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Innovation Policy and Development

Rethinking systems of innovation and competitiveness

Serpong, 14 December 2011

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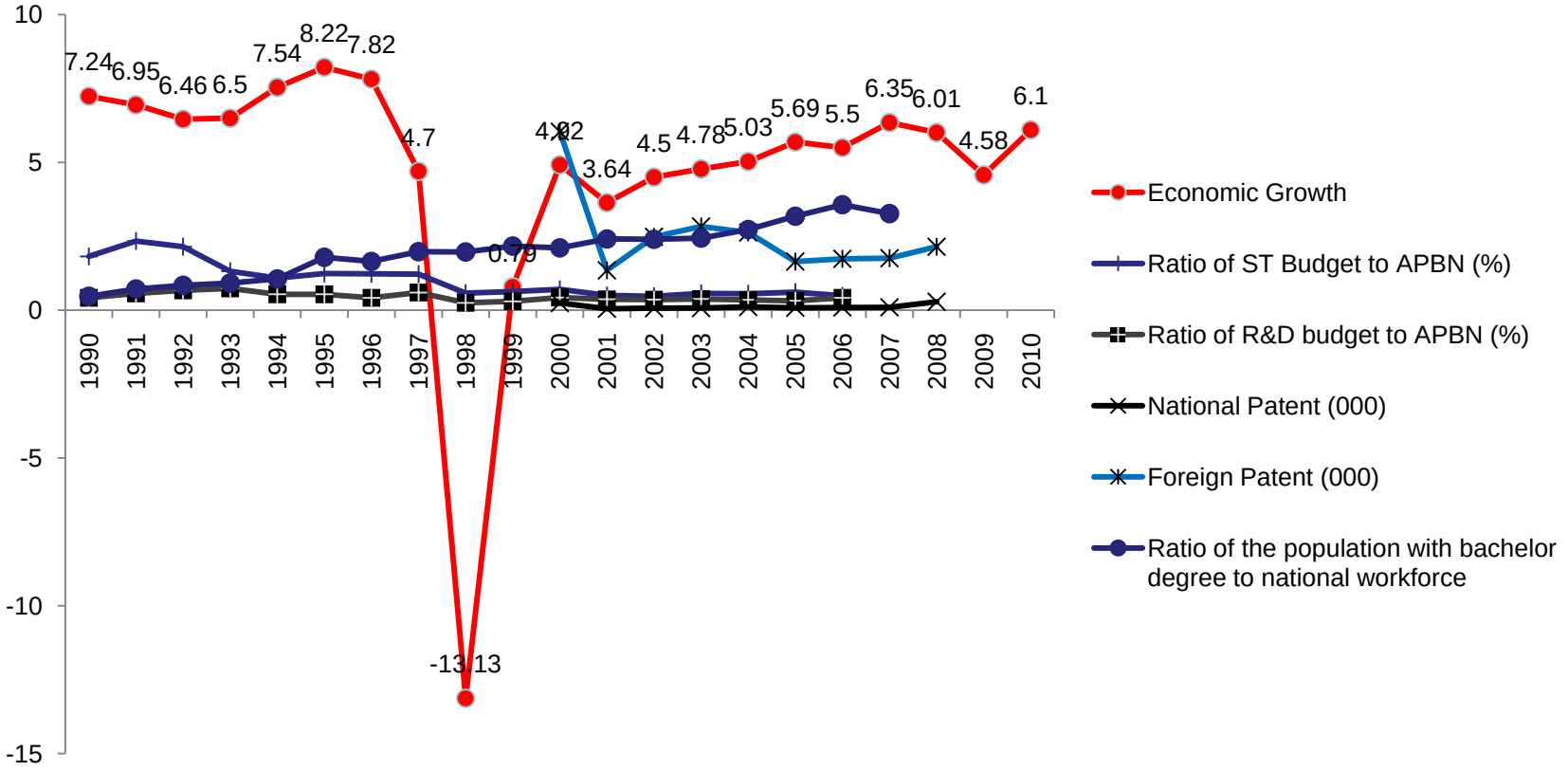
Agenda

- Macroeconomic performance and framework conditions for innovation
- Innovation policy and development
- Future challenges: Disembeddedness
- Rethinking systems of innovation and competitiveness
- Discussion

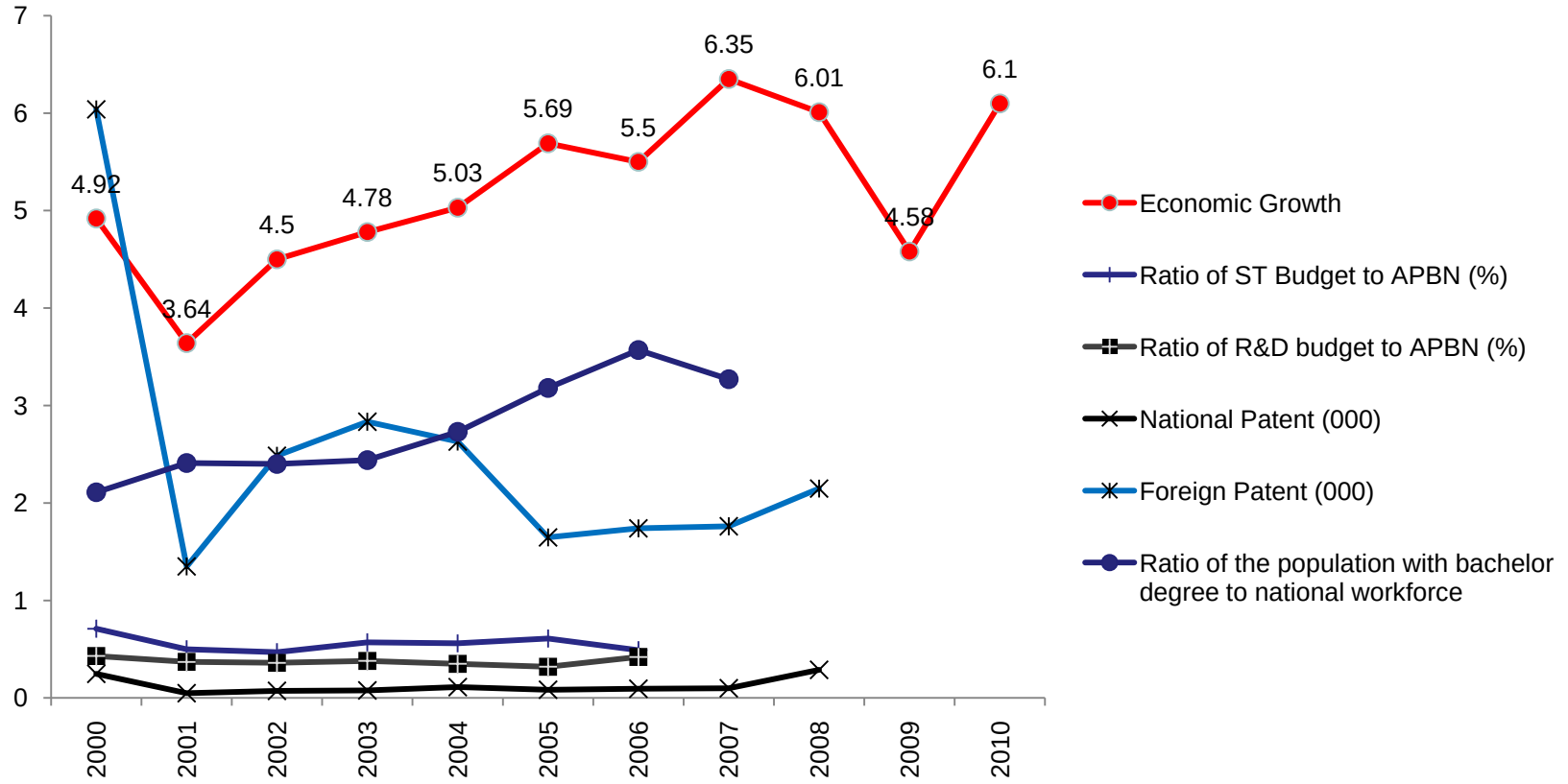
Performance & structure of the economy



Sources:

Economic Growth: BPS, (2010); Ratio of ST& RD budget : Author (2011, processed from Pappiptek-LIPI and BPS,1996-2007); Patent: Indonesian Ministry of Justice and Human Rights (2010); Ratio bachelor: Indikator IPTEK (2009)

Performance & structure of the economy



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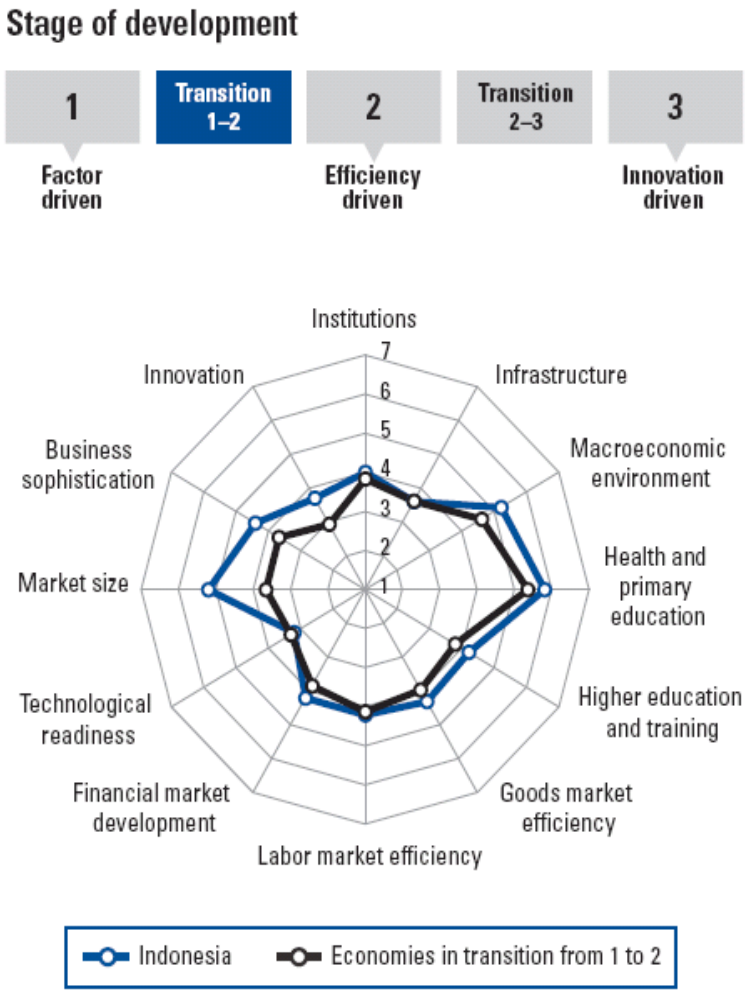
Performance & structure of the economy

	Rank (out of 139)	Score (1–7)
GCI 2010–2011	**44**	**4.4**
GCI 2009–2010 (out of 133)	54	4.3
GCI 2008–2009 (out of 134)	55	4.3
Basic requirements	**60**	**4.6**
1st pillar: Institutions	61	4.0
2nd pillar: Infrastructure	82	3.6
3rd pillar: Macroeconomic environment	35	5.2
4th pillar: Health and primary education	62	5.8
Efficiency enhancers	**51**	**4.2**
5th pillar: Higher education and training	66	4.2
6th pillar: Goods market efficiency	49	4.3
7th pillar: Labor market efficiency	84	4.2
8th pillar: Financial market development	62	4.2
9th pillar: Technological readiness	91	3.2
10th pillar: Market size	15	5.2
Innovation and sophistication factors	**37**	**4.1**
11th pillar: Business sophistication	37	4.4
12th pillar: Innovation	36	3.7



Source: Global Competitiveness Report (2010)

Innovation policy and Development

- **Innovation is usually understood to be distinct from invention. While invention is the first occurrence of an idea for a new product or process, innovation is the first attempt to carry it through into practice (c.f. 'Creative Destruction' – Schumpeter, 1934).**
- **Innovation Policy: Any policy that aims at shaping, enabling and supporting the creation (and transfer) of knowledge, of technological artefacts as well as of product and service innovation.**
- **Innovation policy is often assumed to have positive links with development –both policies and practices.**

Can this assumption be held true?

Innovation policy and Development

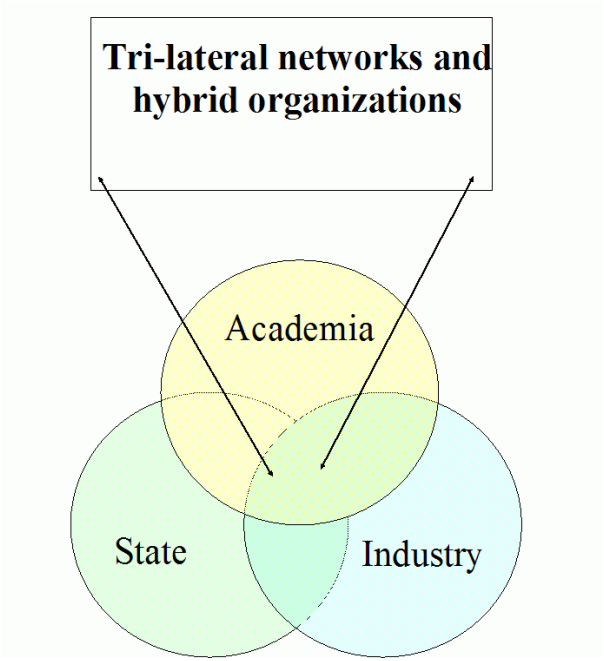
Do we consider the production of knowledge?

Mode 1	Mode 2
University as the main site of knowledge production	Socially-distributed knowledge production – university just one actor
Individual researchers	Collaboration and teams
Disciplinary	Trans-disciplinary
'Disinterested' generation and validation of new knowledge	Solving problems in 'context of application'
Peer review – autonomy	Reflexivity and evaluation – social accountability
Science policy	Innovation policy

Source: Shinn T, 1999

Innovation policy and Development

Adaptation of new norm(s). Are we critical enough?



The Triple Helix thesis: the university (and research institutions alike) can play an enhanced role in innovation in increasingly knowledge-based societies **(Etzkowitz & Leydesdorff, 2000)**

<u>Three institutional spheres</u> drive the global knowledge-based economic system: university, industry and government

Interactions between them shape them (dynamic) - inter-institutional relations

<u>Three 'dynamics':</u>

1. Economic dynamics of the market

2. Internal dynamics of knowledge production

3. Governance of the interface

Firms/industry/market not centre stage anymore

Future challenges

GRAND CHALLENGES

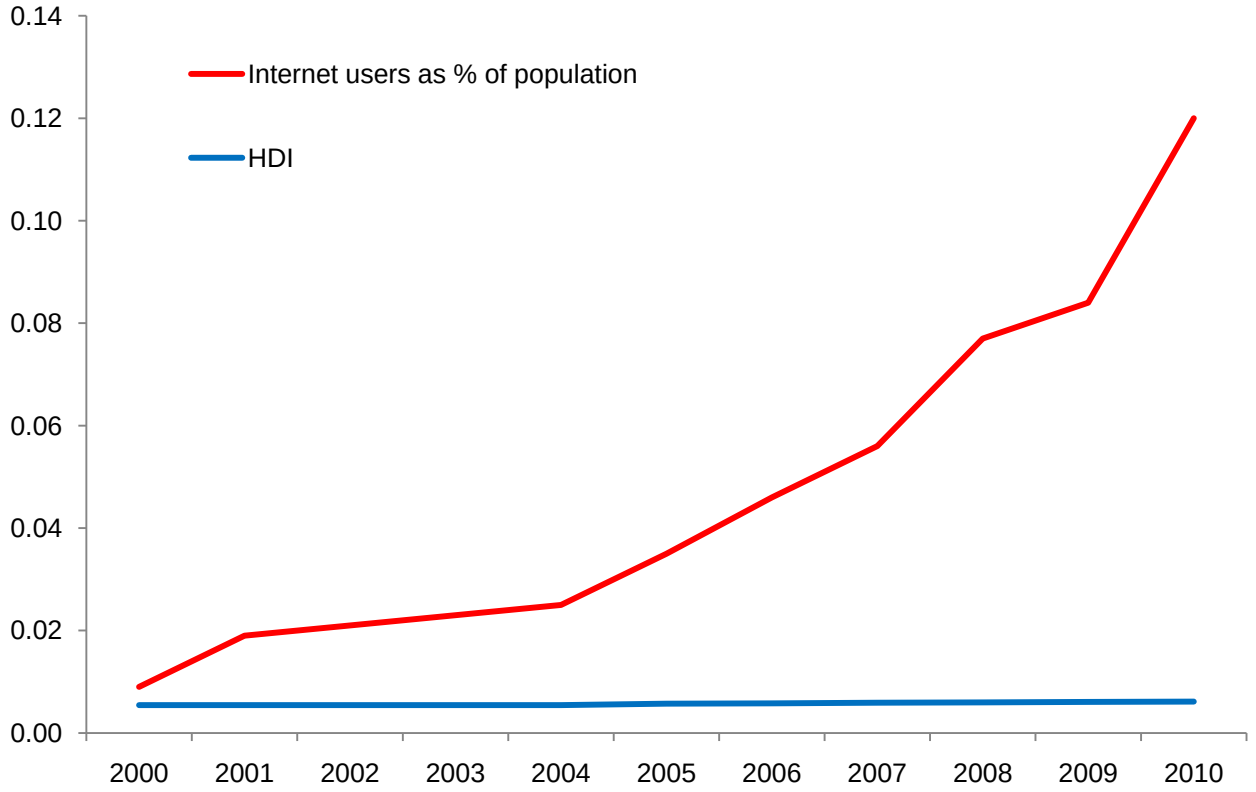
1. Water security
2. Energy security
3. Disease
4. Sustainable development
5. Aging & demography
6. Globalisation
7. Social cohesion
8. Work-life balance
9. Behavioural change
10. Trust in governments
11. Urbanisation
12. Prosperity & Stability
13. Exclusion & poverty
14. Social pathologies
15. Coexistence & conflicts
16. Crime & corruption
17. Ethics of science & technology
18. Knowledge divides
19. Techno-security
20. Food security

Are these what we may want to focus? Why?

Source: European Commission (unpublished)

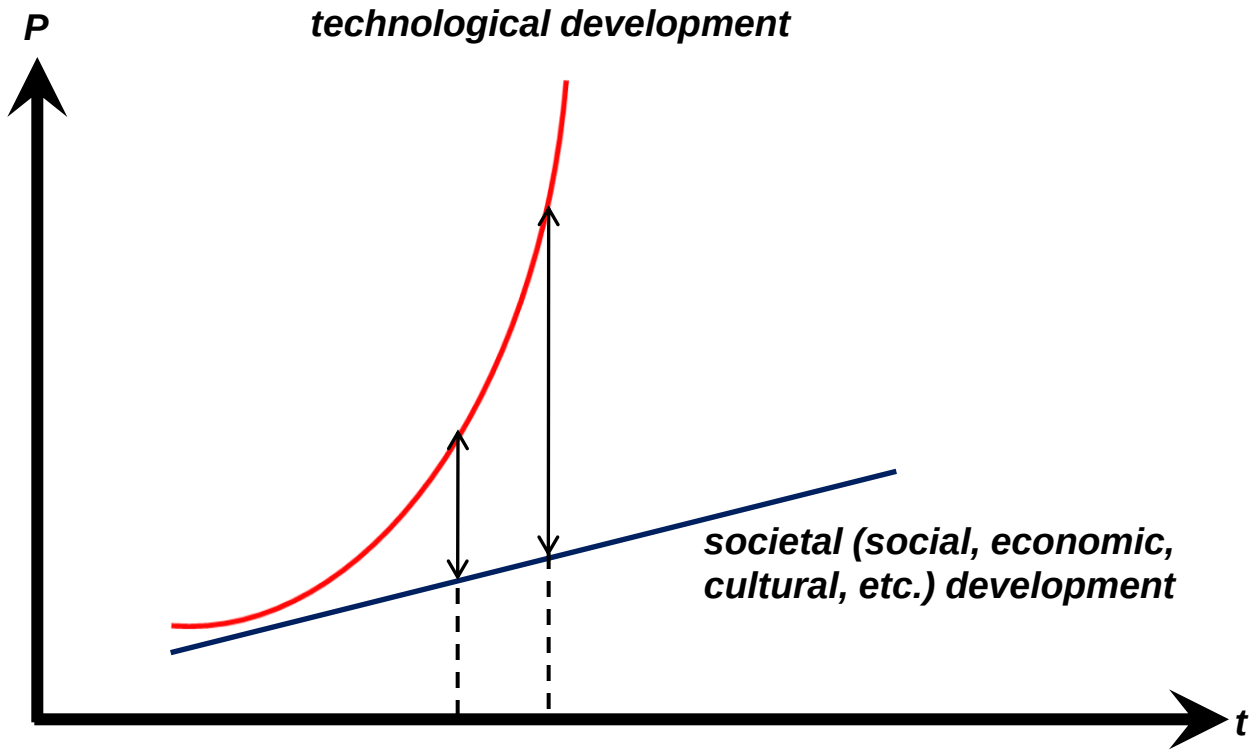
Future challenge: Disembeddedness

Evident trend: Technological uptake v. developmental progress



Source: *Author (calculated from Human Development Index (2010); Internetworldstats (2010))*

Future challenge: Disembeddedness



Rethinking (National) Systems of Innovation

Foundations of National Systems of Innovation

- "systems" approach rooted in evolutionary economics – non-linearity, learning, technology at the centre
- Lundvall 1992 – narrow ("searching and exploring") and broad definitions – all parts and aspects of the economic structure and the institutional set up affecting learning as well as searching and exploring…production, marketing, finance sub-systems
- Why- to understand the relative economic performance and competitiveness of countries – similarities and differences – do they explain differences in national performance (Nelson, 1993)
- Nelson and Rosenberg 1993 – "*a set of institutions whose interactions determine the innovative performance of national firms*"
- Broad concept of innovation where the context is crucial – not just leading edge technological firms or world class research performers – but national technological capabilities and processes of transforming them into economic wealth

Source: Flanagan & Barker PR6011

Rethinking (National) Systems of Innovation

Links to Policy perspective

- Metcalfe 1995 – "*that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the* ***knowledge****, skills and artefacts which define new technologies.*"
- Motivations, incentives and interconnectedness

Source: Flanagan & Barker PR6011

Rethinking (National) Systems of Innovation

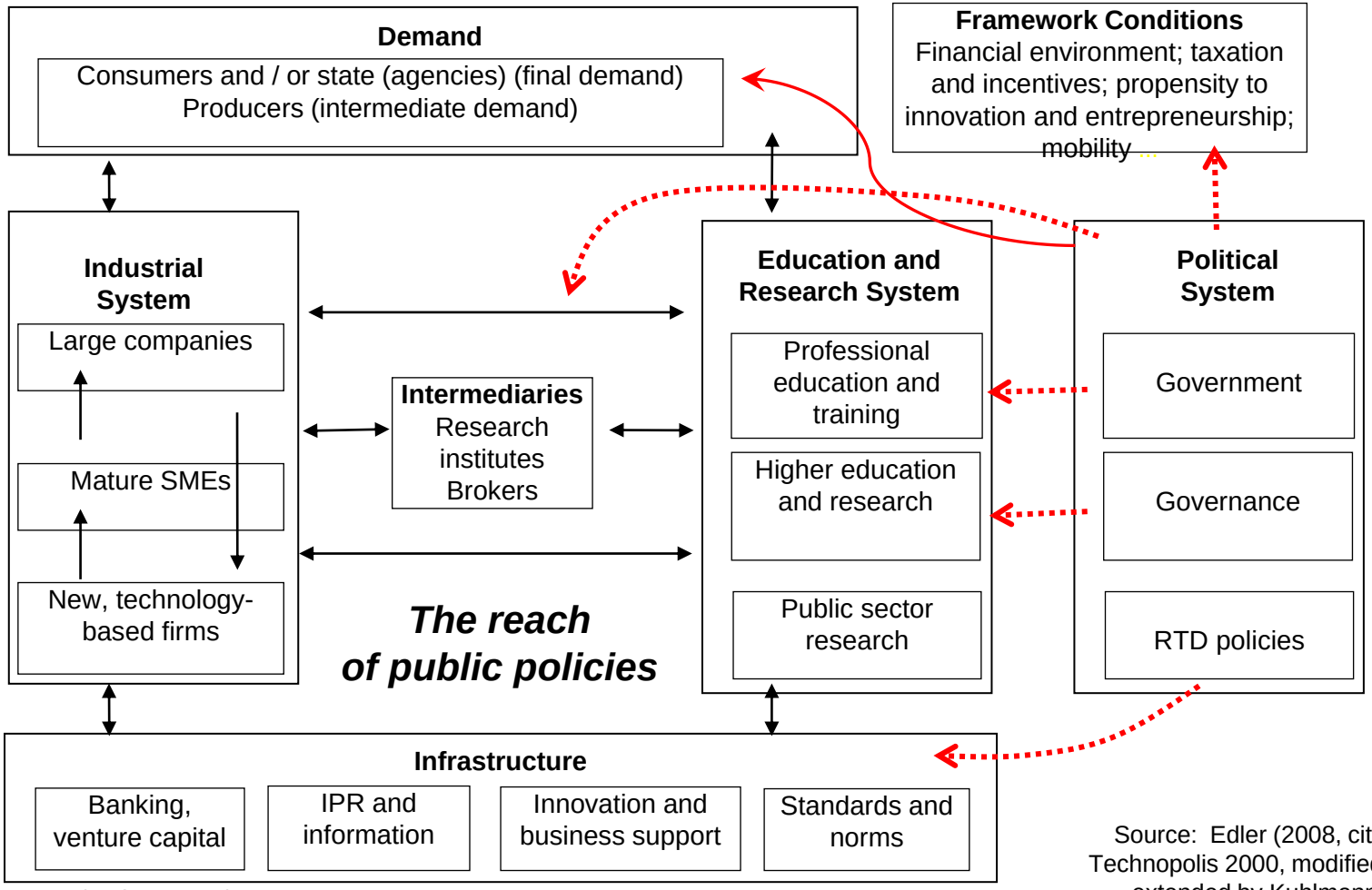
Different types of innovation policy

- ***Top down*** (supporting selected areas) v. ***bottom up*** (areas of research to be defined by those supported)
- ***Mission oriented*** (selected areas, targeted funding, early phase of life cycle) v. ***diffusion oriented*** (broad orientation, improving innovation capabilities across the board of the innovation system, scientific infrastructure, technology transfer and cooperation)
- ***Problem-driven*** (e.g. “sustainability”): combining areas and instruments to contribute to problem-solving
- ***Science/Technological area*** (e.g. Biotech, Nanotech etc.)
- ***Sectoral*** (e.g. forestry research programmes): combining the instruments and areas needed to boost the development within a certain sector
- ***Actor specific*** (e.g. SME, transfer institutions, etc.)
- Defined and implemented on different ***policy levels*** (regional, national, international)

Source: Edler 2008

Rethinking (National) Systems of Innovation

NSI: Helpful heuristic, but not enough:
An EU experience



Source: Edler (2008, citing Technopolis 2000, modified and extended by Kuhlmann)

Rethinking (National) Systems of Innovation

Making systems of innovation work: Learning from EU

European Research Area – ERA (Green Paper 04.04.07)

1. ERA Vision:

The European Research Area will deeply root knowledge in society and free Europe's knowledge potential in all its dimensions: people, infrastructures, organisations, funding, knowledge circulation and global cooperation (p.9)

2. Making ERA vision reality

1. Promoting mobility of researchers

2. Developing research infrastructures

3. Strengthening research institutions

4. Sharing knowledge

5. Optimising research programme and priorities

6. International cooperation

Rethinking (National) Systems of Innovation

A CLEAR CRITERIA TO IDENTIFY GRAND CHALLENGES

"… are of sufficient scale and scope to capture the public and political imagination, create widespread interest among scientific and business communities and NGOs and inspire younger people. They must be capable of acting as an important tool for percolating attention at all levels of society all the way down to civil society and the public at large." **(EUR 23326, 2008:37)**

CRITERIA for the GC:

1. **Is it relevant to address at the EU level?**
2. **Is there a clear research dimension contribution?**
3. **Is it feasible as an economic or social investment? → problem of embeddedness**

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Rethinking (National) Systems of Innovation

Learning from Framework Programme 7 (FP-7) Research Priority

1. Information & Communication Technology
2. Health (including medical)
3. Transport
4. Nanotechnology
5. Energy (including renewable/green energy)
6. Food and Agro (including consumption)
7. Environment (including climate change)
8. Space
9. Security
10. Social Sciences & Humanities

OTHER

1. *Ideas (blue-sky res.)*
2. *People*
3. *Capacities*
4. *EUratom*
5. *Joint Research Capacity*

Rethinking (National) Systems of Innovation

Institutional linkage and framework of coordination – UK example

- ERC – European Research Council: Funding, research dir. at EU level
- RCUK – UK Res Council (incl. Technology Strategy Board): Funding, research direction at UK level to:
  - Disciplinary research council (MHRC, AHRC, ESRC, EPSRC, etc)
  - Royal Societies, charities, research fund organisations
- Universities carrying out researches (M.Res, M.Phil, Ph.D, res. proj)
  - → bridging to commercialisation through patent office
  - "Hub" for business-government-academia-third sector
- Business/private sectors & third sector provide research 'fields'
- Regional/local development agencies set development priorities and needs for localised/customised research agenda
- Clear & measurable research agenda and priorities → evaluation
- State direction, but organic evolution and emergence NOT forced.
- S&T Act 1967: ministries have great flexibilities to make/change adopt systems of innovation → can coordination be legislated?

Rethinking (National) Systems of Innovation

BENEFIT OF NSI

- "Good bye" to the linear model, able to capture complex, interactive nature of the innovation process
- Can be (and has actually been widely) transformed into *technological* or *sectoral* innovation systems, thus applied to specificities of "areas" rather than nations.
- Emphasis on the contextualisation and importance of institutional settings, as well as on the **interaction** and **learning of actors**

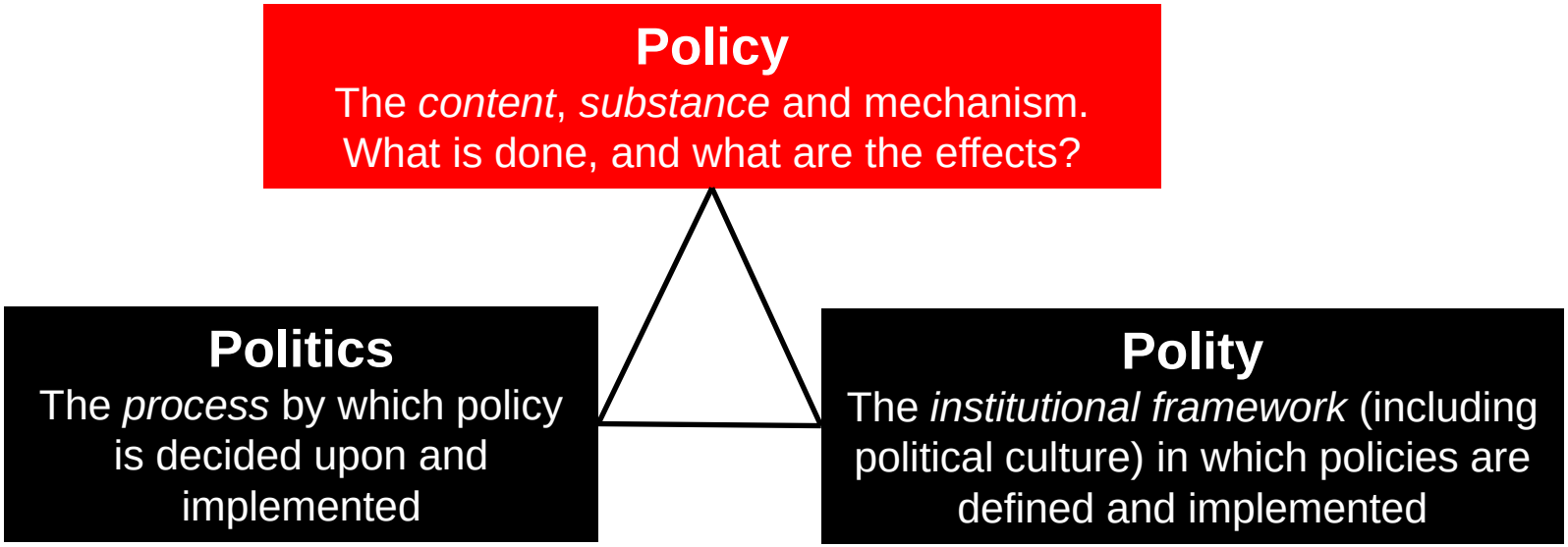
BUT …

- Black box of *innovation process* partly been opened, but…box of *policy process* remained black and closed.
- Thus: Role of (policy and) policy-making is under-valued;
- … role of rationales of policies not questioned
- … and with it all the deficiencies of policies that derive from simplistic learning
- As concept: it does not carry multi-level dynamics (Europeanisation, Asianisation, Globalisation and National Systems…)

Source: Edler 2008

Pointer for discussion

POLICY MAKING



Source: Edler 2008

To what extent does research contribute to the policy making process?

- How can research be influential to the policy (content, substance, mechanism)?
- (How) can research(ers) influence politics?
- (How) can research provide, or become, polity?

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Thank you.

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