

## Expert workshop

Policies supporting efficiency  
and effectiveness of R&I systems

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# Policies supporting efficiency and effectiveness of R&I systems

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A study on behalf of the  
European Commission



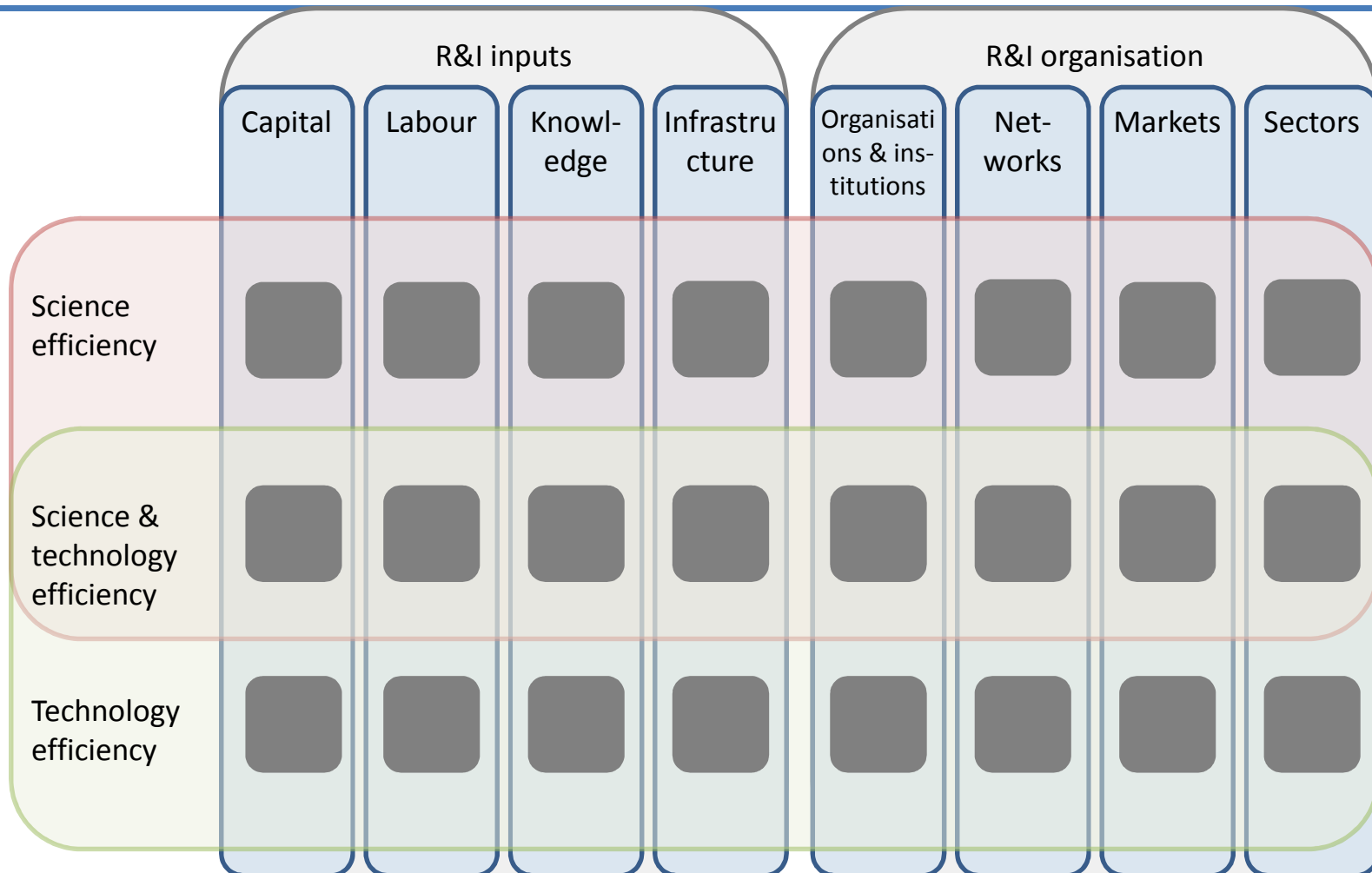
# Objectives

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- **Identification of major R&I funding strategies and R&I policy reforms and instruments**
- **Analysis of their contribution to R&I system efficiency and effectiveness**
- **Ranking according their impact on R&I system efficiency and effectiveness**

# Methodology

## Analytical framework of R&I systems



# Methodology

## Original approach

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- **Case studies of 10 selected countries (AT, BE, CH, DE, IR, IT, LT, SE, SI, UK)**
- **Review of academic literature, policy documents and evaluations**
- **Assessment of policies along four dimensions**

# Assessment of policies along four dimensions

## Consistency and coherence

Is the public intervention appropriate for the underlying problems? Are the implementation rules and requirements adequate and consistent with the goals? Is the intervention coherent and complementary to existing institutions, measures, or tasks? Are there (too) many overlaps of policy measures?

## Goal attainment and effects

Did the intervention achieve its goals? Which intended or unintended consequences has the intervention produced? Are the effects short-term or long-term? Does the intervention increase inputs to innovation and innovation outputs or does it substitute these? Does it change innovation-related behaviour?

## R&I policies

## Subsidiarity of policies

How is the relationship between function and territory, or content of policies and geographical scope? Is there a tension between national and sub-national responsibilities in R&I policy making? Are policies for international and cross-border issues coordinated internationally?

## Policy learning and dialogue

Is policy-making participatory and dialogic? Does policy learning take place? Are evolutionary variation and experimentation built into the process? Are policy evaluation and the use of intelligence part of the process? Is the introduction of new policies balanced with the removal or adaptation of existing programmes?

# Methodological problems

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- **The available literature permitted only an incomplete assessment of policies.**
- **Details on policy alternatives and impact were not included.**
  - e.g. the practice for allocating public research funds by means of institutional budgetary allocations or competitive grants, the ownership regime for academic IP, etc.
- **Time lag between policy implementation and policy impact varies across policy areas and is essentially not known.**
- **No clear patterns appeared when countries were grouped according to levels or growth of science efficiency or technology efficiency.**

# Methodology

## Modifications of the approach

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- **Review of international and comparative literature such as**
  - OECD STI Outlooks,
  - topical studies done for the EC and others**to obtain specific data at country level on selected research and innovation policies**
- **Comparison of countries along the (enhanced) IUS 2011 grouping**

# Country grouping

**Group 1: Innovation leaders**  
**Germany, Sweden, and Switzerland**  
with high knowledge intensity and low growth of science efficiency but high growth of technology efficiency

**Group 2: Innovation followers**  
**Austria, Belgium and the UK**  
with high knowledge capacity and a mixed economic structure, and low growth of science efficiency but high growth of technology efficiency

**Group 4: Moderate innovators**  
**Italy and Lithuania**  
with medium-low knowledge capacity and catch up in regard to science efficiency and technology efficiency

**Group 3: Innovation followers**  
**Ireland and Slovenia**  
with science efficiency catch up but continued gap in technology efficiency



# Results: R&I funding

**Group 1: Innovation leaders**  
**Germany, Sweden, and Switzerland**  
Strong focus on funding public R&D  
Negotiation- and contract-based university funding  
Co-funded by industry  
No tax incentives for business R&D

**Group 2: Innovation followers**  
**Austria, Belgium and the UK**  
Funding to universities  
Above average support to businesses  
Indirect funding (e.g. tax incentives)

**Group 4: Moderate innovators**  
**Italy and Lithuania**  
Shift from catch-up to consolidation and valorisation of R&D investments  
Indirect funding (e.g. tax incentives)

**Group 3: Innovation followers**  
**Ireland and Slovenia**  
Topic-orientation of research funding has grown  
Shift from catch-up to consolidation and valorisation of R&D investments  
Indirect funding (e.g. tax incentives)

# Results:

## Labour input to R&I and innovation

**Group 1: Innovation leaders**  
Germany, Sweden, and Switzerland

Securing the supply of highly qualified labour, avoiding or reducing shortages  
Raising student numbers  
Opening borders  
Developing academic career prospects  
Raising participation of women

**Group 2: Innovation followers**  
Austria, Belgium and the UK

**Group 4: Moderate innovators**  
Italy and Lithuania

Raising employability of unemployed  
Speeding up progression through higher education  
Raising completion rates and efficiency  
Less open to foreign students

**Group 3: Innovation followers**  
Ireland and Slovenia

# Results: Knowledge transfer (KT) and U/I collaboration

**Group 1: Innovation leaders**  
Germany, Sweden, and Switzerland  
Support to knowledge co-creation  
Activities to bring SMEs closer to science

**Group 2: Innovation followers**  
Austria, Belgium and the UK  
Support to knowledge co-creation  
Strong technology transfer infrastructure

**Group 4: Moderate innovators**  
Italy and Lithuania  
Academic culture creates barriers to KT

**Group 3: Innovation followers**  
Ireland and Slovenia  
Academic culture creates barriers to KT  
Strong technology transfer infrastructure (Ireland)  
Low absorptive capacity of industry (Ireland)

# Results: Organisations and institutions

**Group 1: Innovation leaders**  
Germany, Sweden, and Switzerland

Entrepreneurship:  
Barriers : cultural and social norms  
Drivers: governmental support

**Group 2: Innovation followers**  
Austria, Belgium and the UK

**Group 4: Moderate innovators**  
Italy and Lithuania  
Entrepreneurship  
Barriers: national policy regulations  
Drivers: internal market dynamics  
University autonomy  
Low academic autonomy of universities

**Group 3: Innovation followers**  
Ireland and Slovenia  
Entrepreneurship  
Barriers: national policy regulations  
Drivers: internal market dynamics

## Results: Markets

**Group 1: Innovation leaders**  
Germany, Sweden, and Switzerland

Demand-side innovation policies more advanced

**Group 2: Innovation followers**  
Austria, Belgium and the UK

**Group 4: Moderate innovators**  
Italy and Lithuania

Limited demand-side innovation policy action and discourse

**Group 3: Innovation followers**  
Ireland and Slovenia

## Conclusions on this exercise

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- **Similarities and differences between (groups of) countries exist, but cause and effect are difficult to identify**
  - Does policy drive R&I system performance or does it react to it?
- **Whether policy measures can be regarded as efficient and/or effective depends on the specific context a country's operating in.**
  - Different countries encounter different 'efficiency challenges', but they are not free of such challenges

# Annex: Framework – R&I inputs

R&I inputs				
	Capital	Labour	Knowledge	Infrastructure
Science efficiency	<ul style="list-style-type: none"> <li>• block/comp. funding</li> <li>• generic/oriented fund</li> <li>• nat./internat. funding</li> <li>• fund for basic/applied</li> <li>• HEI/PRO funding</li> <li>• geogr. open/restricted funding</li> </ul>	<ul style="list-style-type: none"> <li>• # and quality of academic personnel</li> <li>• gender balance in academia</li> <li>• inflow of foreign academics</li> </ul>	<ul style="list-style-type: none"> <li>• knowledge supply from industry</li> <li>• knowledge supply from abroad</li> </ul>	<ul style="list-style-type: none"> <li>• research infrastructures</li> </ul>
Science & technology efficiency	<ul style="list-style-type: none"> <li>• funding to public/private R&amp;D performers</li> <li>• public/private funding of public R&amp;D</li> </ul>	<ul style="list-style-type: none"> <li>• # students and graduates in tert. edu.</li> <li>• quality of tert. edu.</li> <li>• inflow of foreign students</li> <li>• gender balance of students</li> <li>• students in STI fields</li> </ul>	<ul style="list-style-type: none"> <li>• knowledge demand from industry</li> <li>• U/I collaboration</li> <li>• staff mobility &amp; migration</li> </ul>	<ul style="list-style-type: none"> <li>• ICT/e-infrastructures</li> <li>• general infrastructure (transport, electricity, etc.)</li> </ul>
Technology efficiency	<ul style="list-style-type: none"> <li>• R&amp;D/non-R&amp;D activities</li> <li>• fund by MNCS/SMEs</li> <li>• fund by nat./foreign firms</li> <li>• direct/indirect fund</li> <li>• venture capital</li> </ul>	<ul style="list-style-type: none"> <li>• qualified labour for R&amp;D&amp;I</li> <li>• vocational training &amp; further education</li> <li>• entrepreneurial education</li> </ul>	<ul style="list-style-type: none"> <li>• IP regime, owership of IP</li> <li>• knowledge &amp; technology supply from science</li> </ul>	<ul style="list-style-type: none"> <li>• entrepreneurship infrastructure, incubators</li> </ul>

# Annex: Framework – R&I organisation

R&I organisation				
	Organisations & institutions	Networks	Markets	Sectors
Science efficiency	<ul style="list-style-type: none"> <li>• national government</li> <li>• subnational governments</li> <li>• agencies</li> <li>• universities</li> </ul>	<ul style="list-style-type: none"> <li>• academic networking</li> <li>• national/international collaboration</li> </ul>		<ul style="list-style-type: none"> <li>• scientific domains</li> </ul>
Science & technology efficiency	<ul style="list-style-type: none"> <li>• intermediaries (TTOs)</li> <li>• committees, advisory bodies</li> <li>• regulations governing science, technology &amp; innovation</li> </ul>	<ul style="list-style-type: none"> <li>• clusters</li> </ul>	<ul style="list-style-type: none"> <li>• knowledge demand from industry</li> <li>• purchase of scientific expertise (= private funding of public R&amp;D)</li> <li>• knowledge markets &amp; platforms</li> </ul>	
Technology efficiency	<ul style="list-style-type: none"> <li>• new companies, entrepreneurship</li> <li>• corporate governance (contributions of shareholders, managers, other stakeholders)</li> </ul>	<ul style="list-style-type: none"> <li>• industry networking</li> <li>• national/international collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• size of product markets</li> <li>• market openness, comp</li> <li>• international demand, FDI abroad</li> <li>• public procurement and other demand-side policies</li> </ul>	<ul style="list-style-type: none"> <li>• technology intensity (high tech, medium-tech, low-tech)</li> </ul>