Mission-Oriented STI Policies for the Future – what lessons from the past?

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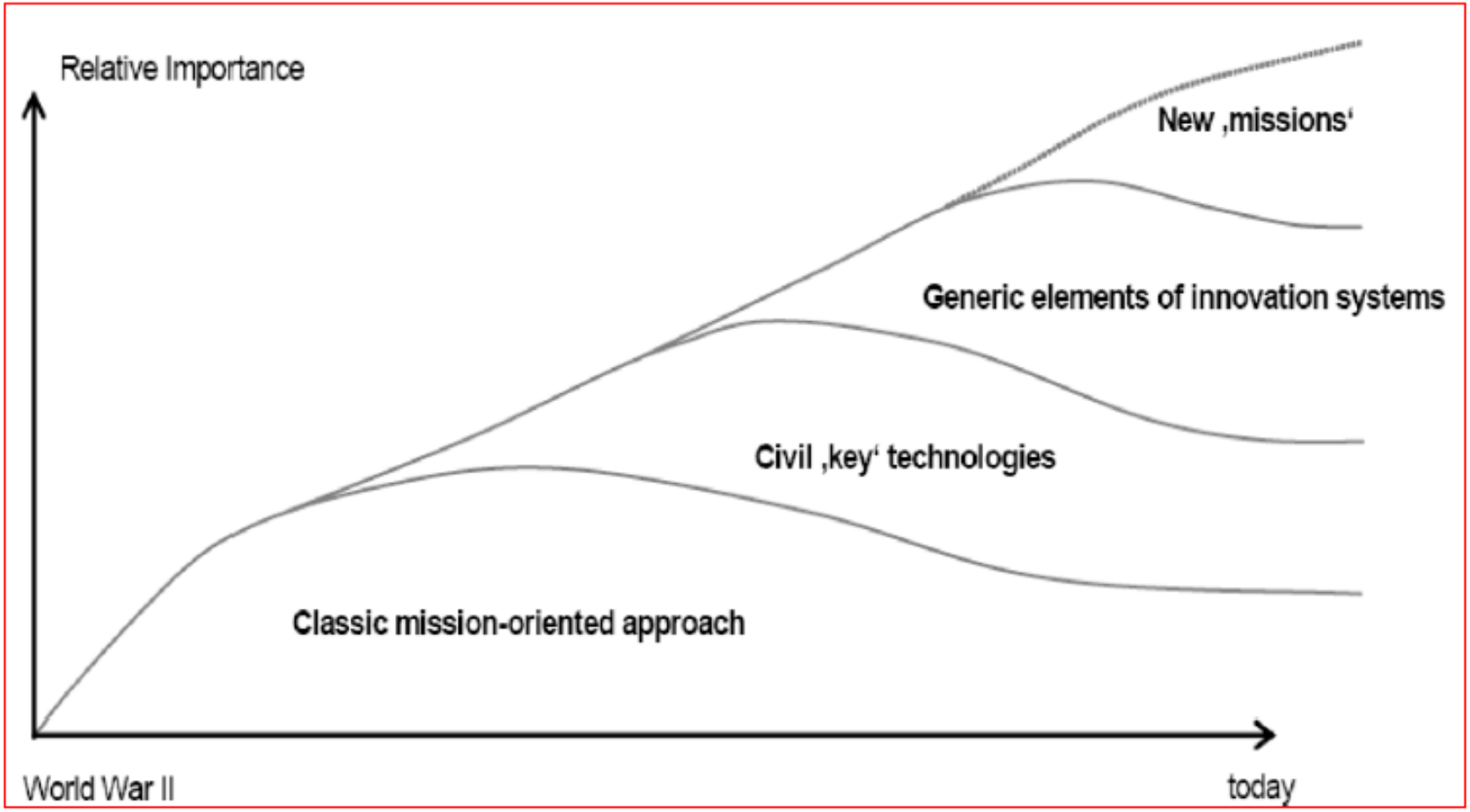
Background: Current Studies on Mission-Oriented Policies (MOPs) for FP9

- Interim Evaluation of H2020 + Lamy Group Report stress the need for an ***impact-focused mission-oriented approach for FP9***

3 Studies in response

- MAZZUCATO, M. (2018): Mission-Oriented research and Innovation in the European Union. A problem-solving approach to fuel innovation-led growth. European Commission. Brussels February 2018
- JIIP / Joanneum Research / Tecnalia / TNO / VTT / DTI / VVA (2018):
  - Mission-Oriented Research and Innovation.Inventory and characteristics of initiatives. Project Report for the European Commission. Brussels March 2018
  - Mission-Oriented Research and Innovation. Assessing the Impact of a mission-oriented research and innovation approach. Project Report for the European Commission. Brussels March 2018

Mission orientation – „back to the future“ or something very new?



Source: Gassler/Polt/Rammer 2008

Defining Mission-Orientation in Research and Innovation (MO R&I)

- MO R&I has been an **evolving** concept. Historically and currently it comes in **various forms**:
  - Old v New
  - Narrow v Broad v ‚Umbrella'
  - ‚Accelerators' v ‚Transformers'
  - Technology v Societal Challenge oriented
  - ….

But there is a **core of the concept**

- **large scale interventions aimed at achieving a clearly defined mission (goal, solution) within a well-defined timeframe with an important R&I component**

Defining Mission-Orientation in Research and Innovation (MO R&I)

MO R&I initiatives

- can be **public** or **private** (though they mostly are public, there is often a PPP element)
- are **ambitious**, **exploratory** and **ground-breaking** (that's one of the reasons why there need to be missions!)
- are often **cross-disciplinary**, affecting a number of **industrial sectors** and **social contexts** (‚cross-cutting')
- target a **concrete challenge/problem** (often with a sense of urgency)
- need a **mix of policy instruments** to be effective (R&D not being sufficient)

Hence, while MO RI share a lot of characteristics with other types of ‚systemic policies', **the main differentiating feature is their level of directionality and intentionality with respect to specific targets**

Defining Mission-Orientation in Research and Innovation (MO R&I)

This has some (far reaching) implications for MO R&I policies

- needs to **stretch into application and diffusion** (over many TRLs)
- needs to **mobilize substantial ressources** (public & private) and **apply them in a coherent way**
- requires horizontal **policy cutting across governance levels**
- asks for **coherent application** of the mix **of policy instruments**
- has to have **reflexivity mechanisms** and show **flexible policy design** and timely monitoring activities
- needs **strong** (political) **ownership**, (operational & political) **governance** and **buy-in** (from stakeholders)

…and hence asks for a substantial overhaul of current policy settings (both on national as well as on EU level)

Case studies of MOPs – Examples (1)

Title	Country	Thematic area	Type	Level	Timeline
Active and Assisted Living Programme (AAL)	EU	Health	Programme	International	2013-2020
Cancer Moonshot	US	Health	Initiative	National	2016-2023
Circular Flanders	Belgium	Circular economy	Initiative	Regional	2012- 2020
Clean Air London	UK	Climate change / Health	Initiative	City	1999 – ongoing
High Tech Strategy (HTS)	Germany	Re-industrialisation	Policy approach	National	2006 – ongoing
Hydrogen Society	Japan	Energy and transport	Policy approach	National	1991-2040
KIRAS – Sicherheitsforschung (security research)	Austria	Security	Programme	National	2005-2020

Case studies of MOPs – Examples (2)

Title	Country	Thematic area	Type	Level	Timeline
Airbus	France, Germany, Spain and the United Kingdom	Transport	Initiative (private)	International	1967-
Apollo Project	US	Aerospace	Programme	National	1961-1972
Brain Initiative	US	Health	Initiative	National	2013-2025
Concorde	France, United Kingdom	Transport	Initiative (private)	International	1962-2003
Delta Plan / Delta Programme	Netherlands	Security and resilience, climate change	Programme	National	1937-2050
e-Estonia	Estonia	IT/Digitalisation (multi-sectorial)	Policy approach	National	1997-current
Electric vehicle initiative	Norway	Transport	Policy approach	National	1989-2025
Energiewende	Germany	Energy, climate change	Policy approach	National	2010-
Human Brain Project	EU	Health	Initiative	European	2013-2023
New Energy Vehicles (NEVs)	China	Transport	Policy approach	National	2001-2020/2025

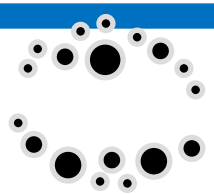
Narrow and broad types of Missions

‘Accelerators’

- Develop technologies
- Enablers
- Radical innovation
- Few actors - centralised
- One buyer and user (e.g. military)
- Global competition
- First mover advantage
- Advanced consumers
- Competitive advantage

‘Transformers’

System innovation
- Transform a system
- Systemic use of all instruments
- Several technologies
- Many Actors, decentralised



Tech Niches, New firms and value chains

New paradigm

Source: DG RTD (modified)

New Missions addressing societal challenges

Technical target: All cities in the EU below the WHO's norms all year around

Political target:
Clean Air in all EU cities by 2025

Measurable: WHO norms of
SO2, NOx, PM2.5, PM10, CO, O3, VOCs, etc.

Public Procurement for Innovation
Innovation

Social innovation

Public Sector Innovation

Technological innovation

Regulation

Fiscal policies

City Air Quality

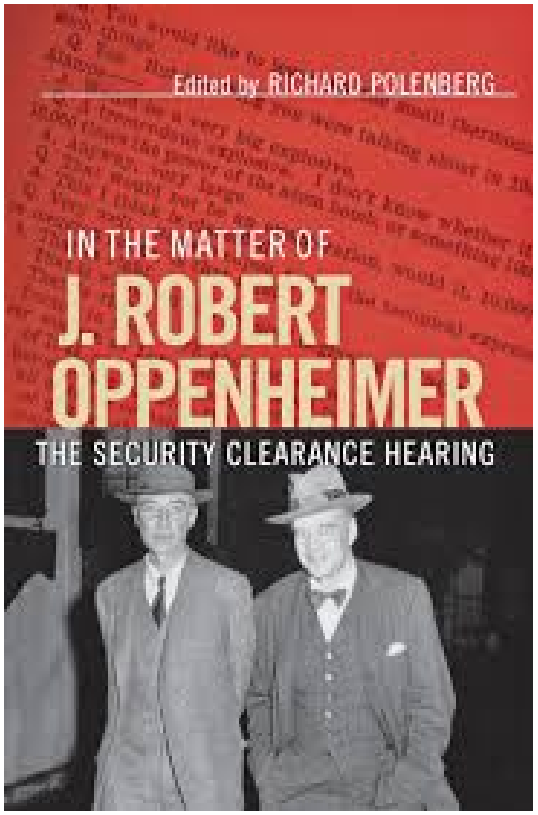
- **Urban traffic**
  - Automotive industry — E&A
- **Housing**
  - Construction and design industry — EE
  - Energy industry — E&D
- **Industry**
  - Manufacturing and Recycling industry — C&D
  - Digital industry — Ubiq

Research

THE INNOVATION COMPANY

Source: DG RTD (modified)

Mission orientation – the (very) old type



effective at all costs !

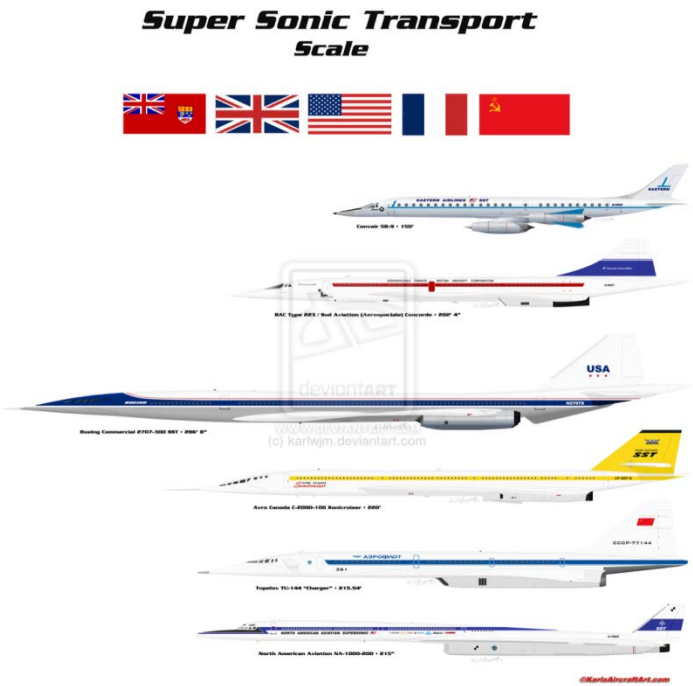
Mission orientation – the old type

http://electra.ihmc.us/viewer/cmap/1J2D426SK-Z6PBXX-1NS4

A purely public mission – with a lot of spill-over effects !

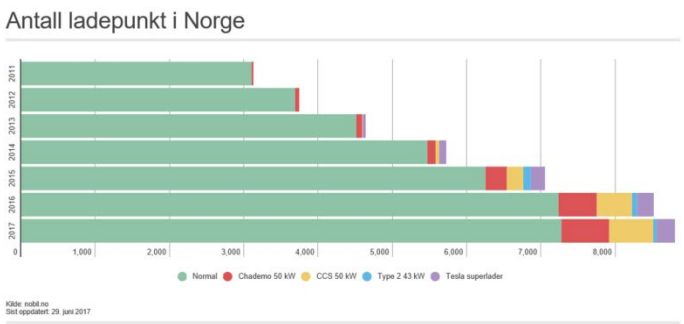
Old Missions for civilian purposes? Some have triggered industrial developments….

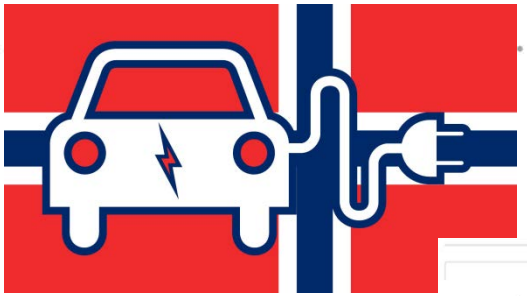
…but not every mission is a success…

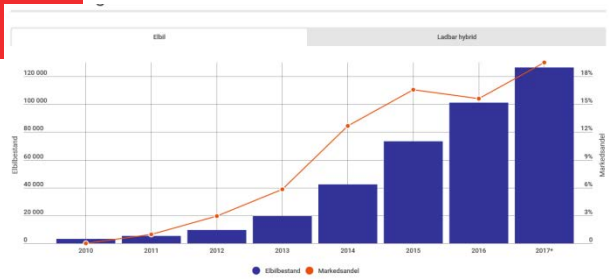


Lesson: It's hard to pick winners and to second-guess markets !

Some missions (e.g. Norwegian EV Initiative) are successful in achieving some targets …







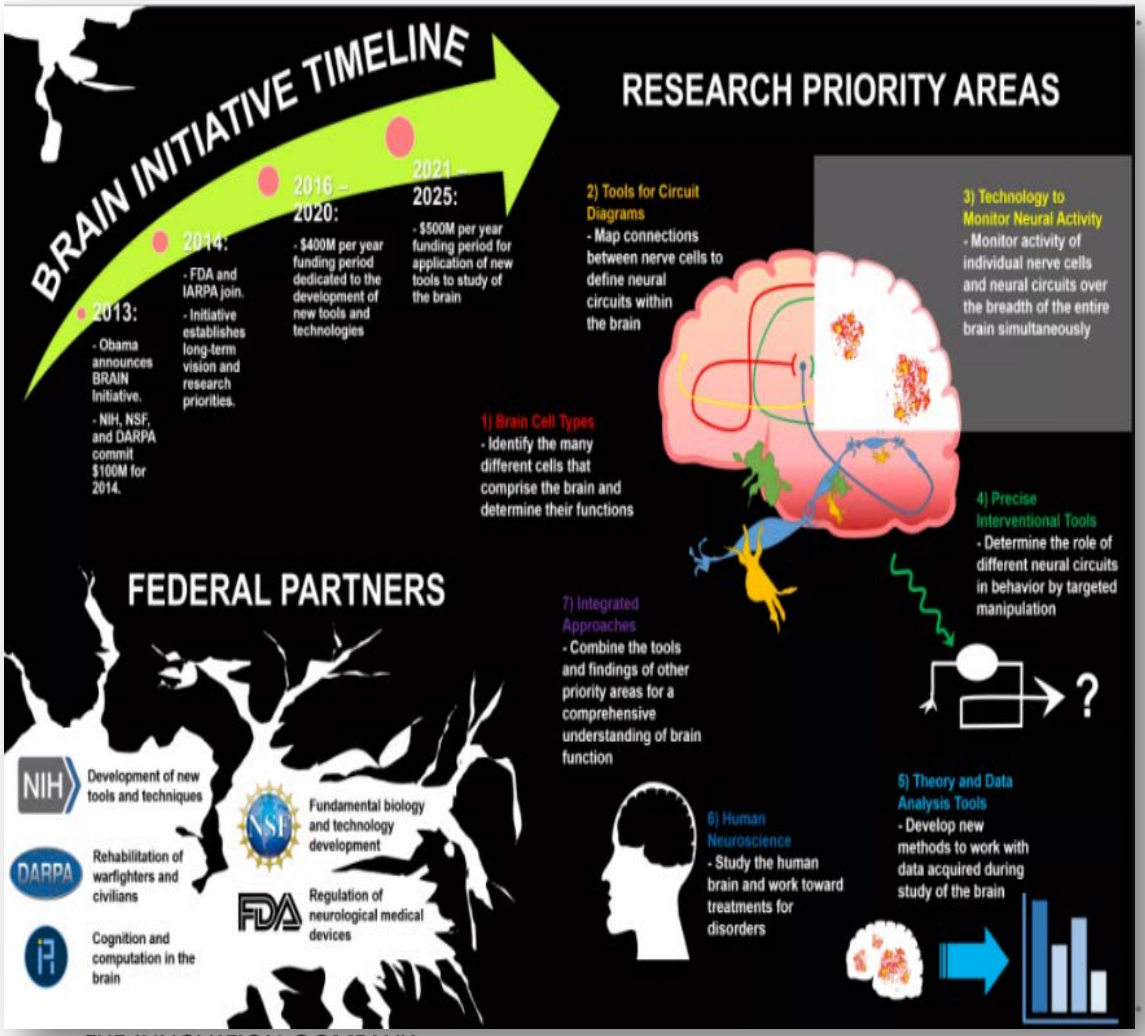
- **Cost-efficiency** of the initiative is horrible
- Benefitting more foreign (e.g. Tesla) than **domestic car manufacturers**

But fail (miserably) on others (in this case: industrial policy targets). Lesson: there are trade-off between targets!

While others are very applied (NL Delta Plan) …

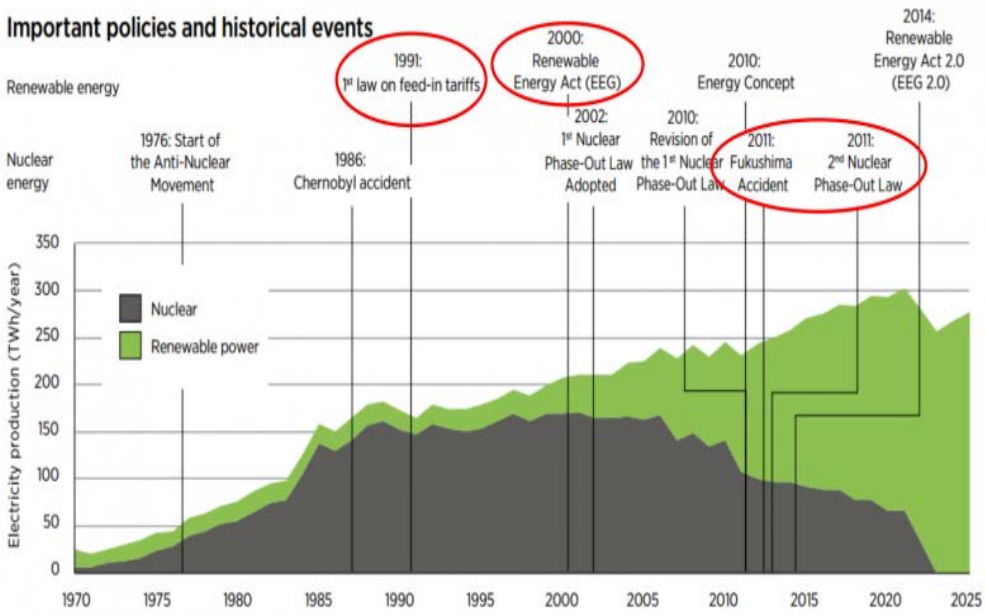
…and are examples of MOP where R&I is a necessary ingredient, but not the most important one (which is likely to be the case in many ‚grand challenges')

Some missions are very much basic research driven (US Brain initiative) …



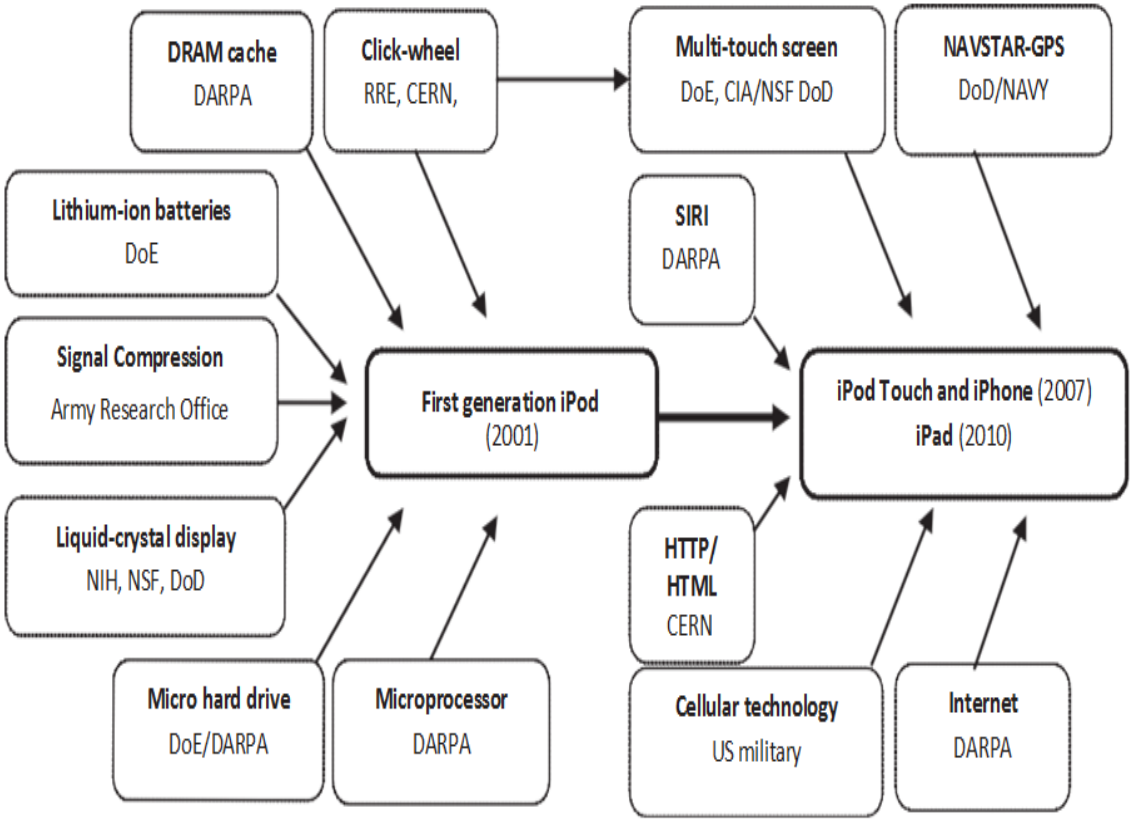
…but have not resulted in ‚problem solving' applications so far…

Some missions are of an ‚umbrella type' (like the German ‚Energiewende'…



…and have proven to be ‚reflexive' and able to adjust goals and targets…

A famous example: Publicly-funded technologies in Smart Phones



Source: Mazzucato (2013)

Economically successful product innovation as a by-product of ‚accelerator' projects ? – the private sector as ‚system integrator' !

New Mission Type 1: addressing grand challenges…

But not necessarily with enough 'operationalization' of the targets and actions needed

Some observations on the strength and weaknesses of STI policy paradigms

STI Policy paradigm	Strength / Accomplishments	Limits / Shortcomings
‚Old mission'	Effective in achieving ‚single objectives'	Linear model only limited guide for innovation policy
Key technologies / strategic sectors	Widening of objectives towards economic ones	Danger of capture & pork-barrel politics, difficulties to ‚pick winners/sectors'
Systems approaches	Achieves better interaction especially in industry-science relations, but also in regional clusters	Does not seem to trigger ‚breakthrough' or ‚radical' innovation
New Mission	Tackling eminent societal challenges	Current national and international governance systems not (yet) up to the task

Observations on (successful) MOPs (1)

- There is not one and only type of MOP: MOPs can (AND SHOULD!) take **very different forms and scales** between the poles of ‚accelerators' and ‚transformers', MO R&I and ‚full-scale MOPs, … and mixes of these elements, e.g. under the heading of **‚umbrella type initiatives'**
- While there are cultural & political factors that have an influence on practices, the **general characteristics** of (successful) MOPs seem to be **more or less the same in all countries**
- They almost always emerge from a **sense of urgency** that is shared by a wide array of stakeholders

Observations on (successful) MOPs (2)

- There must be a ‚**fertile ground**' in terms of scientific and industrial capacities and political and cultural environments → there can be ‚**great leaps forward**', but they cannot be too great…
- Public organisations must set **long-term direction** towards and **commitment to clearly identified missions**
- They are managed by a **clearly identified and empowered governance body** which can be held responsible for the achievements of the mission(s) – even in missions where there are multiple stakeholders

Observations on (successful) MOPs (3)

- **New forms of governance** are needed … especially for the ‚transformer type' MOPs, some would have to be (experimentally) discovered (‚competitive designs'?)
- **Citizen engagement**: success factor only for some types of MOPs (mostly transformers), but (percieved) **legitimacy** is success factor for all
- **Policy mix** varies between the types of MOPs: the more of the ‚transformer type' the more varied (including demand-side, regulation etc.)

Some premilinary Observations and critical reflections on potential pitfalls

- The broader the approach, the greater the number of targets, the more **difficult to implement**
- Most succesful MOPs were **regional or national ones** – there are hardly any international good practice examples
- Most MOPs face (sometimes severe) **trade-offs** between policy, technology and economic targets
- While it is easier to embark on ‚accelerator'-type missions, the **risk of ‚capture'** is also larger there
- New MOP might be a challenge too large for existing goernance systems (→ let it be or empower?)

Practical (but difficult) steps in the Organisation of Mission-Oriented Policies

Mission selection	How to select missions that have enduring and democratic legitimacy
Co-production	How to engage public, private and third sector actors in mission selection, implementation, learning and evaluation processes
Mission definition	How to define missions concretely but with sufficient breath to motivate action across multiple sectors of the economy, enabling new types of interactions between public, private and third sectors, and over different time horizons
Dynamic capacities	How to develop new competencies and capabilities for dynamic change: ability to envision new futures and to accommodate risk-taking, experimentation and underlying uncertainty of the discovery process
Decision tools	How to develop new indicators and assessment tools to aid decision-making and evaluate impact, beyond the static cost/benefit framework
Managing failure	How to manage inevitable failure as well as success by taking a portfolio approach
Sharing rewards	How to ensure rewards as well as risks are shared so that the growth generated is inclusive as well as smart

Source: Mazzucato (2017)

The challenge of Missions

- MOP, taken seriously, has the potential to (or the prerequisit of)
- A change in the way we think about the capabilities of governments (empowering the entrepreneurial state or leave it to the market?)
- A change in the way we think of the current production of knowledge (from ‚excellence' to ‚relevance'?)

Thank you for your attention !

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