

Mission Oriented Innovation

reframing the *direction* of economic growth

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Rethinking the 'direction' of growth

- European Union Horizon 2020
 - Smart growth (better innovation)
 - Sustainable growth (more green)
 - Inclusive growth (less inequality)
- United Nations SDGs
- The return of 'industrial strategy'

Levelling the playing field?

standard policy mantra:

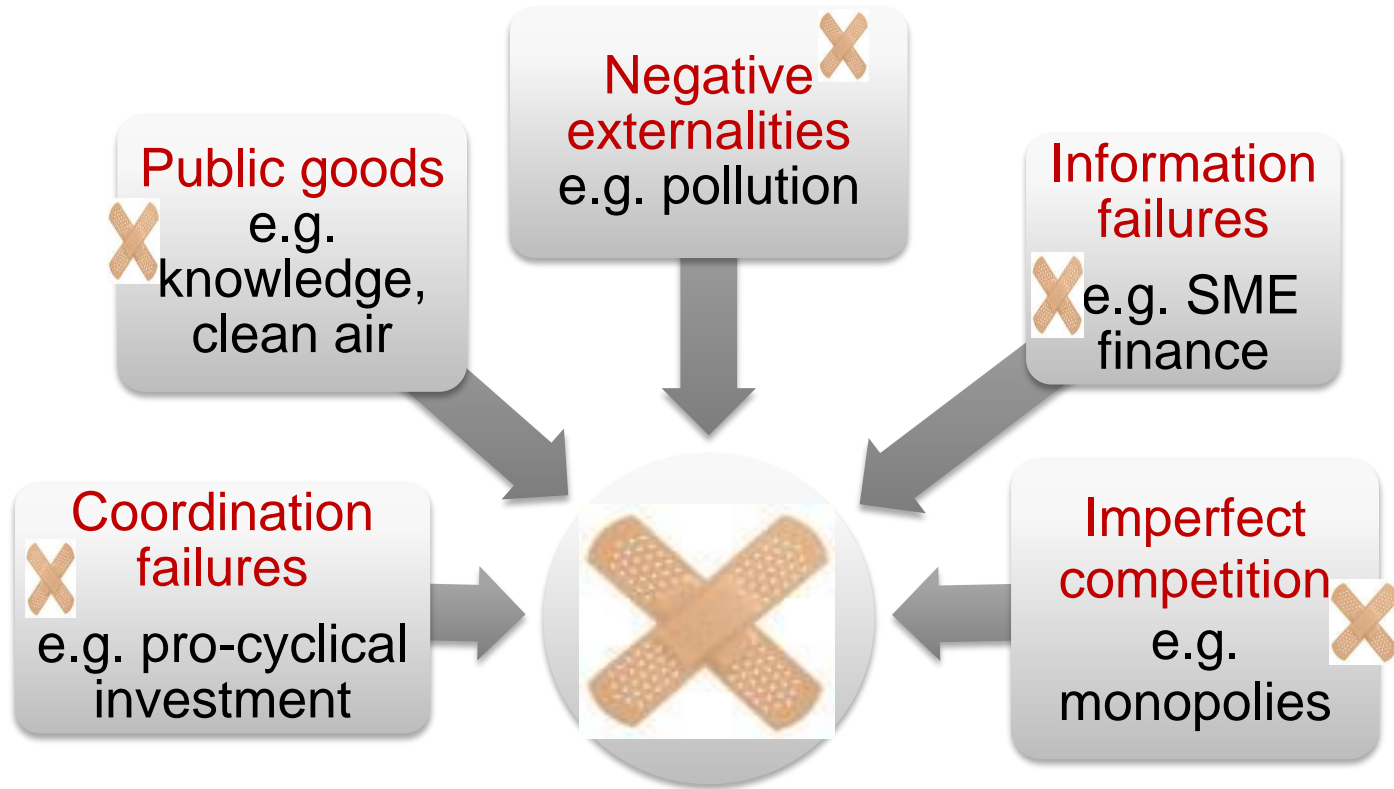
Set the rules of the game

De-risk, enable, incentivise, 'facilitate' private sector

Fix market and system 'failures' (then get out of way)

Lender of last resort

Just fixing failures?



the assumption



private
sector

where are the
european go als?
vs.



public
sector

Private wealth creators encouraged to

- invest in capabilities
- take risks & welcome uncertainty
- learn from trial and error
- make strategic choices (MBA)
- be hungry & foolish!

Public servants encouraged to

- facilitate
- de-risk
- level the playing field
- redistribute value
- fix market failures then get out of the way!

(then criticised as *boring, slow, bureaucratic*)

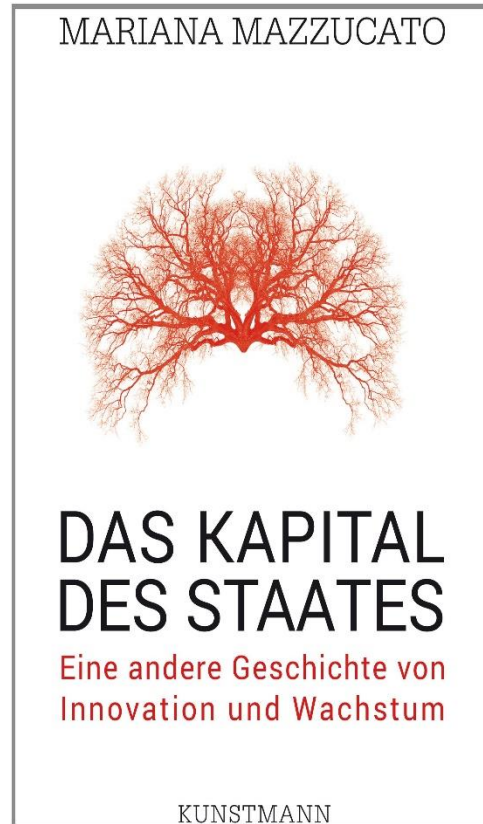
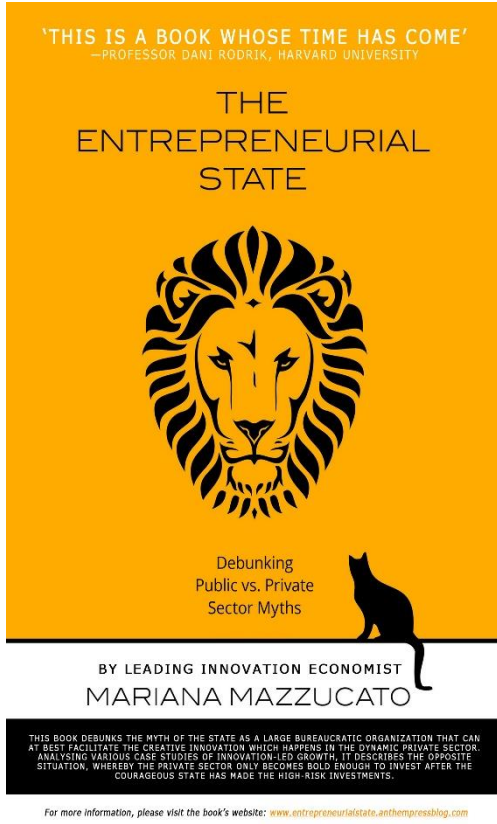
But market failure policies did not get us the GPTs

- ‘mass production’ system
- aviation and space technologies
- IT and internet
- nuclear power
- nanotechnology and AI
- green technology

... and wont get us the SDGs

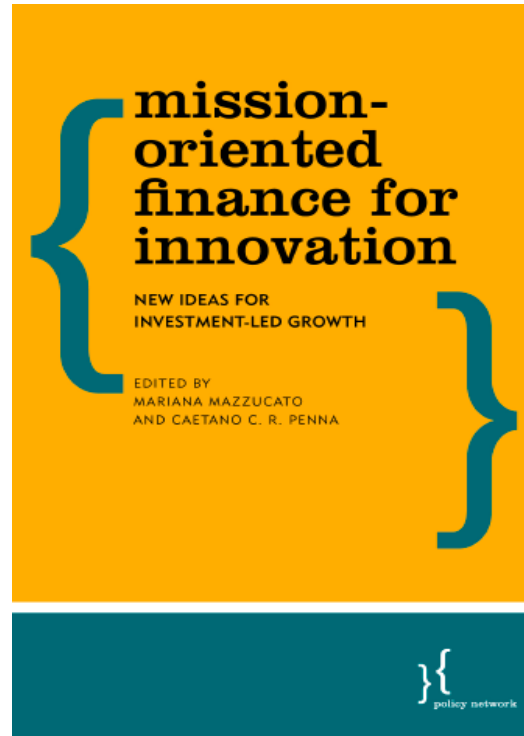


Investor of first resort



We measure success by how many risks we have been willing to take (with inevitable failures) and whether the successes actually matter.

Cheryl Martin, ex-Director **ARPA-E**, 2014





Temas Estratégicos para o
Desenvolvimento do Brasil

Março 2016 - Nº 1

The Brazilian Innovation System: A Mission-Oriented Policy Proposal

Mariana Mazzucato
(Science Policy Research Unit, University of Sussex, UK)

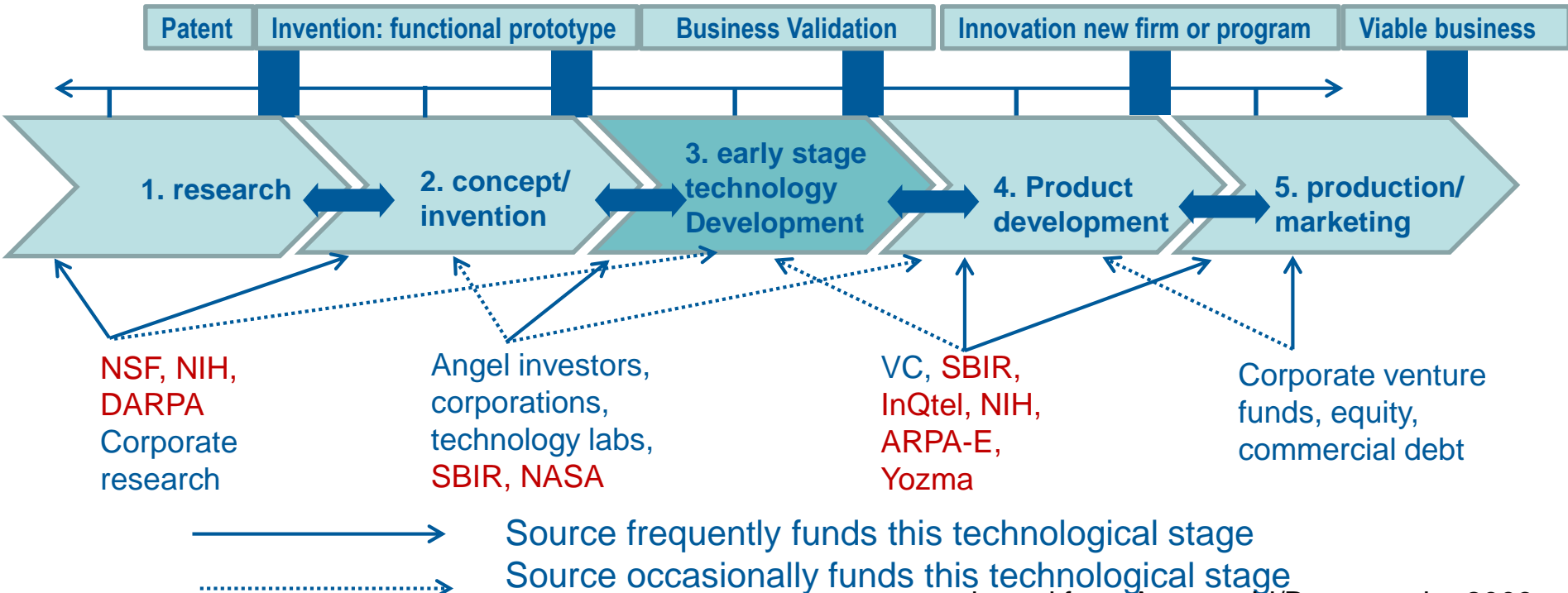
Caelano Penna
(Institute of Economics, Federal University of Rio de Janeiro, Brazil)



Centro de Gestão e Estudos Estratégicos
Ciência, Tecnologia e Inovação

2016

Risk-taking and market making along entire innovation chain



source: adapted from Auerswald/Branscomb , 2003

Creating missions not fixing markets

NASA's mission is to “*Drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.*” NASA 2014 Strategic Plan

“*Creating breakthrough technologies for national security is the mission of the Defense Advanced Research Projects Agency (DARPA).*”

“The **ARPA-E mission** is to *catalyze* the development of transformational, high-impact energy technologies.”

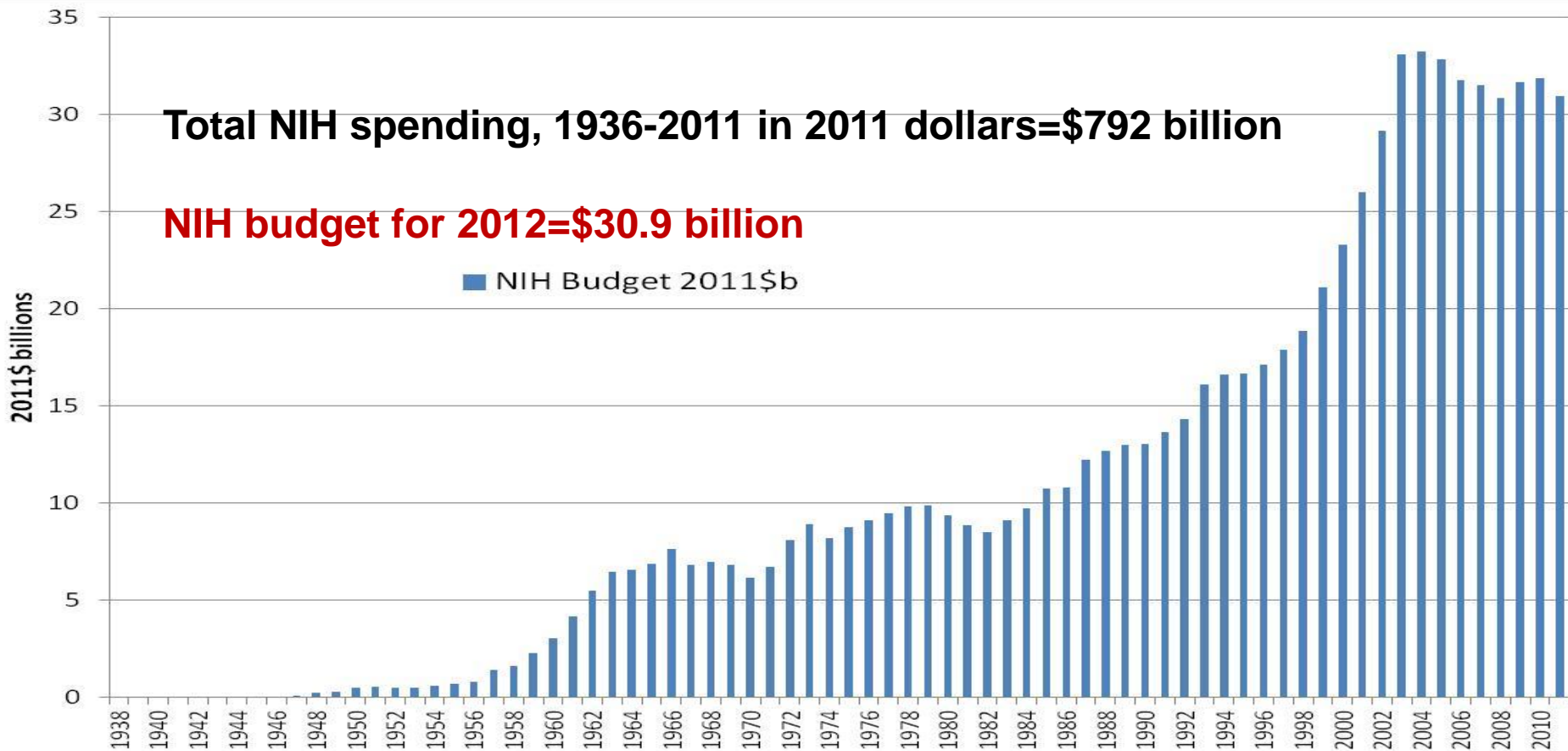
“**EMPRAPA's mission** is to provide research, development, and innovation solutions for the sustainability of agriculture and for the benefit of Brazilian society...responding to the demands of agriculture while anticipating and facing global challenges of the future.”

“The **mission** of the **KfW Group** is to support change and encourage *forward-looking ideas* – in Germany, Europe and throughout the world.”

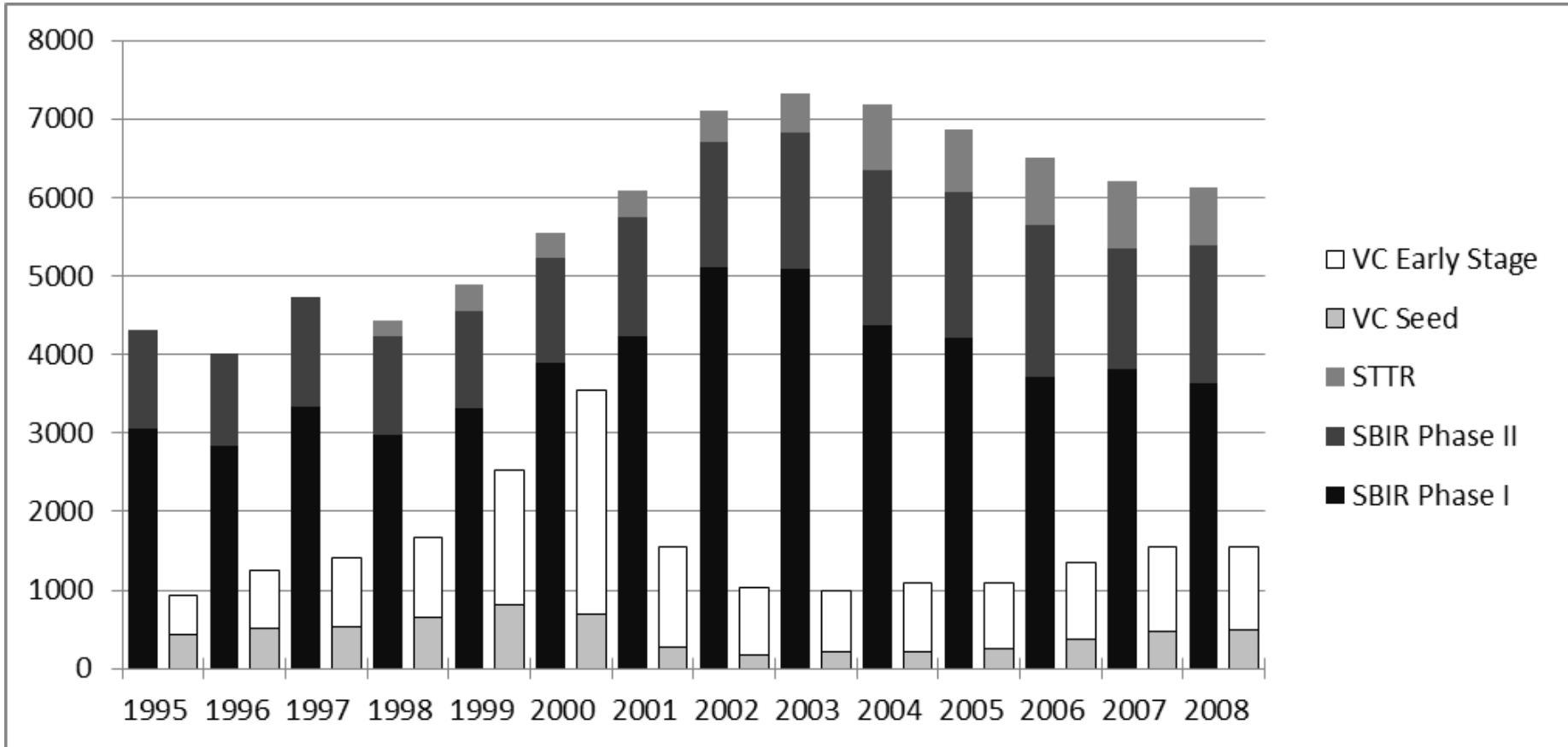
National Institutes of Health budgets 1936-2011

Total NIH spending, 1936-2011 in 2011 dollars=\$792 billion

NIH budget for 2012=\$30.9 billion



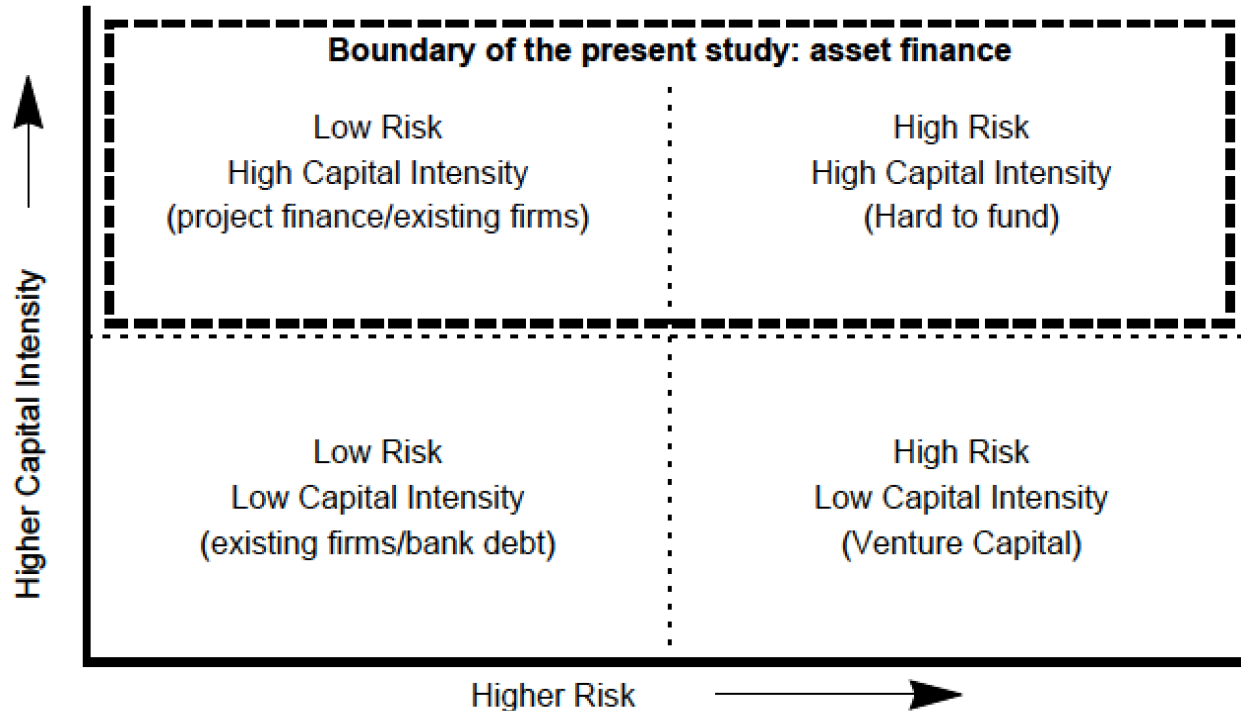
Private and Public (SBIR) Venture Capital



Source: Block and Keller, 2012

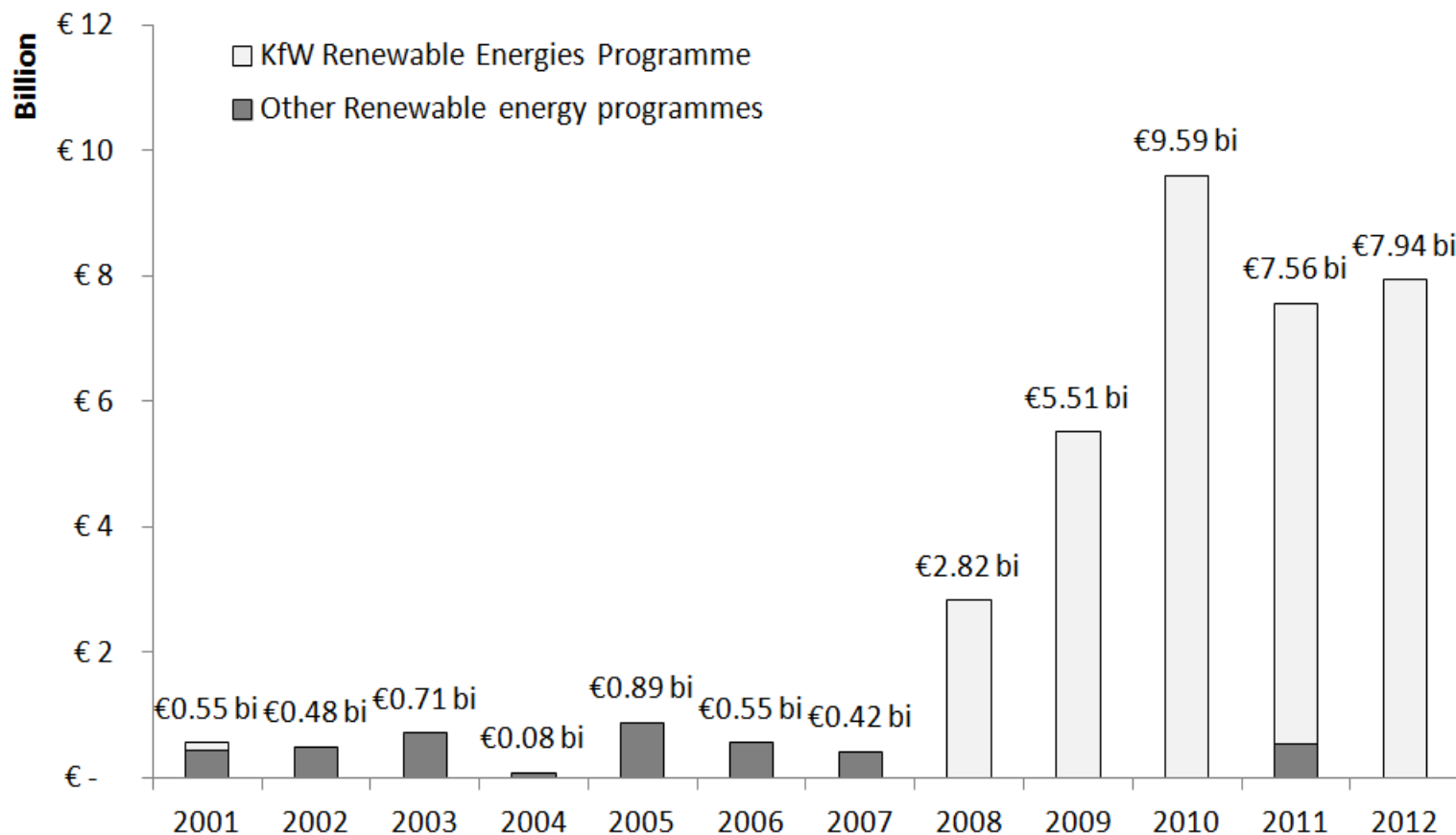
Green tech: state leads business follows

Figure 4: Risk-capital intensity classification of RE finance

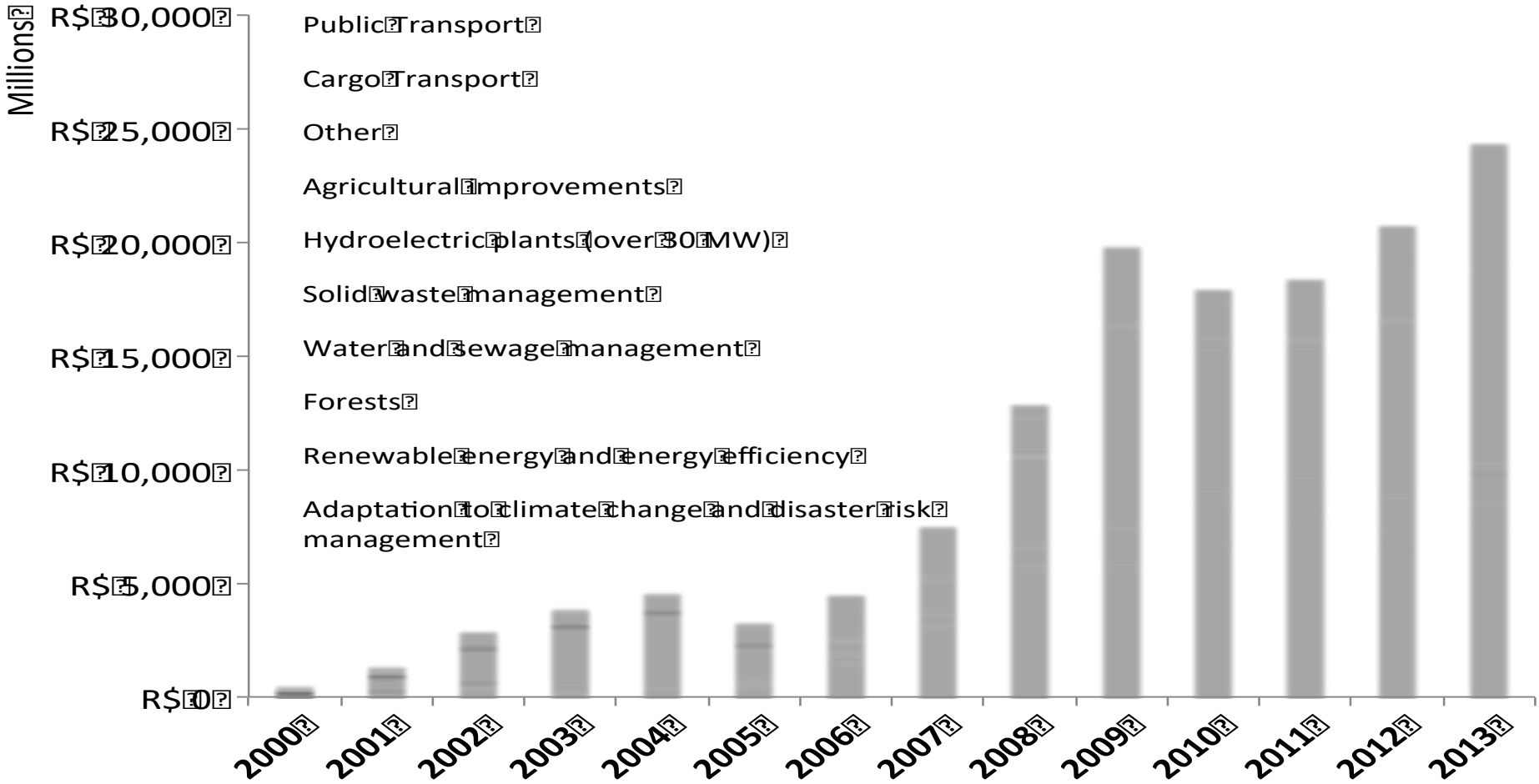


KfW funding for industrial environmental and climate protection projects in Germany

2001-2012



BNDES' disbursements for the green economy and climate change



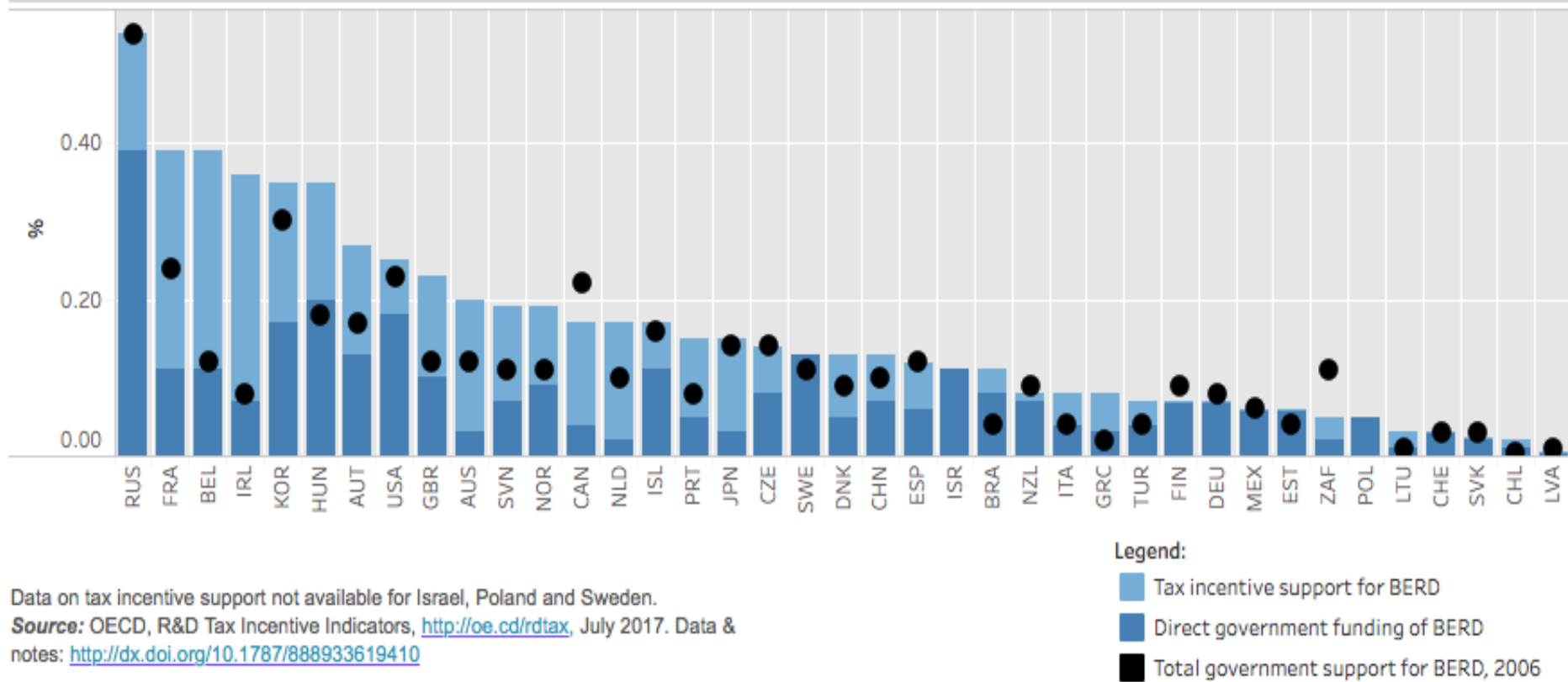
China Development Bank

CDB founded **CDB Capital**, a 'public equity' fund with **\$US 5.76 bn to finance innovative start-ups** from the energy and telecom sectors.

Yingli Green Energy received **\$1.7 bn** from 2008 through 2012 with a **\$5.3 bn line of credit** opened for it. **LDK Solar (\$9.1 bn)**; **Sinovel Wind (\$6.5 bn)**; **Suntech Power (\$7.6 bn)**; and Trina Solar (**\$4.6 bn**),

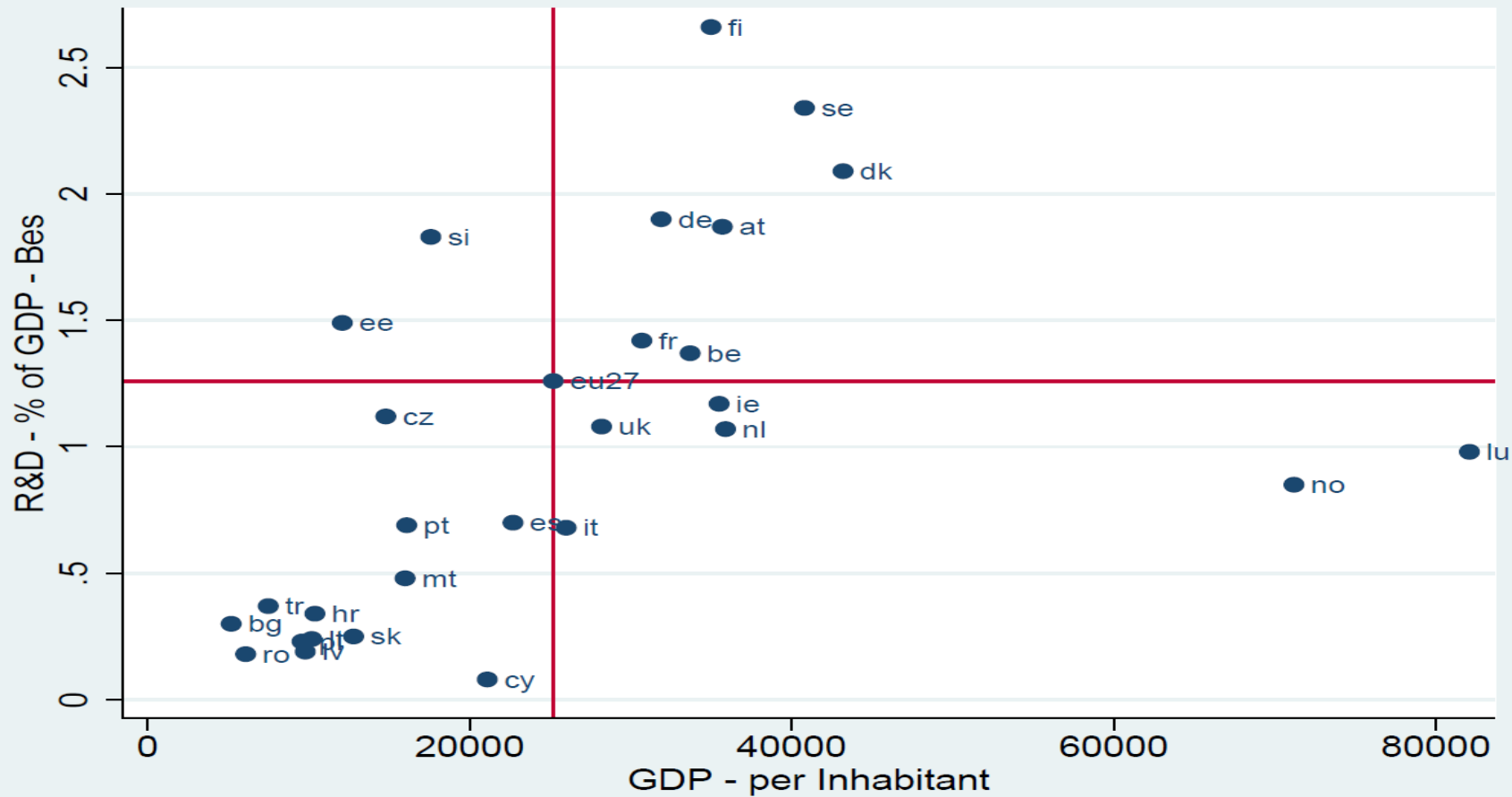
Direct government funding and tax support for business R&D, 2015

As a percentage of GDP



Data on tax incentive support not available for Israel, Poland and Sweden.
Source: OECD, R&D Tax Incentive Indicators, <http://oe.cd/rdtax>, July 2017. Data & notes: <http://dx.doi.org/10.1787/888933619410>

Business R&D spending (BERD)



Think Again!



private
sector

vs.



public
sector

ROAR

ROUTES & DIRECTIONS. How to use policy to set direction of change and enable bottom up experimentation?

ORGANIZATIONS. How to build explorative public sector organizations that learn-by-doing, and welcome trial and error?

ASSESSMENT. How to evaluate public investments which create and shape new markets, doing more than just 'crowding in'?

RISKS AND REWARDS. How to form new deals between public and private sectors, socializing both risks and rewards?

Rediscovering Directionality



February 2018

Figure 1 below illustrates the movement from broad challenges to specific missions.

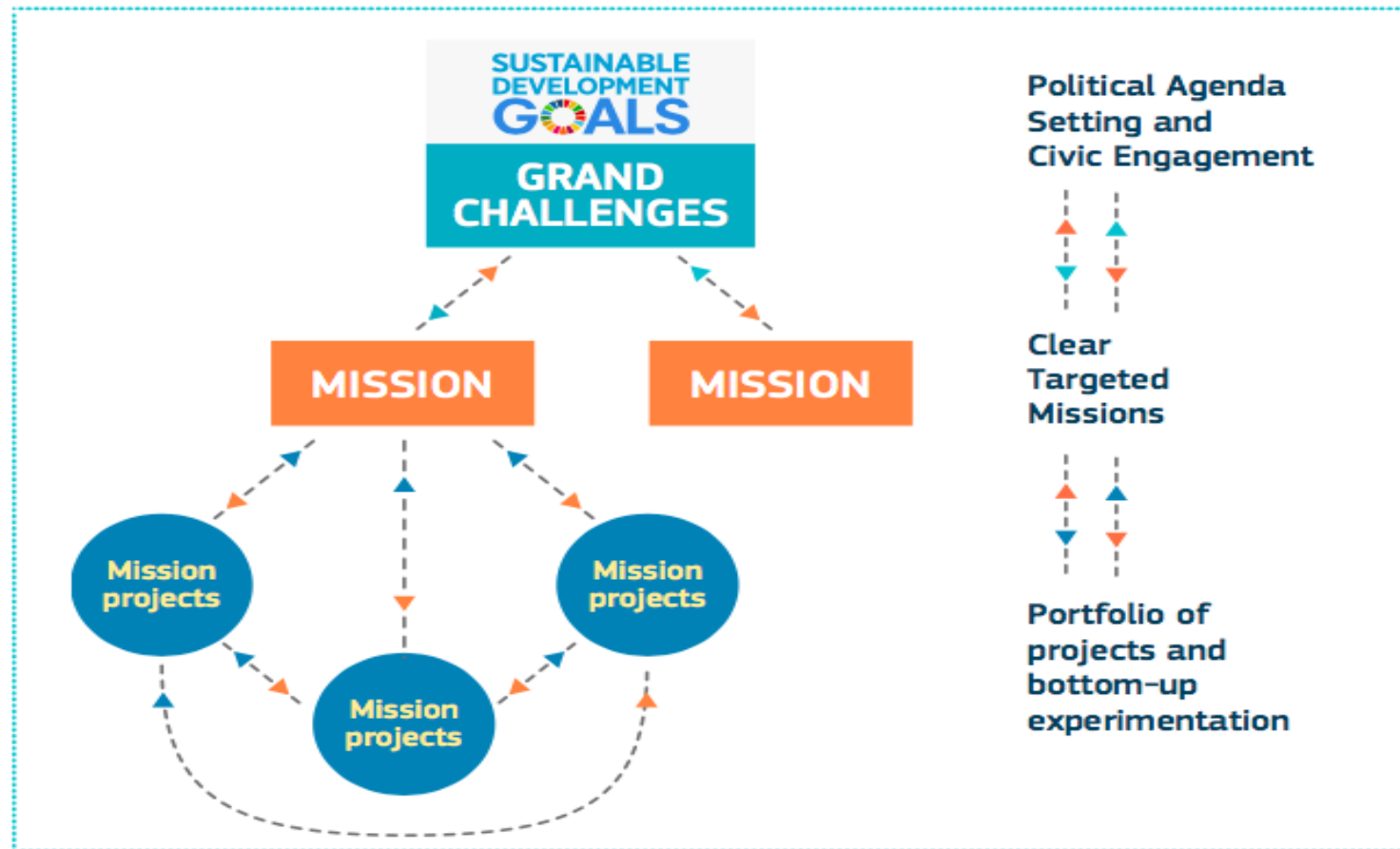


Figure 1. From Challenges to Missions Image: RTD - A.1 based on Mazzucato (2017)

CLEAN OCEANS

A PLASTIC-FREE OCEAN

Reduction of 90% of plastics entering the marine environment and collection of more than half of plastics present in our oceans, seas and coastal areas by 2025

Grand Challenge



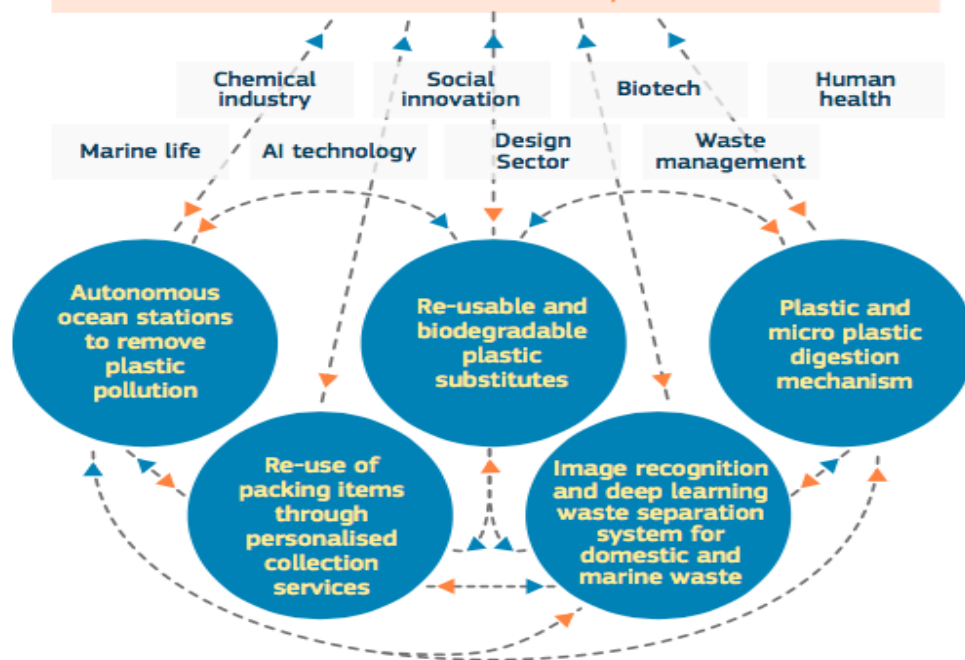
Mission



Areas of interest & cross-sector



R&I Projects



CLIMATE CHANGE

100 CARBON NEUTRAL CITIES BY 2030

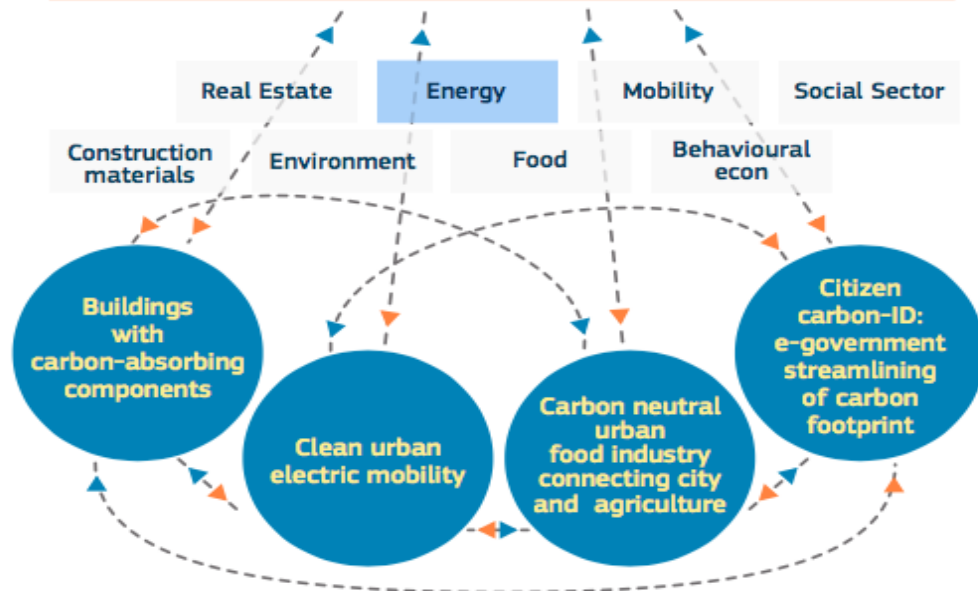
Reach net zero greenhouse gas emissions balance of 100 European cities by 2030

Grand Challenge

Mission

Areas of interest & cross-sector

R&I Projects



CITIZEN HEALTH AND WELLBEING

DECREASING THE BURDEN OF DEMENTIA

Halving the human burden of dementia by 2030

Grand Challenge



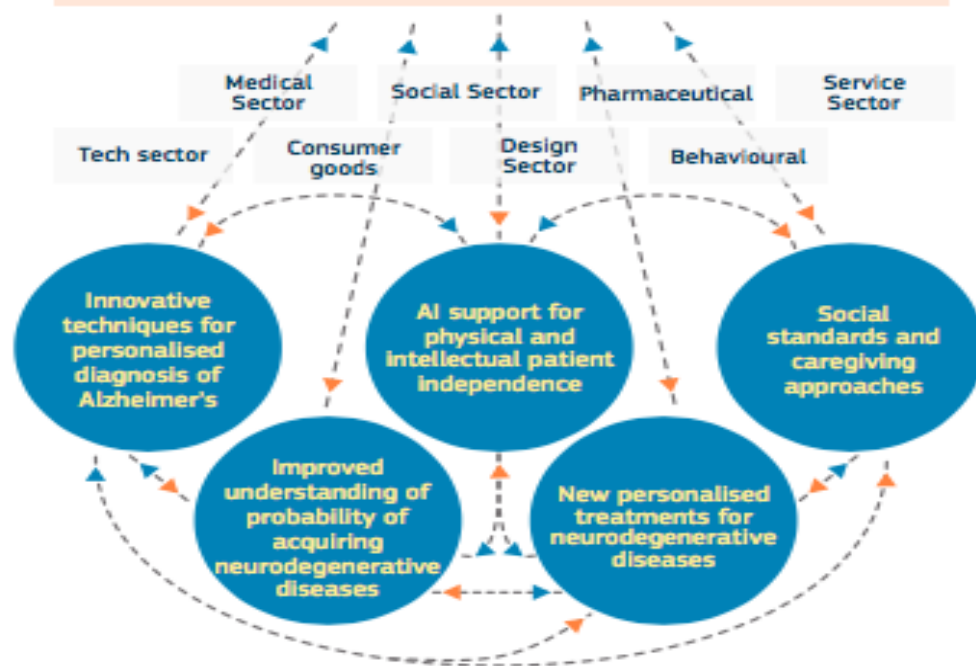
Mission



Areas of interest & cross-sector



R&I Projects



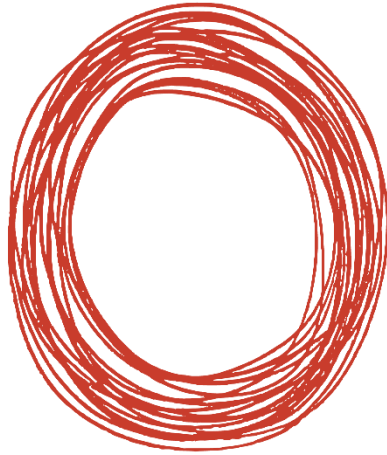
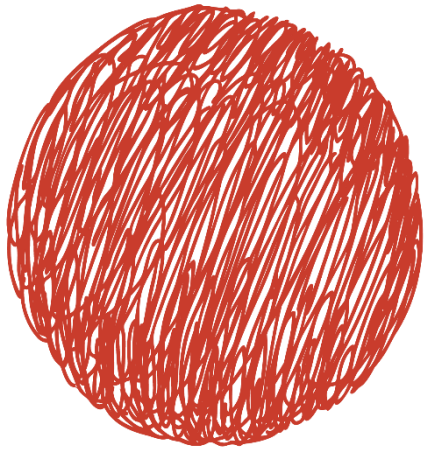
Criteria for selecting missions

- Bold and addressing societal value
- Concrete targets: you know when you got there!
- Involving research and innovation: technological readiness over limited time frame.
- Cross-sectoral, cross-actor, cross disciplinary
- Multiple competing solutions

How to implement missions

- Selection (who decides?)
- Impact-driven (targets / milestones)
- Pro-active portfolio management (DARPA style)
- Flexibility and adaptability
- Accountability
- Connecting and engaging citizens
- Public sector capacity building and relationship to industrial strategies of member states

rethinking how **public value** is
created, nurtured and evaluated



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Public Purpose



UCL



~~Derisking~~

Welcoming uncertainty

~~Fixing markets~~

Co-creating and shaping

~~Levelling playing field~~

Tilting towards a direction

~~Outsourcing~~

Capacity building

~~Picking winners~~

Picking the willing

~~Cost benefit~~

Dynamic spillovers

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Busting the myths about *value creation*



UK April 2018
USA Sept 2018
Brazil Autumn 2018

The Entrepreneurial State: debunking public vs. private sector myths (2013)

The Value of Everything: makers and takers in the global economy (2018)

Financing renewable energy: who is financing what and why it matters (2017),
Technological Forecasting and Social Change, with G. Semieniuk

From Market Fixing to Market-Creating: A new framework for innovation
policy, *Industry and Innovation*, Vol. 23/2 (2016)

The risk-reward nexus in the innovation-inequality relationship: Who takes the
risks? Who gets the rewards? *Industrial and Corporate Change*, with W.
Lazonick (2013)

[Mission Oriented Research and Innovation in the EU](#): a problem solving
approach to fuel innovation-led growth, ISBN 978-92-79-79918-1 (2018)