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Breaking down the innovation policy and system debate towards an effective toolbox of instruments

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Track 1: Challenges and new approaches
Session: Rethinking indicators for policy and governance development

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Structure:

1. **The historical development of the innovation policy and system debate:**
   a) Policy rationales: Market vs. system failures and government failures
   b) Driving force of innovation: Technology-Push vs. Demand-Pull
   c) Knowledge production: Basic research vs. applied research / industrial application
2. **Actual challenges of the innovation policy and system debate**
3. **Thinking dynamic: Technology Life Cycle**
4. **Requirements for a toolbox of instruments / selection process**

Basic question

Should the government take action, either directly or indirectly, or should the government be restricted to focussing solely on creating innovation-friendly framework conditions?

Neoclassic ("laissez-faire")* version of innovation policy:

- Two relevant types of "market failures" (Gustafsson & Autio, 2011):
  - Underinvestment in knowledge production
  - Failure of the price mechanism to reflect benefits of certain goods
- Policy maker needs to determine existence and magnitude of market failures (this always requires his judgemental decision if market is functioning)
- Decision on instrument to correct the market failure (subsidies / tax credits)
- Government should intervene, if a market failure exist (only a necessary, but not a sufficient justification)
- Only when benefits outweigh costs and if institutional arrangement allows expecting success (government failure?)

* (Lundvall & Borras, 2005)

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Basic question

Should the government take action, either directly or indirectly, or should the government be restricted to focussing solely on creating innovation-friendly framework conditions?

Innovation system ("systemic") version of innovation policy:

- The innovation system emerges spontaneously for a purpose
- In its (not natural) development, several problems could arise, that hinder its operational capability ("system failure")
- "Systemic instruments" should rely on the system or infrastructure level to improve the operational capability of the innovation system as a whole
- Overall task: Facilitate emergence of innovation systems and maintain the performance
- Government should intervene, if a systemic problem or failure exist that hinder the operational capability or the development of a system
- "Innovation system builder and organiser" (Smits & Kuhlmann, 2004)
- Government failure (e.g. as system builder) not discussed yet

Discussion of the 1970s, 1980s and 1990s

Technology-Push vs. Demand-Pull:

- Rate and direction of technological change more influenced by changes in market demand or by advances in science and technology?
- Critique Technology-Push: unidirectional progression inadequate to explain emergence of new technologies, incompatible with dynamic aspects like feedback or interaction; Critique Demand-Pull: concept too broad and better at explaining incremental change than disruptive or radical change
- Conclusion: both models interact and influence technological change (Mowery and Rosenberg, 1979)

New modes of knowledge production:

- Until then: traditional distinction between ‘basic’ and ‘applied’ research; knowledge generation and diffusion → focus on knowledge contributors, no interlinkages between academia and industry
- Economic pressure and the recognized success of Japans industrial policy forced policy makers to question the efficiency of current policy strategies
- New range of initiatives aimed at promoting: (1) Strategic and generic technologies→ Identification of key technologies, (2) Collaborative research projects between industry and academia

Consideration of the dynamics of science and technological innovation, interrelations between basic and applied-oriented research (Grupp, 1997):

- Cognitive model of feedback functions of science, technology and innovation: R&D as solving process → Its relevance can, therefore, be called upon at any point in the innovation process.

Actual Challenges

Increased challenges for policy decision makers to support technology & innovation in a complex and dynamic environment:

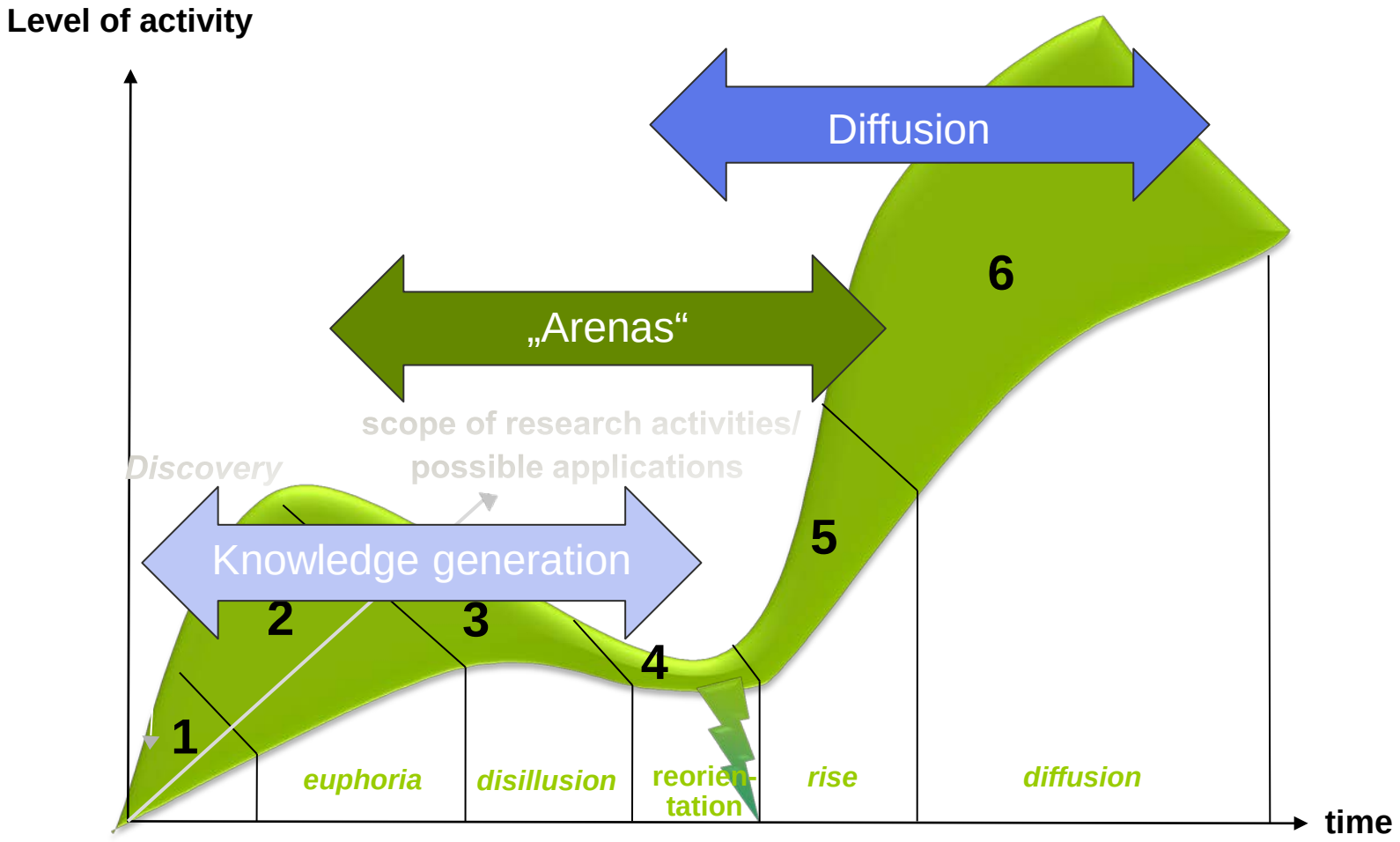
- → New systemic rationales and instruments: expansion of the instrument portfolio → how to secure effectiveness?
- → Innovation system approach still to static and descriptive
- → Effects of Technology-Push and Demand-Pull: How do the effects interact?
- → Changes in knowledge production: dynamics of science and industry, interrelations and feedback functions of science, technology and innovation

Essential information is needed to be able to tailor policy measures in terms of selection, arrangement, use and timing of instruments:

- → Using knowledge on specific instruments
- → Higher complexity has to be managed through systematisation
- → Complexity needs to be structured and reduced in a way that makes objectives, impact and expectable trade-off's, both workable and concrete → conceptual model needed

Example: Policy instruments on the Technology Life Cycle

→ Policy instruments, which support…



Requirements for a toolbox of instruments: Selection process

Procedure (as usual)…

Identified Problem → **Choice of instruments**

Purposed procedure:

Identified Problem

↓

Intended impact

↓

List of potential instruments:

e.g. R&D grants, cooperative research programs, subsidies, public research labs …

Prerequisites of the respective instrument:

- Ability to address the defined target group
- Innovation-oriented R&D function
- Possible range of the instrument/broad impact
- Administrative effort …

Analysis of the context conditions:

- Level of Technology
- (Future) Demand Conditions
- Characteristics of relevant Target groups
- Characteristics of relevant Stakeholder…

Best match → **Choice of instrument(s)**

Thank you for your attention!

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