

Challenges to science policy and its evaluation in small and catching-up countries: experiences from the Estonian science system

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Background

- Funded by the European Social Fund through the Research and Innovation Policy Monitoring Programme.
- To assess (policy analysis):
 - a) how do science funding instruments affect research groups (inputs, processes, outputs/outcomes)?
 - b) how have the orientation towards excellence and socio-economic relevance been balanced?
- in the fields of: ICT, biotechnology, energy technologies and *cleantech*

Estonian context (1)

- **Policy ideology:** predominantly linear view of science and innovation with gradual (EU's structural funds financed) emergence of attempts at systemic steering
 - 1990s targeted funding (project and personal)
 - 2001 centers of excellence (EU funded since 2008)
 - 2004 competence centers (for technology development) (EU funded)
 - 2005 baseline funding (for universities)
 - from 2010 – national R&D programs (EU funded)
 - 2012 targeted funding reformed into institutional grants (6 year 'projects')

Estonian context (2)

- **Funding ideology:** excellence-based (external peer-review), competitive (open calls), project-based (no substantive institutional funding)
- **Science system:** based on bottom-up financed research groups (university research staff based on temporary contracts – 3-5 years – depending on project funding success) with highly fragmented funding
- **Economic system:** integrated into Scandinavian innovation and production networks (based on low-cost advantages) with weak domestic demand for science and R&D → importance of public sector demand

Economic impact of public science

- Framework based on SPRU (Salter and Martin), etc:
- **Supply-driven:** increasing the stock of useful knowledge (incl. publications, new scientific instrumentation, methodologies etc)
- **Middle-ground:** skilled graduates (workforce) and inter-sectoral networks (university-academia cooperation etc)
- **Demand-driven:** commercialization (private gain) and solving complex social problems (public gain/value)

Methodology

- Mapping of research groups
 - ... network analysis in a fragmented project-based research system
 - ... matching of research groups and funding sources
 - ... challenges of determining input-output linkages and impacts of specific instruments
- Semi-structured interviews (35 research group leaders; university R&D and finance departments)

Main findings (1)

- Three logics in research groups
- **fundamental RQ (1)** → applied RQ (2) ---> practical problem-solving (3)
... e.g. some groups in physics, chemistry, biology
- fundamental RQ (2) ↔ **applied RQ (1)** ---> practical problem-solving (3)
... majority of research groups
... since 1990s systemic move away from practical problem solving
- fundamental RQ (3) <--- applied RQ (2) ↔ **practical problem-solving (1)**
... e.g. especially groups in technology-related fields (e.g. oil shale & traditional energy technologies; electrical engineering)
... last category of groups lacks stable funding (paradoxically may be most relevant for short-term domestic demand) → eroding capacities
... difficulties in obtaining competitive funding (excellence criteria) and the impact of rhetorical convergence (e.g. between material sciences and energy technologies; biotechnology and health)

Main findings (2)

- Typology of research groups – predominantly financed by:
 - national excellence-oriented projects
 - foreign excellence-oriented projects
 - national teaching funds
 - applied public and/or private projects
- excellence-based bottom-up funding + fragmentation of instruments = concentration of resources in the top groups + ‘long tail’ of conventional performance laggards (scientists as entrepreneurs)

Main findings (3)

- Main 'systemic failures' of the system → limited strategic steering:

... no substantive extinction of 'weaker' groups

... limited space for launching new/interdisciplinary research streams/projects

... weak and fragmented support for public and private demand based research

... little policy space for other actors (i.e. universities) to rectify these failures

→ But, policy space for demand-based rationalization of policy reforms (instruments, non-excellence-based public funding):

... clarifying public demand (socio-economic issues)

... and supporting the development of private demand

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