

Measuring Health in Research and Innovation Systems: The Czech Audit in International Context

Mostly About Governance

Erik Arnold

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Emerging principles (1)

- Innovation, applied and basic research are interdependent
Linkages among them and the institutions that perform and fund them must be strong
 - Most innovation involves adapting and using existing knowledge, there must be strong capabilities for accessing global knowledge
 - A significant proportion of basic and applied research should be directed towards areas of national and industrial priority
 - Links between industry and the research system are important; the type of link depend their respective capacities
 - Mechanisms are needed to articulate demand for technology and research, not only supply
 - The state's role in governing the parts of the NRIS* under its control must include acting as a 'change agent'
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Emerging principles (2)

- The state must do ‘bottleneck analysis’ as a basis for policy
 - The NRIS must be internationally open
 - Scientific performance must move to and beyond global levels
 - NRIS governance needs to include a transparent ‘arena’ in which to establish broad R&D&I priorities
 - The strategic intelligence needed should be created and analysed in a distributed way across the institutions of the NRIS
 - Evaluation is a key component of strategic intelligence. The overriding purpose of evaluation is to understand the degree to which interventions tackle and solve societal problems
 - R&D&I policy should be implemented according to the principle of subsidiarity
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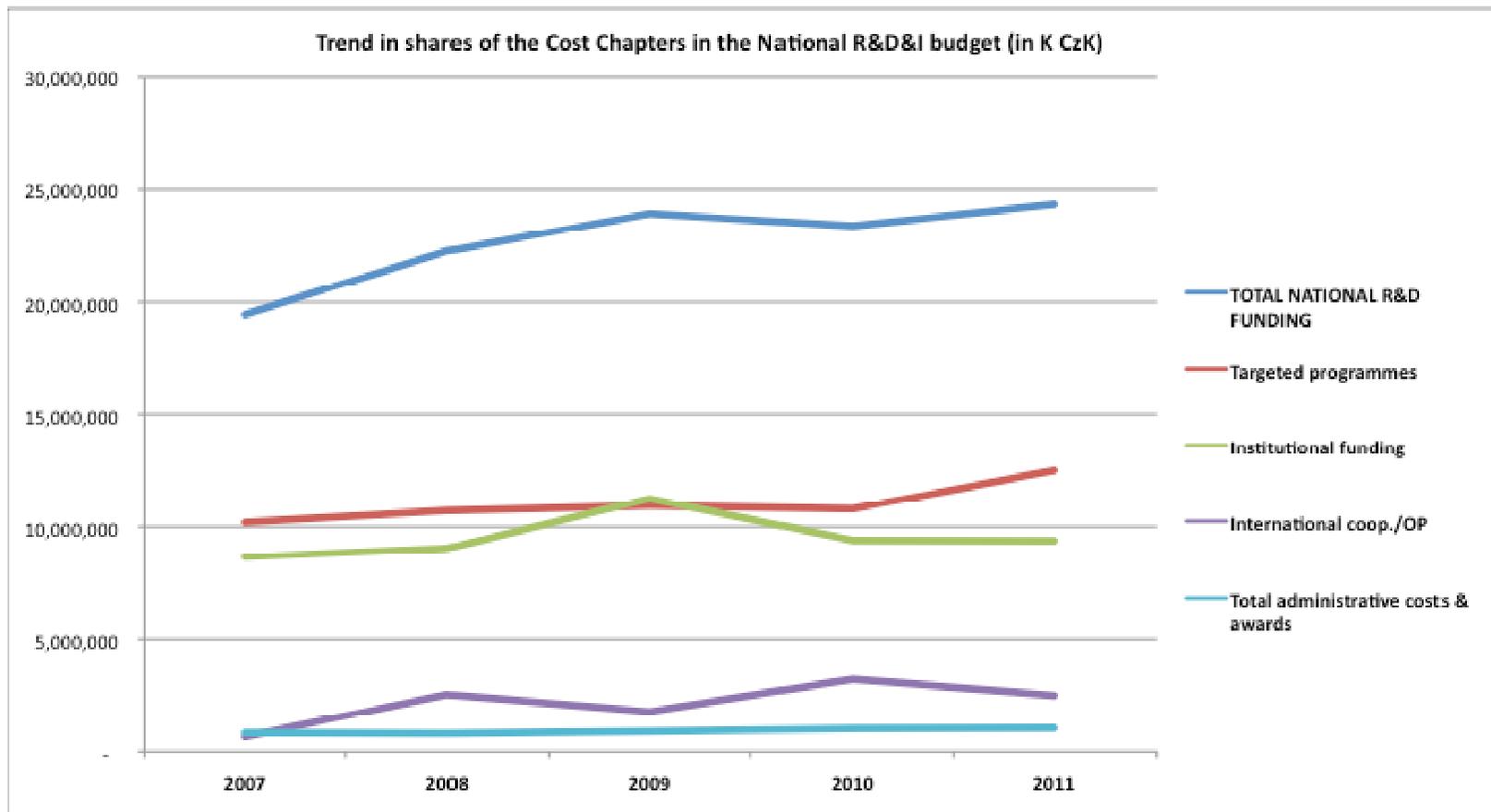
The Czech Republic has been constantly striving to reform R&D&I for the past two decades

- 1990-98, restructuring of ASCR, privatisations, decentralisation of R&D budgeting
- 1998-2003, Pre-accession, first national R&D policy of the CR with broad goals to create a healthy research and innovation system
- 2004-8, shift in policy towards innovation
- 2008 Reform, shifting towards outputs-based funding and seeking increased efficiency as well as better innovation links, more flexible organisational structures, human resources and increased international collaboration
- Sustained budget increases, also in industry up to the financial crisis

Funding

- A system with a low share of institutional funding – but following a trajectory towards making that 100% contestable
 - Privatised RTOs do 14% of BERD and get 29% of state funding for ‘industry’
 - High ratio of private to state R&D spending, but GERD low overall
 - MNCs are important, but CR subsidiaries are at the low-value end of high-tech value chains
 - BERD focuses on experimental development and is less concentrated in big companies than in leading small economies
 - Almost no experimental development in the state sector
 - Importance of catch-up, technology absorption rather than frontier R&D in industry
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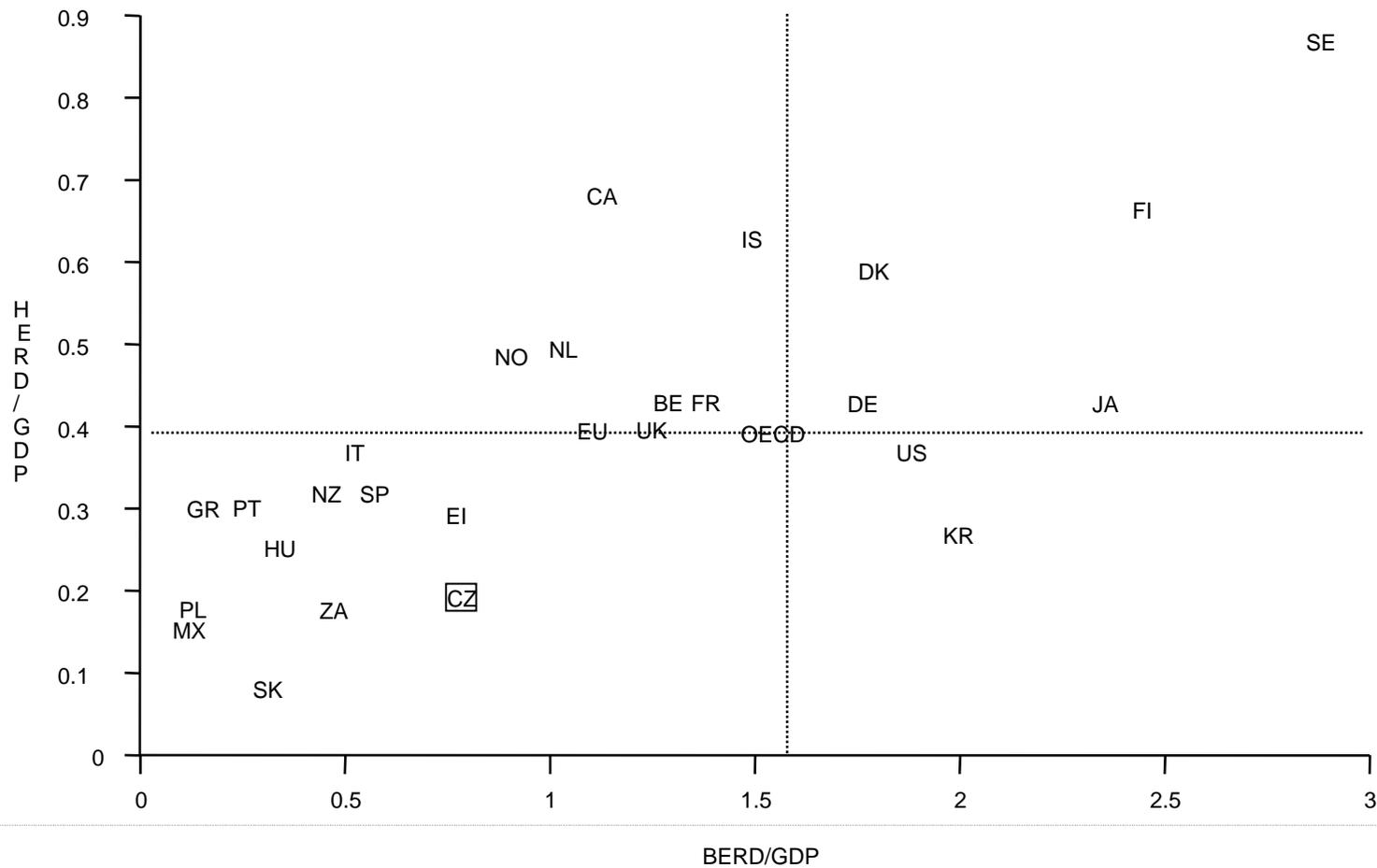
Shares of Cost Chapters in the National R&D Budget



The institutional/targeted distinction over-simplifies the role of funding in RHE system development

Institutional funding		State project funding/co-funding			Contract research
Unconditional	PBRF	Researcher initiated	Programmed	Collaborative	Company defined
↓	↓	↓	↓	↓	↓
Stability Investment	Quality Matthew effect	Quality	Quality Focusing, relevance	Quality Medium-term relevance	Short term societal needs
↓	↓	↓	↓	↓	↓
Research and higher education system					

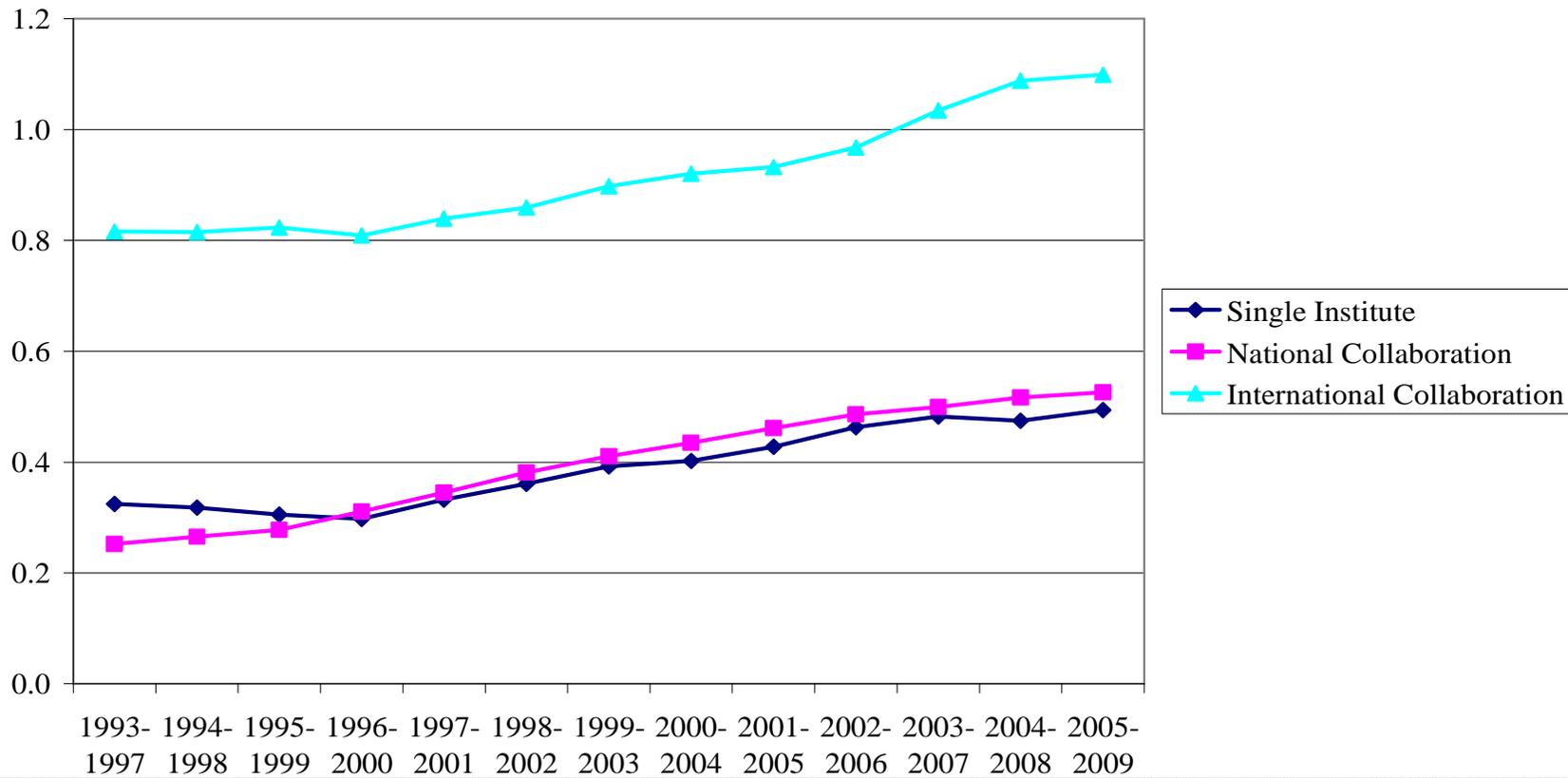
To climb to more knowledge-intensive production, HERD must grow in line with BERD



Note: OECD, 2004 data

Publication performance lifted up by international (European) collaboration

CPP/FCSm evolution by Collaboration



Research management needs modernisation

- Fragmentation of groups and research
- Leading to lock-ins to existing trajectories
- Reluctance to do interdisciplinary or applications-orientated research
- Out of date human resource management, often dependent on a single, ageing leader
- Short-termism, driven by funding policy

Internationalisation needs greater effort

- The CR follows the narrow internationalisation path
- Internationalisation (especially beyond Europe/USA) has little institutional priority
- Low share of foreign staff in CR, compounded by teaching requirement for Czech language
- High effort but low mobilisation in Framework Programme – especially low share of coordinators
- Lack of strategy and national and institutional levels

Science-Industry links exist despite, rather than because of, the orientation of the RHE sector

- Our understanding of Science-Industry links is reduced by the lack of transparency in the way funding to industry is used
- Industrial structure and focus imply catch-up R&D and support in learning and development are key needs for science links
- However, the state research system – partly driven by the Evaluation Methodology – is largely focused on trying to reach the scientific and technological frontier
- We're missing instruments that focus effort at the industry/science interface and that therefore signal about needs and opportunities in research

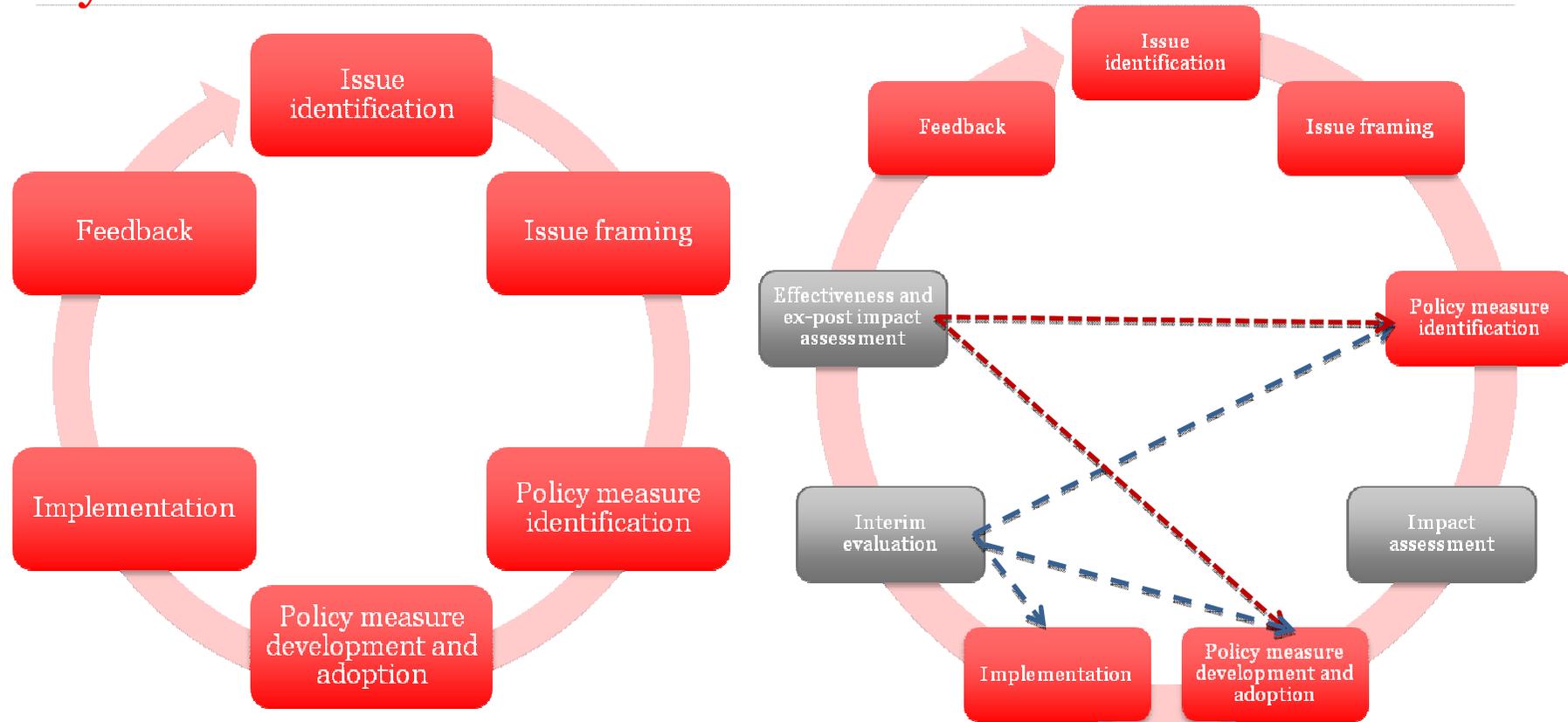
Intellectual Property Rights

- Limited importance in a catch-up system – indeed sloppy IPR practices probably help rather than hinder development
- Czech IPR legislation is state of the art
- Too little understanding of opportunities provided by IP in industry and the RHE sector, outside a small circle of experts
- Evaluation Methodology incentivises unselective IP production and distracts from commercialisation

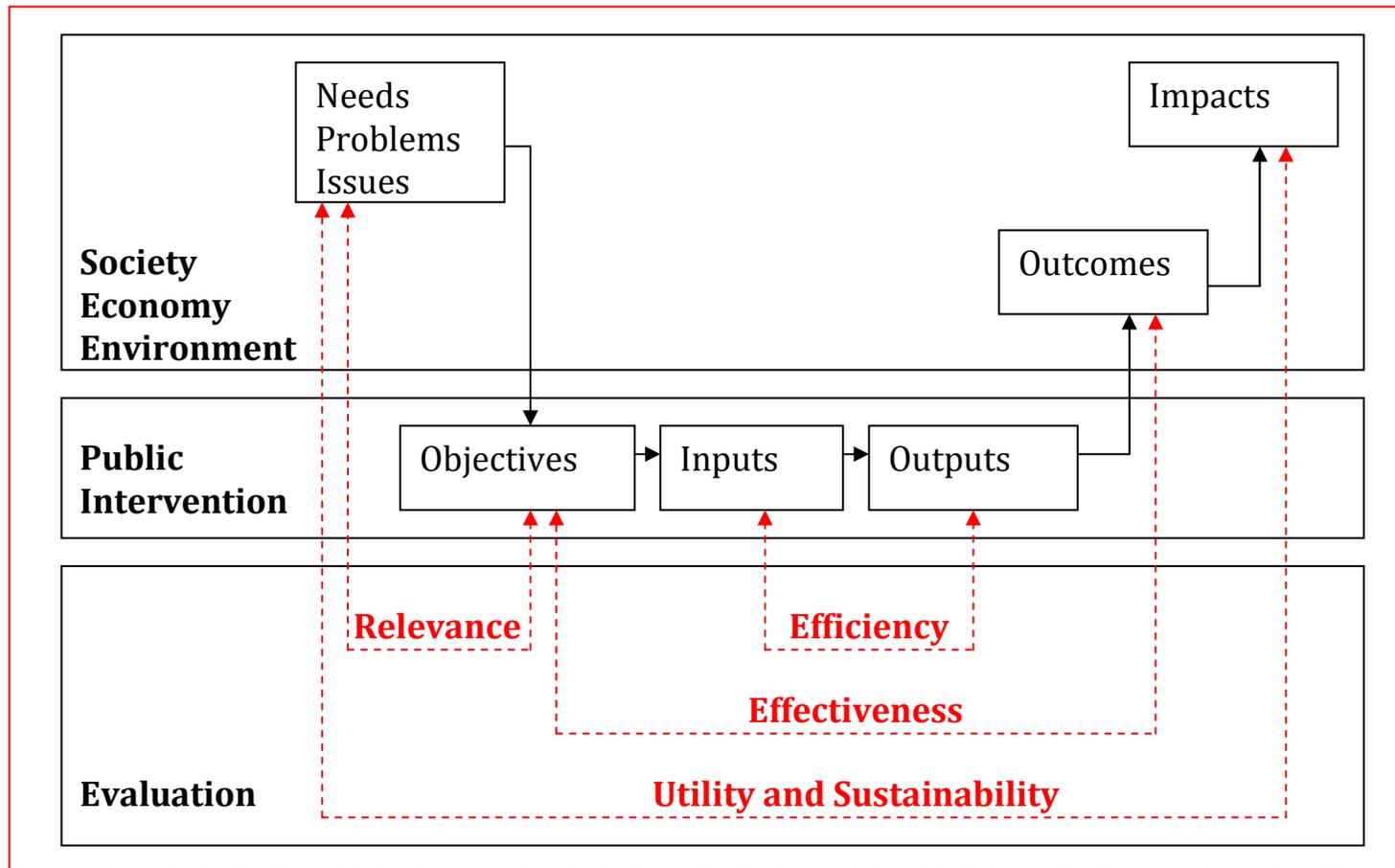
Significant issues in Human Resources (HR)

- Multiple interventions are needed to produce balanced HR policy – overall perspective and strategy are missing
- Career progression problems
 - *In-breeding; low national and international mobility*
 - *Progression is cumbersome and rigid*
 - *Primitive career development and HR practices at institutional level*
- Doctoral training mostly ‘apprenticeships’ – need a graduate school model
- Overlaps between HR policy for research and higher education not well tackled

Evaluation **in general** should inform the whole policy cycle



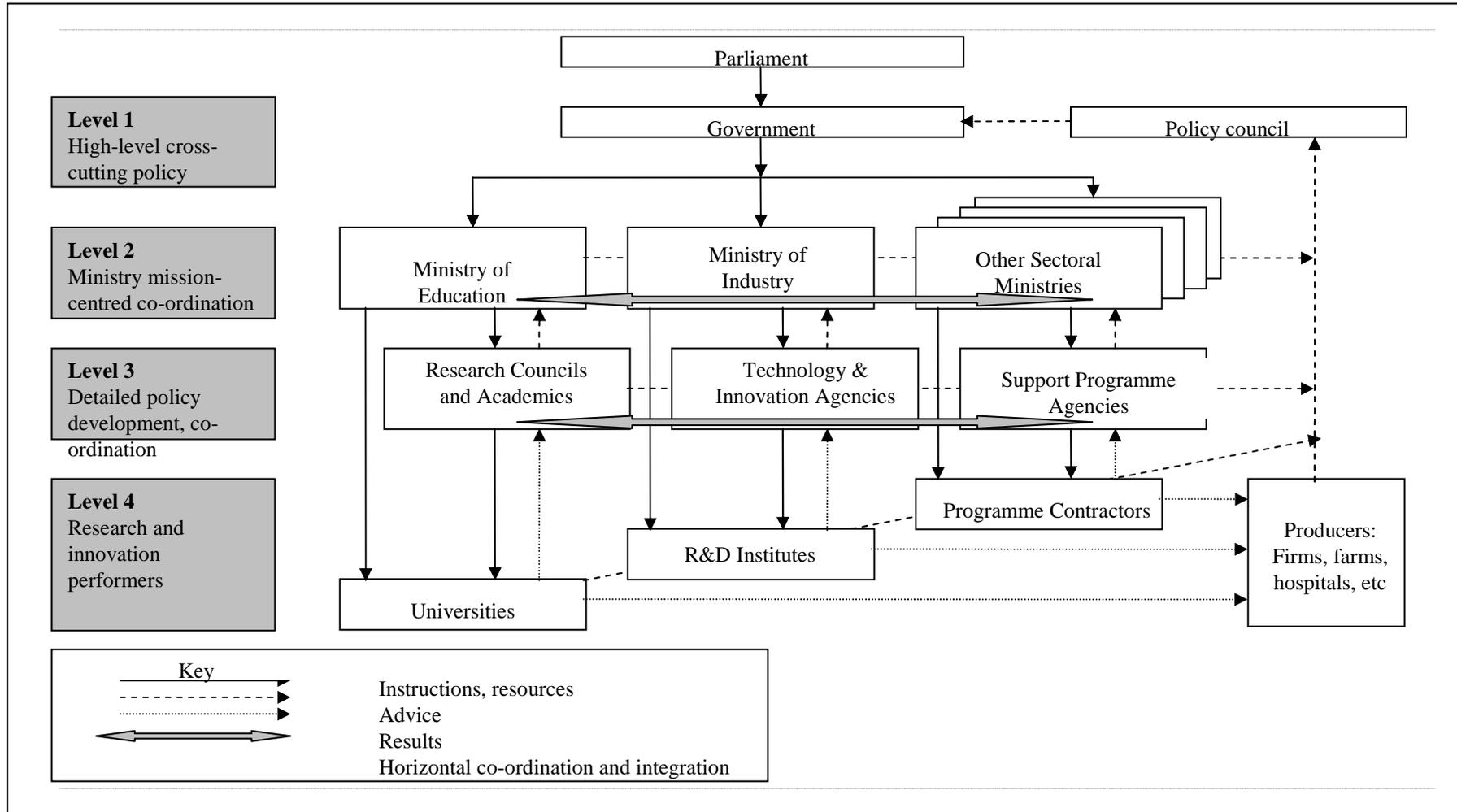
Evaluation should analyse societal effects of intervention, not just focus on outputs as Czech practice does



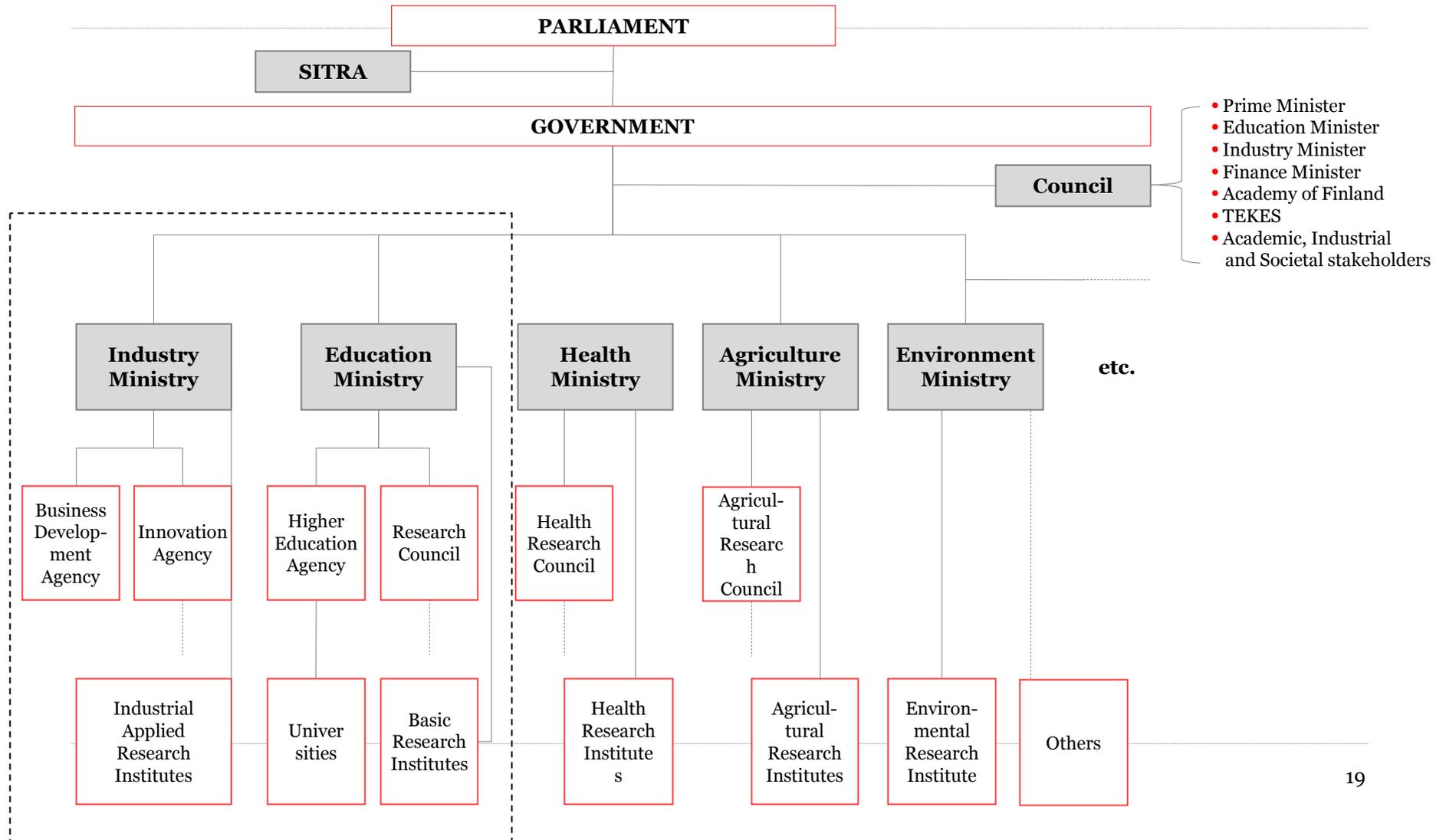
General evaluation recommendations

- To adopt a **less mechanistic** and **more policy-orientated** use of evaluation
- To use evaluation methodologies that **look beyond outputs** and focus on the outcomes and impacts of projects, programmes, departmental policies and national policies – in line with common international practice
- Urgently to launch ex-post impact evaluation exercises of departmental and national policies in the light of the upcoming discussions for the development of the **National R&D&I Policy after 2015**

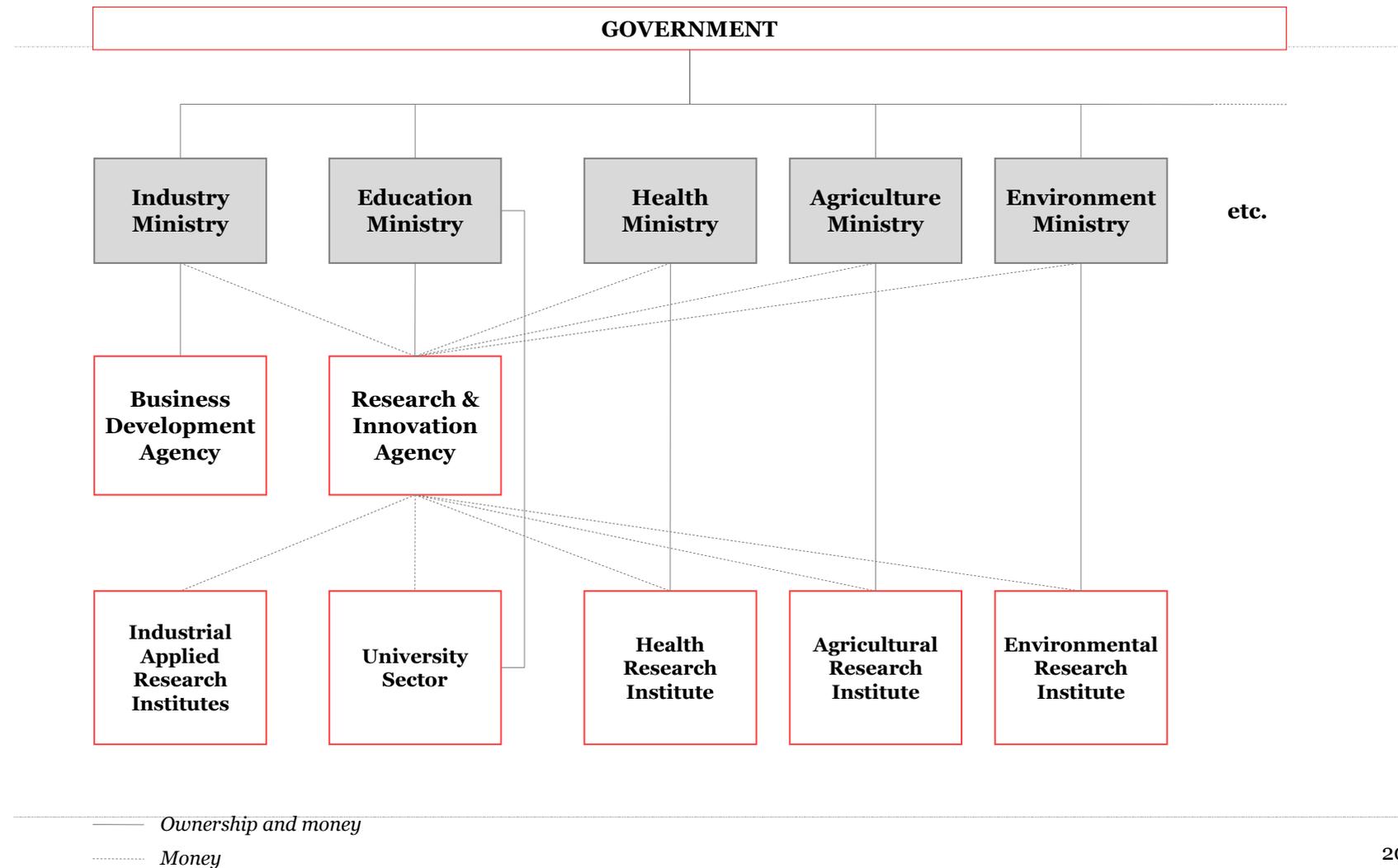
All countries struggle to govern the state's role in the NIS



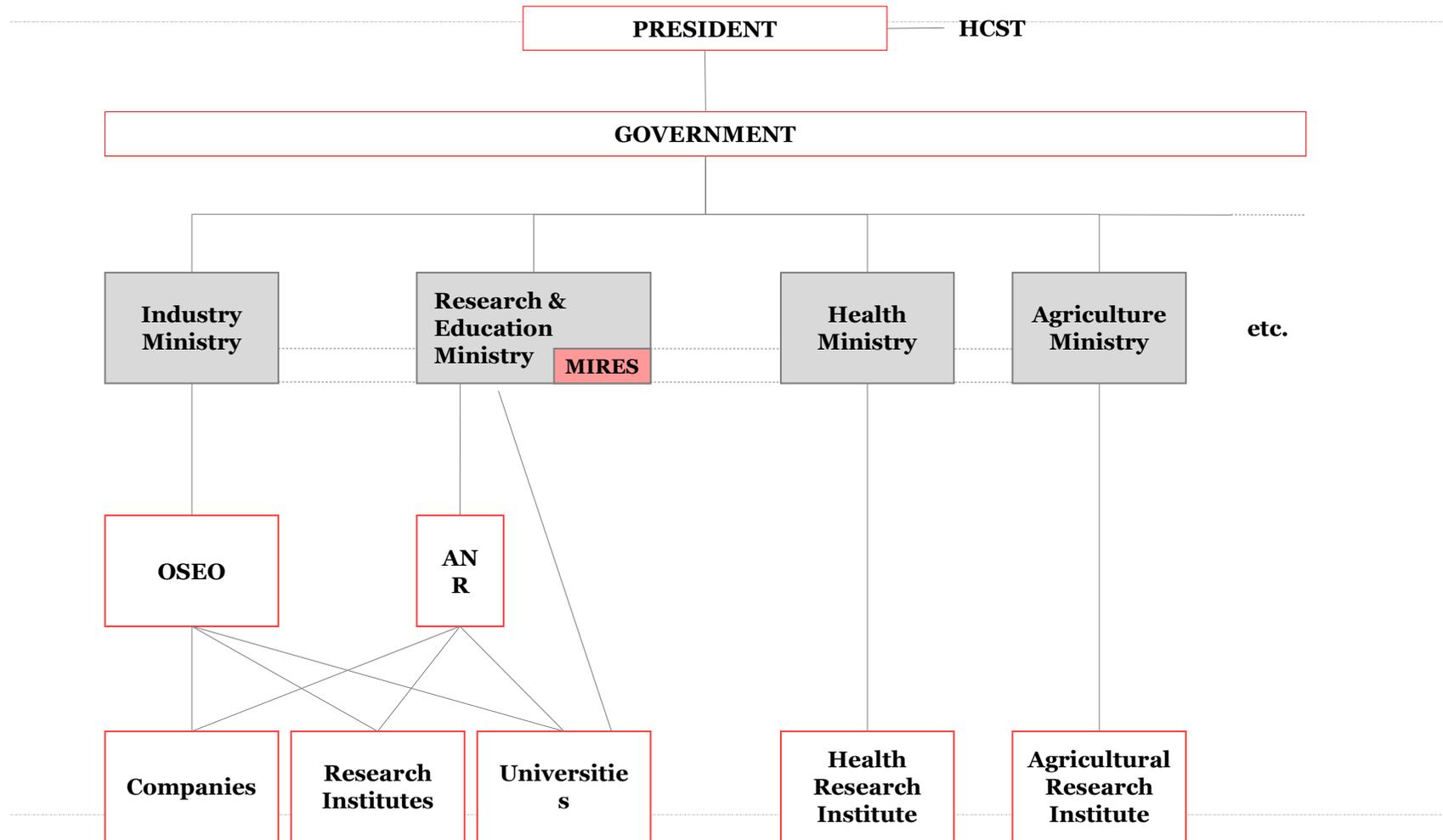
The 'two pillar' model in Finland is highly effective



Coordination through an agency (Norway) is less so



Coordination by a science ministry (France) also has limitations



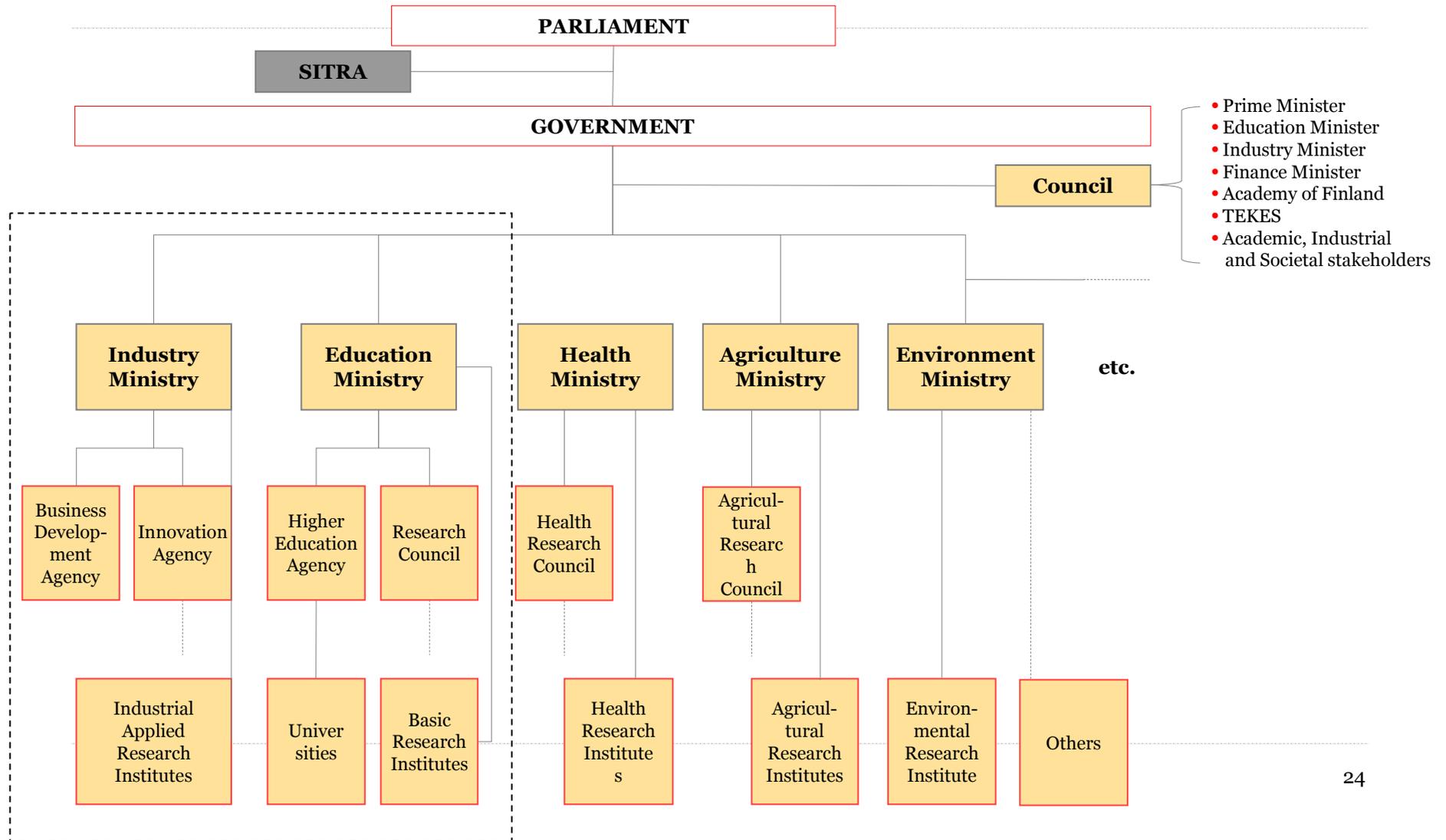
No structure is perfect

- Having multiple ministries responsible for research increases the need for coordination among sectors
- But the ‘science ministry’ approach makes it the enemy of the rest, and reduces the number of voices speaking for research
- Information asymmetries between principals and agents (ministries and agencies; agencies and beneficiaries/stakeholders) reduce the quality of policies and interventions that are centrally designed
- Councils attempting themselves to make **detailed** strategies need large amounts of analytic support (Chile, Czech Republic)

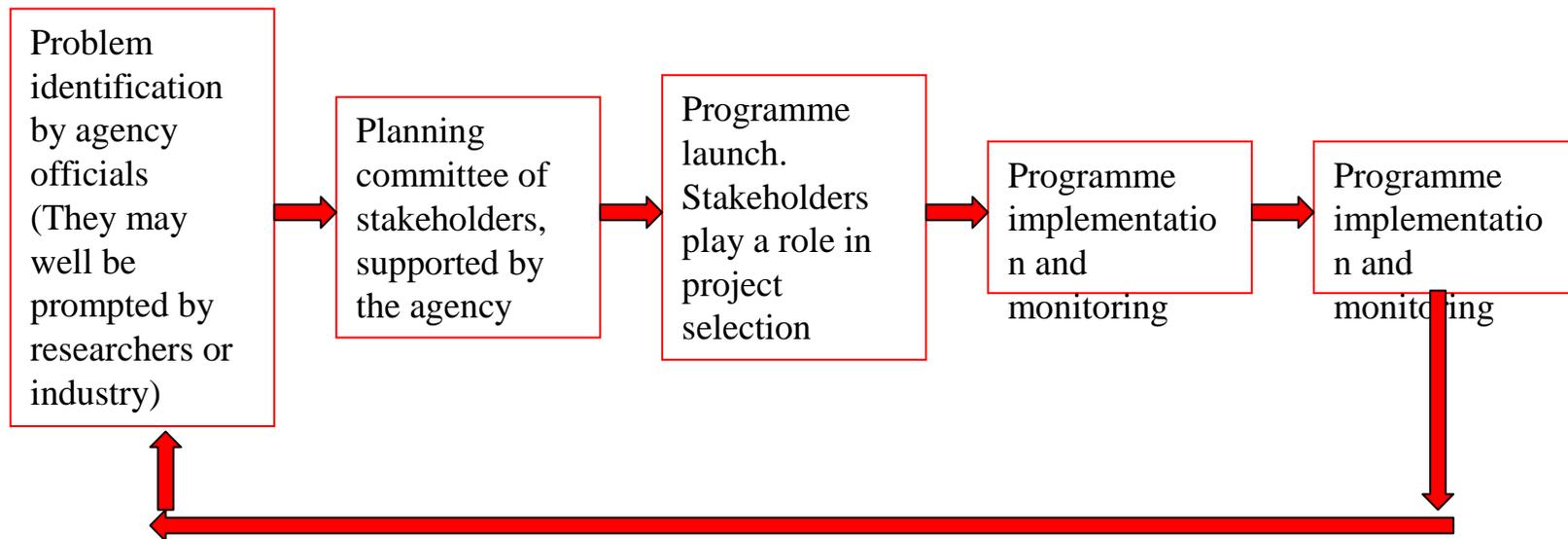
Desiderata for Councils

- Functions as an open **arena** for **consensus**
- Is **legitimate** in scientific, industrial and political terms
- Collates and publishes **strategic intelligence** when needed, within a system of distributed strategic intelligence
- Sets **long-term strategic directions**, reducing dynamic inconsistency
- **Coordinates** vertically, horizontally and over time
- Has a **high profile** with the government and the public
- Is independent enough to be a **change agent**
- Has a clear **interface to government**

Where's the strategic intelligence in Finland?



Nordic programme planning model – Agency level



R&D&I governance has to be robust against globalisation, the ERA and major changes in institutions

- Participation in higher education is tending to about 50% – at which point it costs several % of GDP
 - *Forcing new modes of financing*
 - *Underpinning a change in view of higher education from being a **social** to an **individual** investment*
- **Globalisation** of education and research markets
- Competition rigorously enforced, *inter alia* through publication of research, education and combined **rankings**
- Non-government sources play an increasing part in funding, so the sector increasingly has **new customers**
- Scale is visibly playing a role, with the emergence of ‘**superuniversities**’

Current functions of the R&D&I Council

- Define and implement principles of R&D&I governance
- Allocate the national R&D&I budget across budget lines
- Approve all state R&D programmes
- Monitoring and evaluation
 - *Annual analyses and evaluations of the state of R&D&I*
 - *Development and use of the Evaluation Methodology for institutional funding*
 - *Information system of R&D outputs*
 - *Annual benchmarking of completed R&D programme outputs*
 - *Scrutiny of ministry R&D strategies*
- Define national R&D&I policy and national R&D priorities
- Other support to the governance of R&D&I
- *De facto*, act as principal to the Science Foundation and Technology Agency

Some conclusions at the highest level

- We need to have a conversation about trust
 - *Especially with a community as clever as the academic one, there is no way to replace trust with arithmetic – we need to replace calculation with trust*
- This should involve an open discussion of the respective roles and futures of the Academy and the University systems
- Even in a crisis, it makes sense to invest in R&D&I
 - *Huge social and economic returns*
 - *Look at Finland*

Broad principles

- The Evaluation Method should go from arithmetic to judgement informed by data
 - *Past performance*
 - *Prospective performance*
- We need signalling to help the research system understand and support national needs/priorities
 - *Programme 1*
 - *Programme 2*
- We need a subtler approach to instruments
 - *Finer tuning of instruments to interventions*
 - *Recognise the importance of spillovers in the private as well as the public sector*

Improving performance

- Research management
- Graduate schools
- Internationalisation strategies
 - *National level*
 - *Institutional level*
- Human resources management
- IPR awareness

Sorting out the governance

- The R&D&I Council should change from micro-management and budgeting to broad policy direction and inspiration
 - Following the subsidiarity principle, Ministries and Agencies should be empowered to define their own policies, within the overall frame of reference provided by the R&D&I Council
 - The Technology Agency should become a multi-principal agency under the tutelage not only of the R&D&I Council but also of those Ministries that have reason to fund research
 - Manage agents through performance contracts with principals. The character of steering should therefore shift towards soft steering with the involvement of relevant stakeholders
 - Use distributed not centralised strategic intelligence
 - Radically reform evaluation practice to link with programmes and policies
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South Africa

- Overly narrow conception of ‘innovation system’, too focused on the state and its institutions
 - Innovation policy conceptualised as science (push) policy; almost no policy for technological innovation in industry
 - Strategy deployment influenced by old trajectories and; lack of capacity at ministry and agency levels
 - Political difficulty of funding the universities and firms of the apartheid era
 - Organisational structure - ‘vertical’ specialisation and differentiation need further development
 - Horizontal integration and coordination need improvement
 - *Research and innovation funding institutions need untangling*
 - *Informal links between Departments not always functioning well*
 - *Lack of a cabinet-level ‘referee’ function*
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- *NACI tied to Department of Science and Technology rather than relating to the wider set of Departmental ‘owners’ of the problem of innovation*

Governance issues – Norway

- Strategic intelligence undermined by the lack of a national arena and perceived lack of independence
 - Central planning tradition limits consultation to major industrials, reinforcing lock-in
 - Finnish Council model can't be implemented
 - *Prime minister too weak*
 - *Coalition government prevents agreement among ministry 'fiefdoms'*
 - Civil service lacks the power to coordinate, in the face of the strong sectoral principle
 - Over-steering of agencies prevents coordination at agency level. Micro-management prevents policy holism
 - Failure to reform universities prevents strategy formation
 - National research and innovation policy increasingly fragmented by regional decentralisation
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Chile's National Council for Innovation for Competitiveness (CNIC)

- Assembled relevant stakeholders, whose input and agreement is needed in order to make holistic policy recommendations
 - Established itself as a credible advisor to government, which has in turn created internal structures that enable it to use and implement the Council's advice
 - Researched and delivered a strategy
 - Used strategic intelligence to become an open 'arena' in which national research and innovation policy can be discussed
 - Triggered organisational and policy changes likely to improve the functioning of the state's part of the innovation system
 - It has established a 'flagship' in the form of cluster initiatives
 - Established the principle of selectivity and detached it from policy capture through its own legitimacy, reinforced by external analysis
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CNIC – more to do

- Further depoliticise the research and innovation agenda
- Further increase trust through transparent priority-setting
- Stop allocating the FIC (mining tax) budget by giving this job back to the Inter-Ministerial Council on Innovation
- Find an anchor in the education ministry as well as the industry ministry

We can generalise a little about what works in governance

- Thinking in innovation systems terms - there's nothing as practical as a good theory
 - Using culturally- adapted institutions. What works in Finland may not work elsewhere
 - Using arenas or a forum (depends on structure)
 - Inclusiveness - involving multiple stakeholders
 - Putting the top of the governance system as high in government structure as possible
 - Strategic intelligence needs to be vertically and horizontally distributed in order to be effective. (What you can see depends partly on where you stand)
 - Since learning is key, some continuity is needed in policy, institutions and people
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Thank you

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