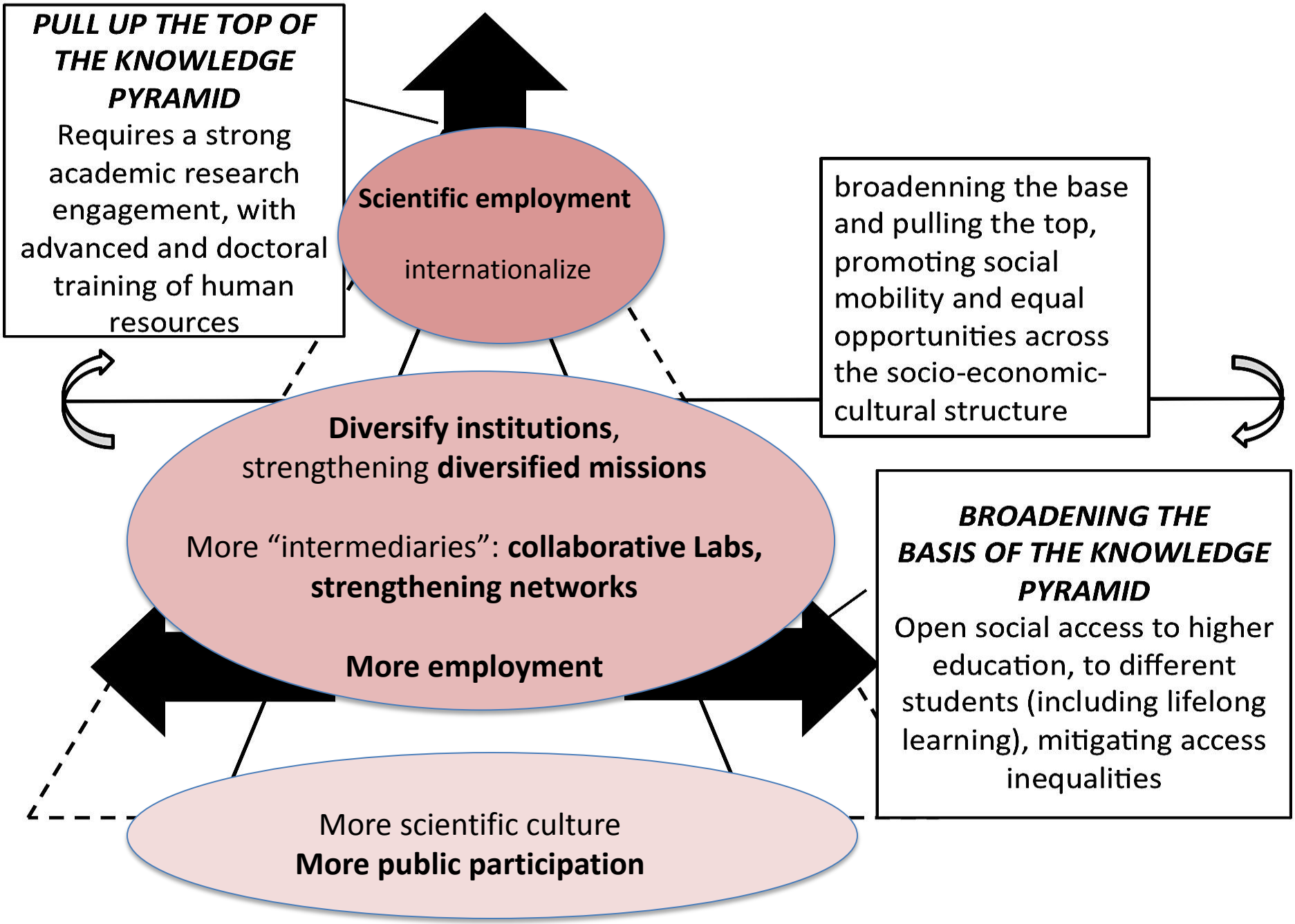
Science, its impact and the presence of innovation, result from a **cumulative, long-term, collective and uncertainty process**, involving an extensive divison of labour, which requires massifying the training of human resources and qualifying the labour force in many economic sectors, in a way that depends on the structure of the economy

Public Policy is critical:

*but, is there room for a **common vision for TIP**?*



The multidimensions of S&T and the social construction of Technology and Innovation Policy


PULL UP THE TOP OF THE KNOWLEDGE PYRAMID
Requires a strong academic research engagement, with advanced and doctoral training of human resources
Scientific employment
internationalize
broadenning the base and pulling the top, promoting social mobility and equal opportunities across the socio-economic-cultural structure
Diversify institutions, strengthening diversified missions
More "intermediaries": collaborative Labs, strengthening networks
More employment
BROADENING THE BASIS OF THE KNOWLEDGE PYRAMID
Open social access to higher education, to different students (including lifelong learning), mitigating access inequalities
More scientific culture
More public participation

Why technology and Innovation?

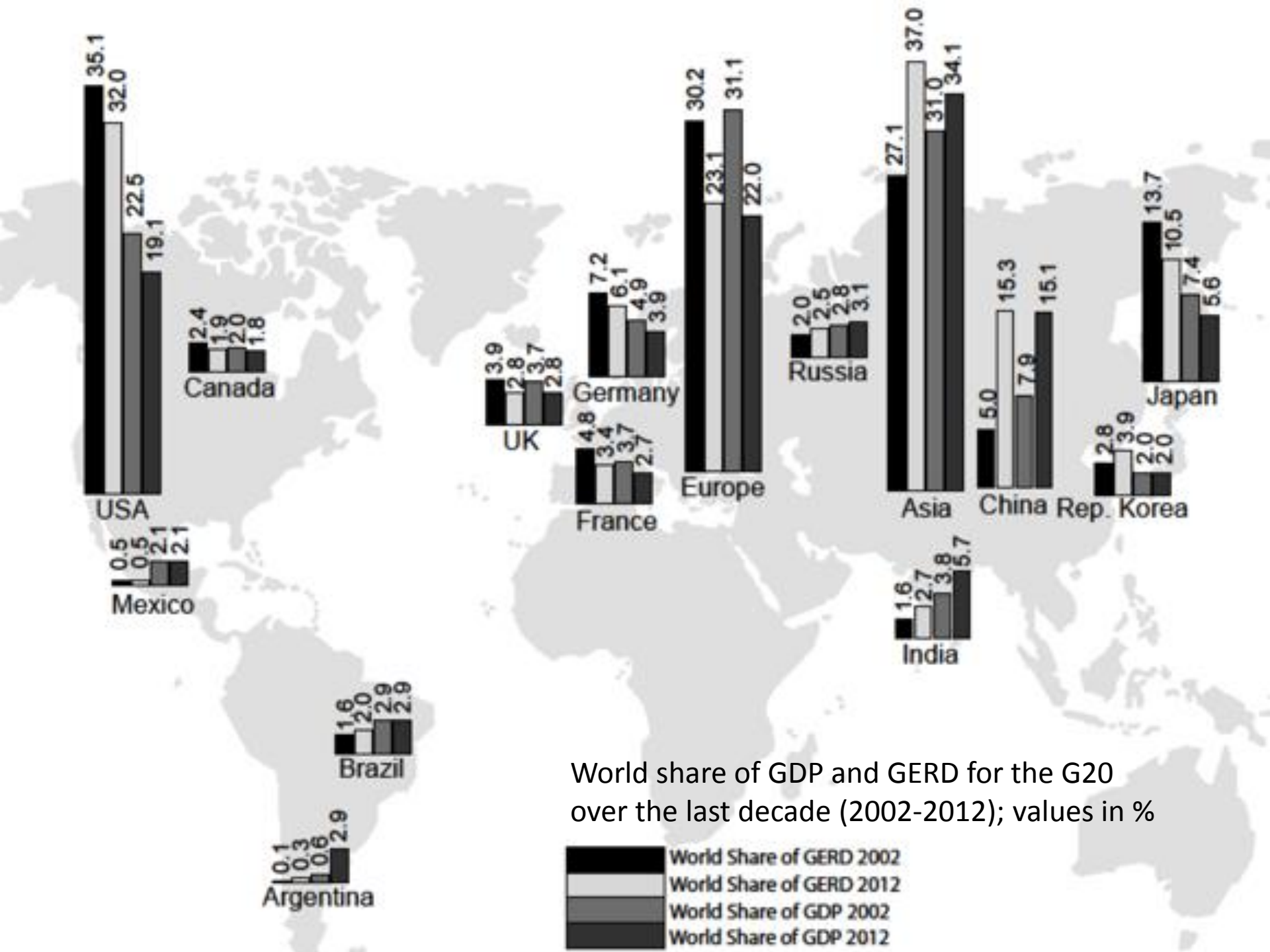
The future requires addressing two key emerging issues everywhere:

- **EXTERNAL – multilateral:**
  - Multiply **global R&D and HE networks**
  - Develop **international R&D organisations** and programmes
  - Promote the international **debate for new research** agendas

- **INTERNAL:**
  - Better understanding of "**policy mix**":
    - Exploration and exploitation
    - Extended BERD across small, medium and large companies
    - The key role of local productive arrangements for global markets
  - Invent jointly new economic drivers
  - Diversify and combine funding sources

*but, is there room for a **common vision** of the future of TIP?*

Francisco Díaz Carreño, 1890
"Posición probable del globo antes del diluvio"
Museo del Prado



World share of GDP and GERD for the G20 over the last decade (2002-2012); values in %