Options to facilitate collaborative climate technology R&D

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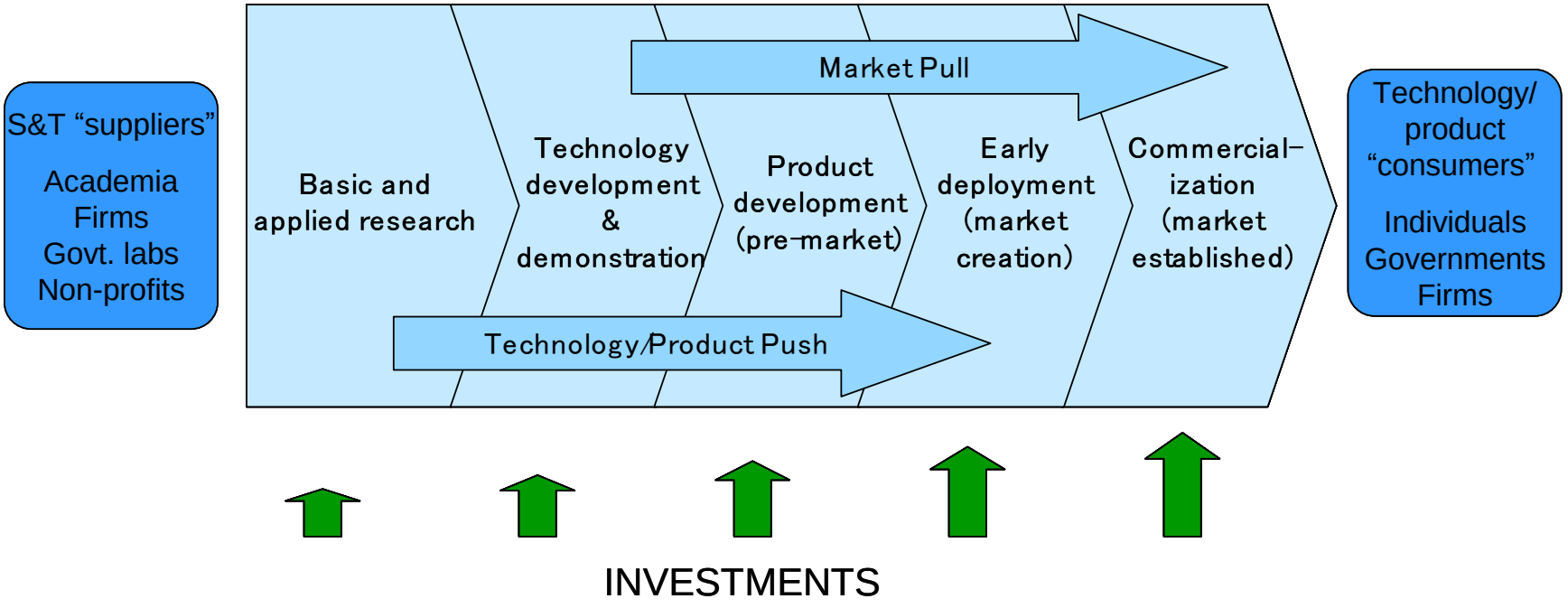
This presentation

- Technology development: some concepts
- Why joint RD&D?
- What the EGTT has found on RD&D
- Examples of joint RD&D activities
- What could the TEC concretely do to facilitate joint RD&D

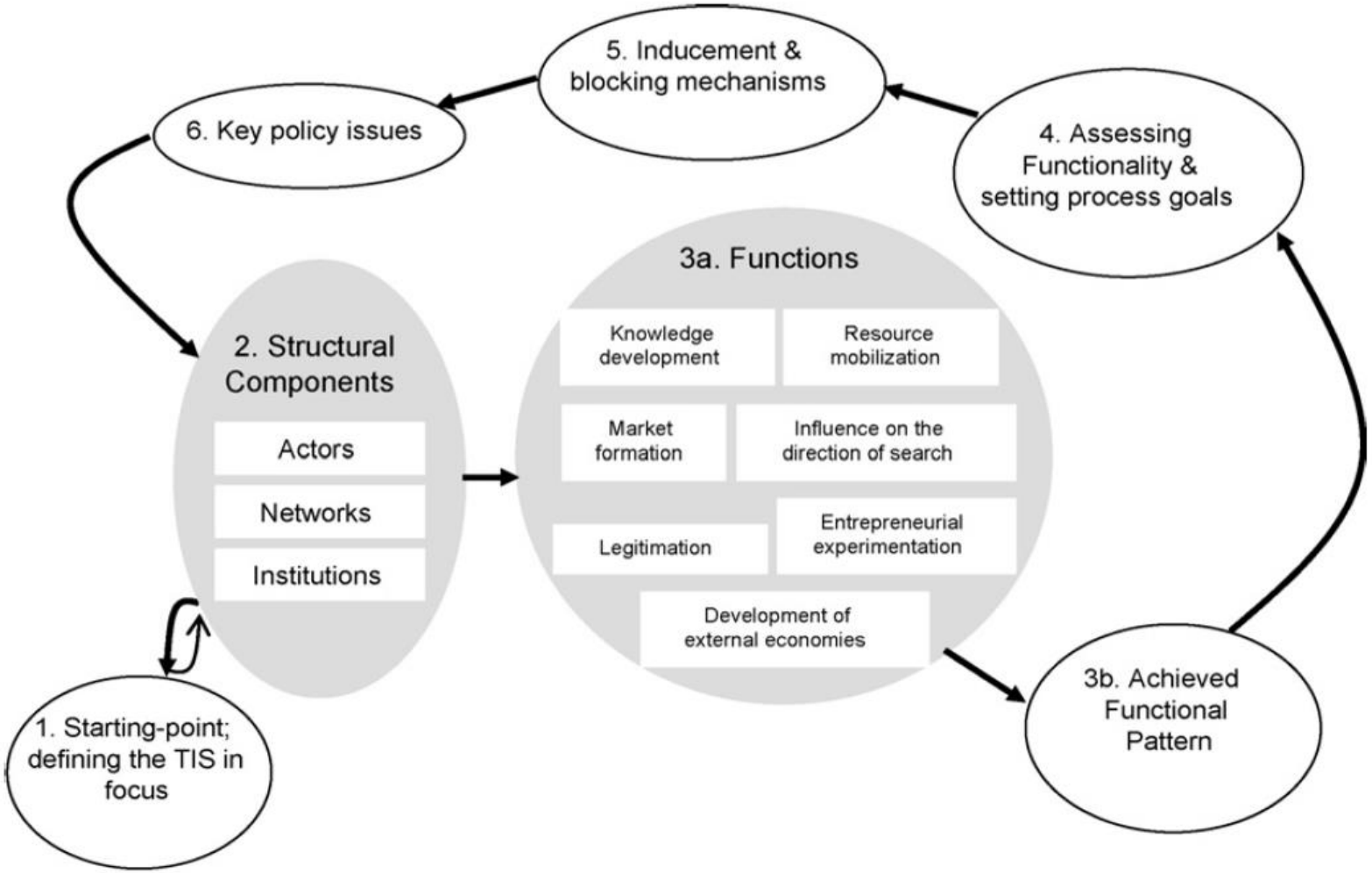
- Basis of work:
  - EGTT/SBSTA paper on collaborative R&D
  - Individual work by Sagar, de Coninck, Ockwell

Technology development: a policymaker perspective



Sagar, Grubb, and Bremner 2009

Innovation while chaotic and non-linear can be enhanced

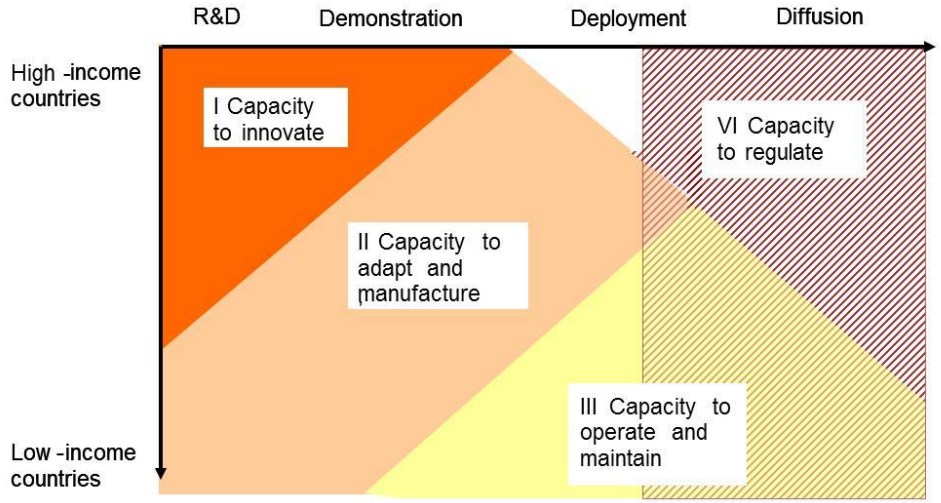


Bergek,2008:

Technology development: Capabilities

Capabilities are key to the enabling environment

- Capacity to operate and maintain
- Capacity to adopt and adapt
- Capacity to manufacture
- Capacity to innovate
- Capacity legislate, assess and regulate



International collaborative R&D: Why?

- Technology is key to meeting climate challenge and promoting development
- International collaboration accelerates innovation
- Limited innovation capacity in developing countries – essential element of any enabling environment!
- Mostly R&D thought of an early-stage activity
  - But also relevant at later stages
  - Late-stage R&D especially important to developing countries
  - Many development co-benefits

Mapping joint RD&D: caveats

- Large topic, first work, preliminary results
- Data availability:
  - Abundant as well as sparse
  - Limited questionnaire results
  - By nature hard to get inside knowledge (commercially sensitive)
  - Bias to success (nobody documents failures in R&D collaboration)

Summary of findings from literature and survey: drivers for collaboration

- Industry:
  - helps obtain funding, reduce costs
  - benefitting from partners knowledge, experience and know-how
- Research institutions:
  - increase likelihood of commercialisation of technology
  - Build capacity in-country (developing country)

Summary of findings from literature and survey: observations and challenges

Observations

- Public funding involved
- One-time collaborations
- IP indicated as an issue

Challenges

- Balance interest of all partners, including the funding party; agree on clear common aim
- Trust between partners needs to be built
- Communication and differences in working culture

Fossil fuels, electricity and storage

- Cleaner fossil energy
- Efficient thermal (incl. biomass)
- Coal mining
- Co-generation
- Pre-combustion coal-fired power with CCS
- CO_2 capture and storage in the power sector
- Distributed generation
- Power generation and transmission
- SMART grids
- Energy storage
- Fuel cells
- Radioactive waste

Renewable energy

- Offshore wind
- Marine, Wave, and Tidal
- Hydraulic
- Distributed Energy
- Biofuels
- Micro-Hydro
- Solar Power
- Biogas
- Small-scale wind power
- Geothermal
- Thermal gradient

Energy efficiency

- Improved Stoves
- Eco-cities
- Sustainable Design
- Construction of the Urban Environment

Forestry

Transport

- Alternative oils for diesel
- Biofuels

Industry

- Aluminium
- Buildings and appliances
- Cement
- Steel

Adaptation

- Water technology and management
- Agro technology
- Agriculture
- Marine resources
- Tropical food borne infectious diseases
- Earth sciences and disaster management

Patterns of existing initiatives

- Most existing initiatives focused on enabling and facilitating deployment, few focused on actual RD&D
- Focus mostly on mitigation (and within that, energy)
- Little coverage on non-energy sectors
- Few technologies for adaptation
- Focus mostly on major developing economies

Exploring collaborative R&D options: key variables

- Focus of collaboration
  - (sector; nature of activity)
- R&D performers
  - (firms, govt orgns, academia, non-profits)
- Collaborative models
  - (two-actor, consortia, networks)
- Funding sources and models
  - (public, private)
  - (project, programmatic)

Options: analysis of collaborative models

Goals	Innovation stage	R&D Partners	Collaboration model	Funders
Adaptation/modification of existing technologies and products	Middle-stage; Market-oriented	Industry, dedicated laboratories (some universities and national laboratories)	Industry-industry (horizontal and vertical)	Public/private
			Industry-national labs/universities	Public/private
			CGIAR-type networks	Public
New technologies and products for "ignored" needs	Middle-stage (and some early stage); End-user oriented	Industry, dedicated laboratories, universities, national laboratories, NGOs	PDPs	Public
			CGIAR-type networks	Public
			Innovation prize-induced collaborations	Public, philanthropic
			Industry-national laboratories	Public-rpivate
Long term R&D	Early stage	Universities, Industry, dedicated laboratories	University-University Collaboration	Public (Climate financing; bilateral, multilateral, philanthropy)
			University- Industry collaboration	
			Industry-industry consortium	
			CGIAR-type networks	
			Global facility	

Options for adaptation/modification of technology or products

- Industry-industry/Industry-national labs/universities
  - Actors working together to adapt specific product for specific countries/regions (e.g., household appliances, power plants)
- Publicly funded networks
  - CGIAR-type approach of establishing centers that are focused on adapting technologies relevant to specific center or region

Options for “ignored needs”

- Product Development Partnerships
  - Partnerships that are aimed at providing solutions in a very targeted manner
- Publicly funded networks
  - Established centers that would focus on multiple technologies and problems
- Innovation-prize induced partnerships
  - Leveraging “innovation-prize” model to facilitate self-assembling partnerships
- Industry-national labs/universities

Options for long-term R&D

- University-university collaboration (focused more on basic and applied research)
- University-industry collaboration (focused on technology development)
- Industry-industry consortium (focused on long-term pre-competitive technologies), with public co-funding
- Publicly-funded networks
- Global R&D facility containing soft loans and grants

Criteria for prioritising

- Factors that positively affect expected benefits
  - Extent to which the collaboration fills a gap
  - Potential scope of product market: more countries
  - Participation of developing countries
  - Specific capacity-development possibilities

- Effectiveness for developing countries
  - Minimal administrative burden
  - Low capacity requirement
  - Fast funding availability
  - Private sector engagement?
  - Flexible criteria for funding
  - Clear role of partners
  - Clear addressing of information sharing
  - Consistent with domestic policy and regulation

Options for the TEC

- **Spread the word** on the rationale and benefits of international joint RD&D
- Highlight good **examples,** promote good **practices** and **explore innovative collaborative models**
- **Invite private sector** to think along how more joint RD&D can be encouraged
- Explore ways how **joint RD&D** can be organized and promoted (possibly through the CTC&N)
  - For example, **explore a Global Climate Technology R&D facility** as a part of the Green Climate Fund and recommend it to the finance discussions