The OECD Innovation Strategy

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Budapest, Hungary

- Ministerial Mandate from May 2007
- Growing recognition that innovation:
  - is a key driver of growth and helps address critical global challenges
  - changes and evolves rapidly, engaging new models, players, and geographies
  - challenges governments to understand the role of policy within a dynamic, multi-player system

The rationale

- Government support for innovation needs to adapt to a borderless world of science and research and evolving innovation processes
- Policymakers need tools to accurately measure innovation's impact on growth and social well-being
- If government policies to promote innovation are narrow and uncoordinated, they may conflict with each other and fail.

The main components

1. The changing nature of innovation:
   Shift toward openness, networking and cooperation
2. Human capital: Building skills for entrepreneurship and innovation across society, including non-technical workers
3. Markets and governance
4. The global dimensions of innovation:
   Wielding innovation to solve global problems
5. Measurement:
   Identifying gaps and developing new metrics

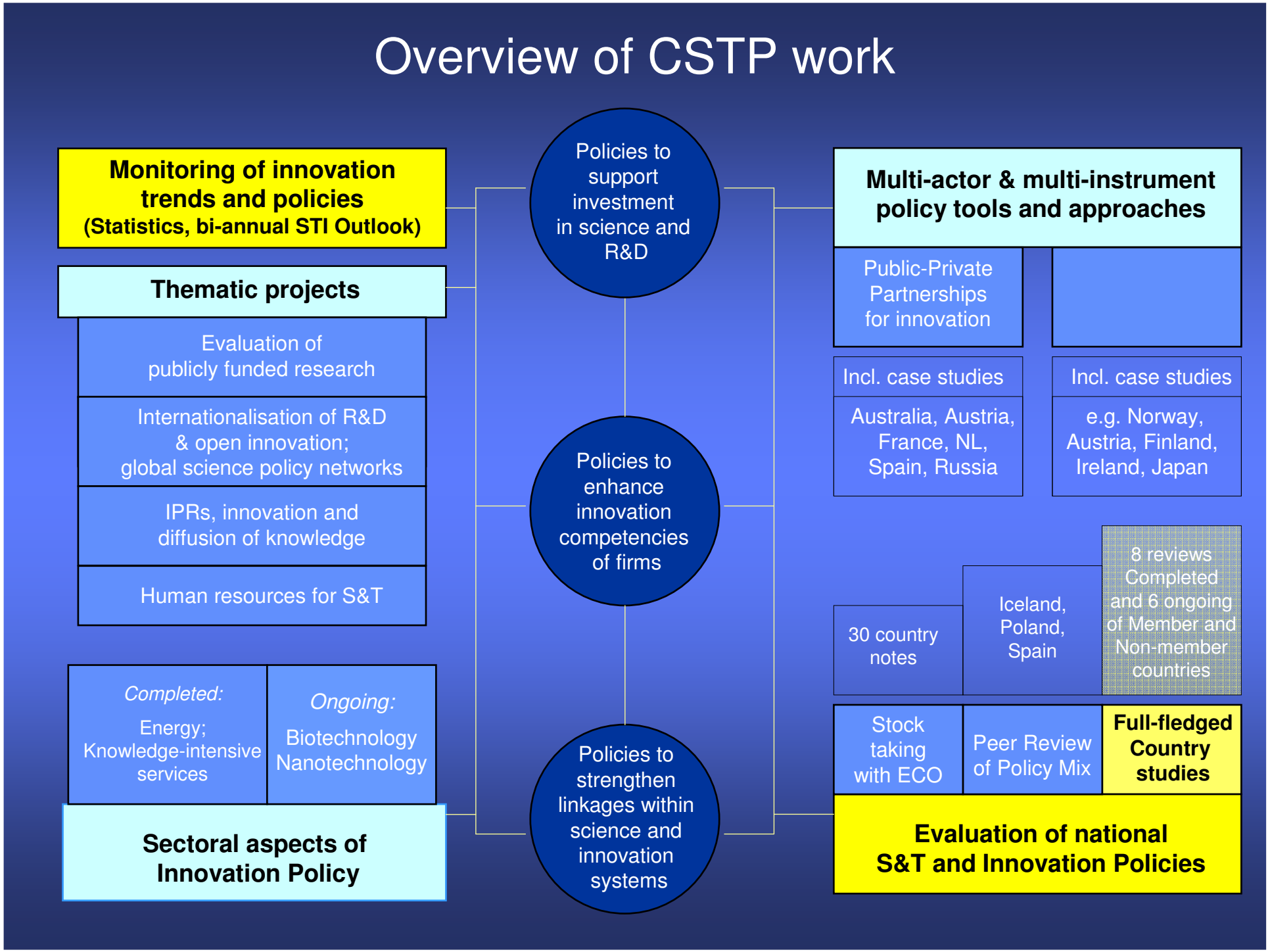
Expected outputs

- A major report providing a whole-of-government approach to promote, measure and evaluate innovation performance
- A new OECD Innovation Scoreboard that provides tools for national comparisons.
- A series of reports that examine how innovation systems are changing as a result of new business models, the rapid spread of the Internet and globalization.

Who is engaging?

- OECD Committees on science and technology (CSTP), education, investment, business development, tax, trade, environment, health and others.
- External actors including industry, investors, consumers and employers.
- The combination will enable a whole-of-government view and system-level perspective

Overview of CSTP work



Monitoring innovation trends and policies

Available on
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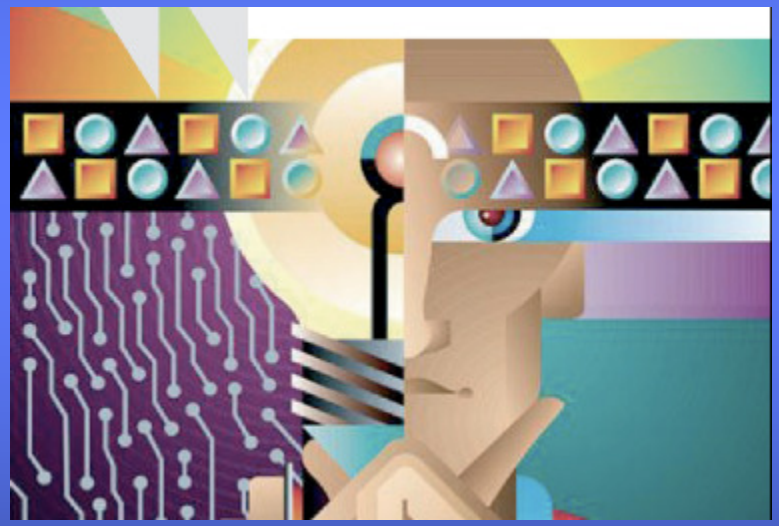
OECD Innovation Reviews

HUNGARY

Overall assessment and recommendations



Jean Guinet
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Outline

- Introduction: Context, nature and process of the Review
- Innovation and economic performance:
  - ✓ Lessons from OECD work -- implications for Hungary
- Hungary's innovation system
  - ✓ Overall performance: some international benchmarks
  - ✓ Distinguishing features
  - ✓ Strengths and weaknesses
- Policy recommendations
  - ✓ Strategic goals
  - ✓ Specific recommendations

Context and nature of the Review

- This Review has been undertaken as part of a programme implemented under the aegis of the OECD Committee of Scientific and Technological Policy (CSTP). Other countries having requested a review include:
  - Luxembourg, Switzerland, South Africa, New Zealand, Chile, China, Norway (already published); Korea, Mexico, Greece (close to completion)
  - Turkey, Russia (under launch); Brazil, Japan, Italy (under discussion)
- It is an *independent* assessment. Its conclusions are therefore of the sole responsibility of OECD
- It focuses on the role of government in promoting innovation. It formulates a set of policy recommendations but does not attempt detailed policy design
- It builds on recent OECD work, especially on the links between innovation and economic performance, and on best practice policies to foster innovation
  - It expands and deepens the analysis of one chapter of the OECD report "*Reforms for Stability and Sustainable Growth – an OECD perspective on Hungary* " which was published earlier this year

The Review process

- The preparation of the Review involved:
  - Agreement on Terms of Reference
  - Preparation of a Background Report by a team of experts commissioned by the Hungarian government.
  - Interviews with key stakeholders in Hungary by the OECD Review team
  - Preparation of a draft report by the OECD Secretariat
  - Consultations of Hungarian authorities on the draft report
- It benefited from a strong support by the Hungarian government, especially the National Office for Research & Technology (NKTH)

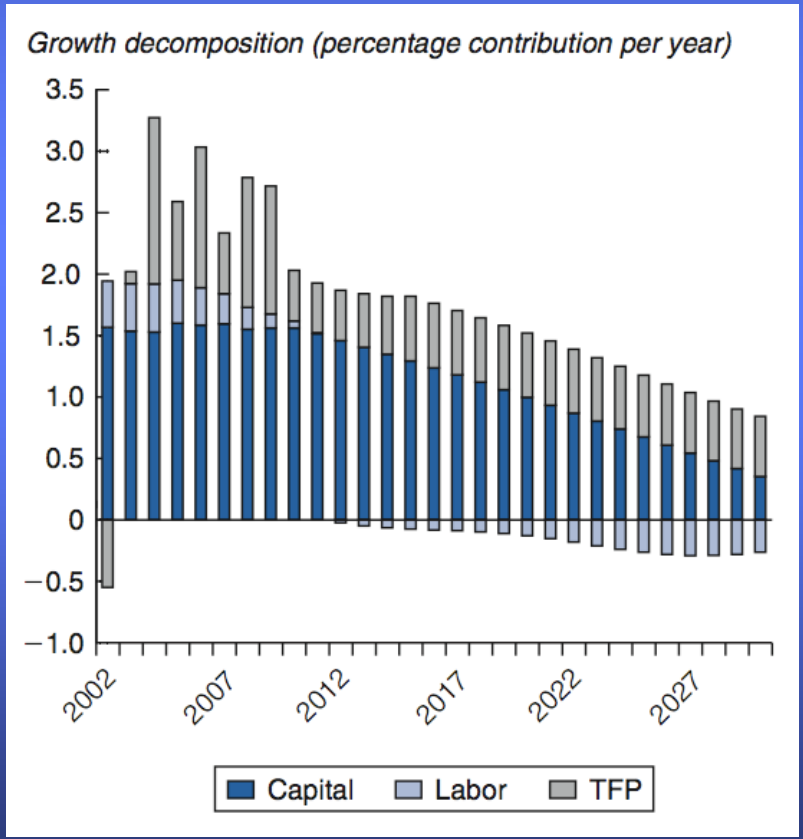
Innovation-led economic growth

Some lessons from OECD work

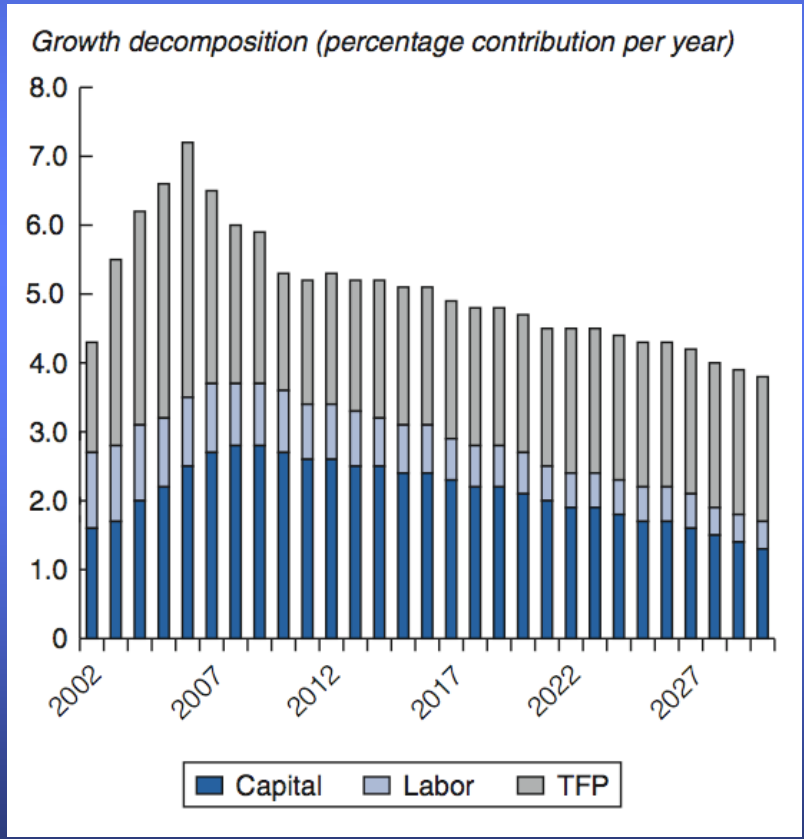
Innovation capabilities condition more than ever long-term growth potential

Contribution of Total Factor Productivity (TFP) to economic growth

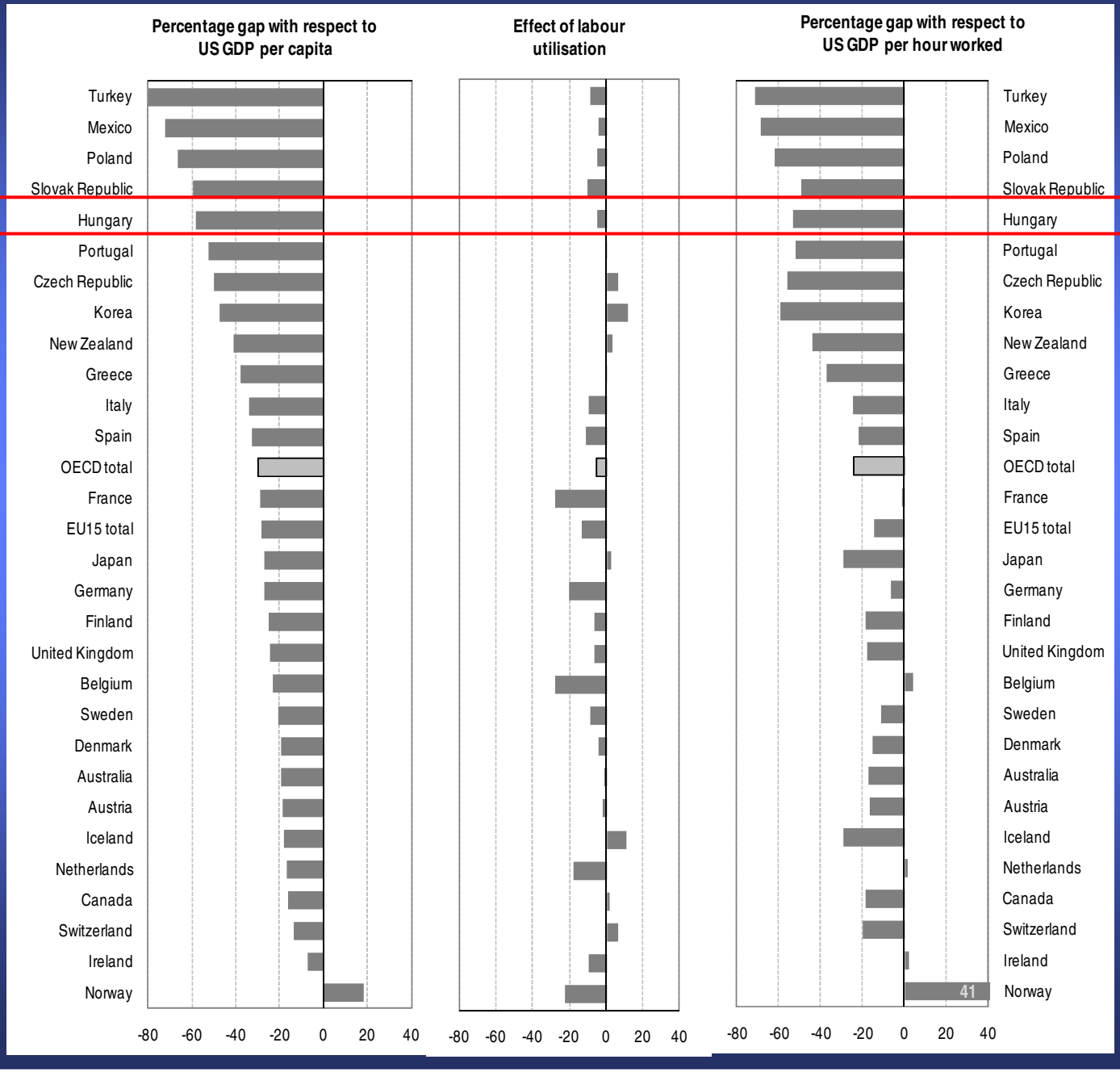
Developed countries



Developing countries

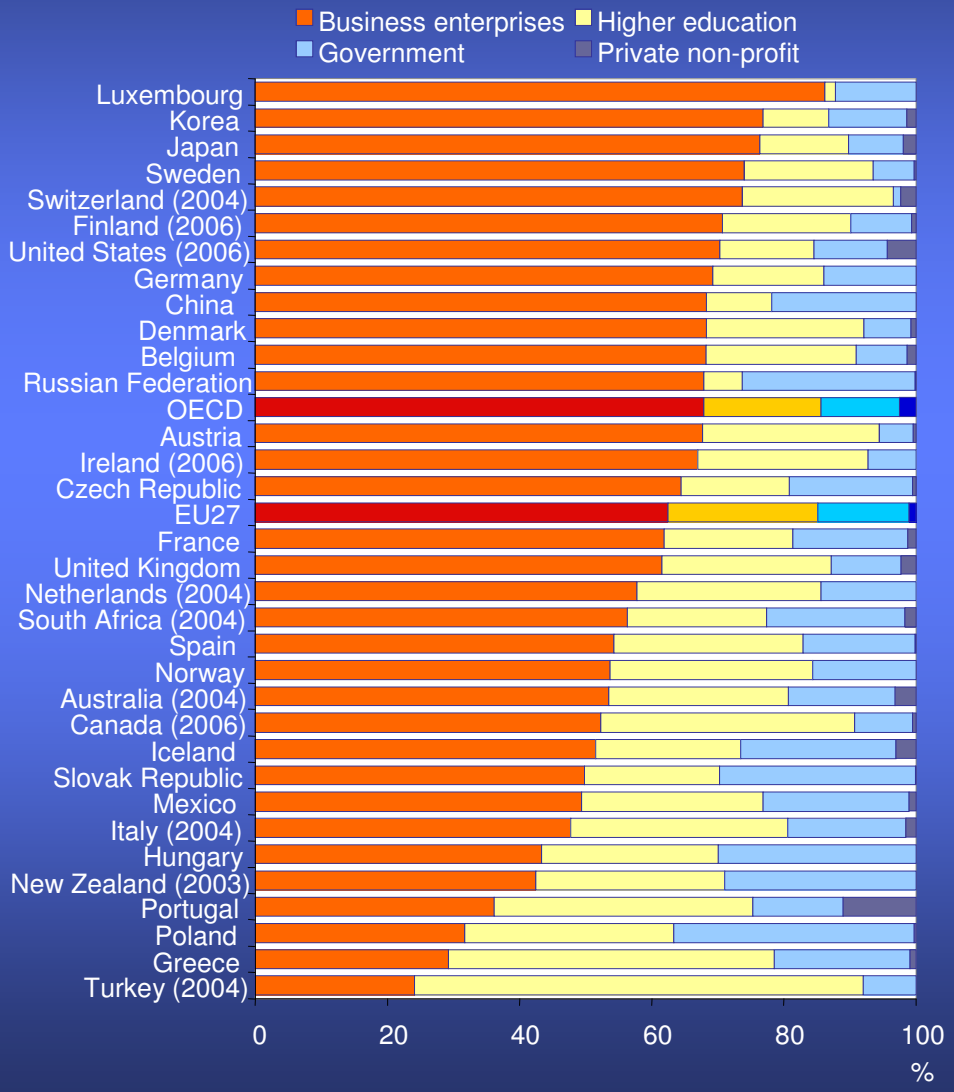


Income and productivity levels, 2006

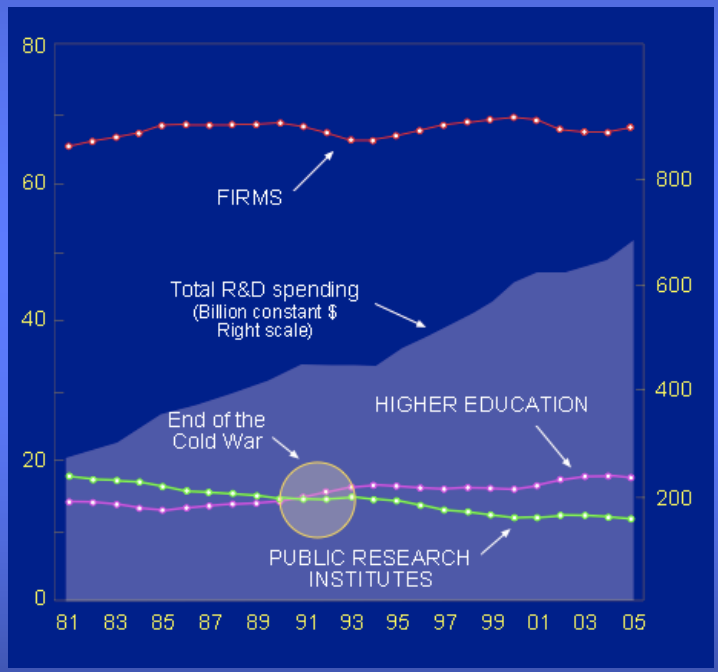


High performing innovation systems are firm-centered

Share of main actors in R&D performance, 2005



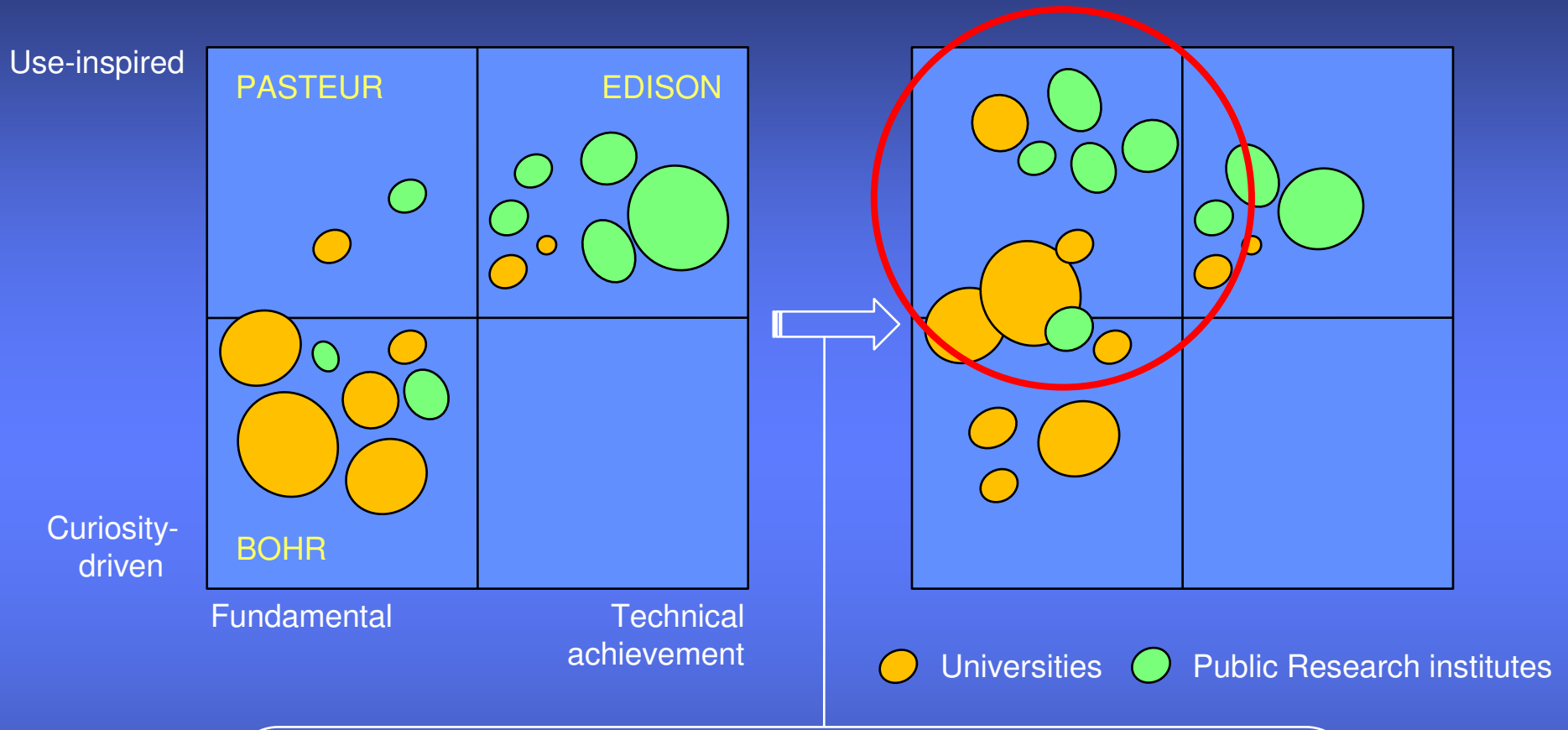
Share of main actors in R&D performance, OECD total, 1981-2005



Public research retains a key role, and free riding is not an option …

- Basic *vs* applied research is an obsolete dichotomy. Borderlines become increasingly blurred, making the quality of industry-science (public research) linkages more important for economic performance. This is true for the three types of public research
  - Long term "public good" research (environment, health, security, etc.)
  - curiosity-driven research (serendipity and contribution to education)
  - economically-relevant research
- Increasing scientific content of innovation
  - Growing importance of science-based technologies (electronics, new materials, biotechnology, nanotechnology, advanced analytical and measurement methods)
  - ICTs have enhanced the role of codified knowledge which has resulted in a move away from craft-based technology to technology based on more formal bodies of knowledge (including science) in many traditional engineering sectors
- Changes in business R&D strategies: "Open Innovation"
  - Focus on core business and short to medium term research agenda
  - Individual products and processes incorporate an increasing range of technologies
  - Growing need for knowledge from outside the firm, including public research

… but public research orientations must change

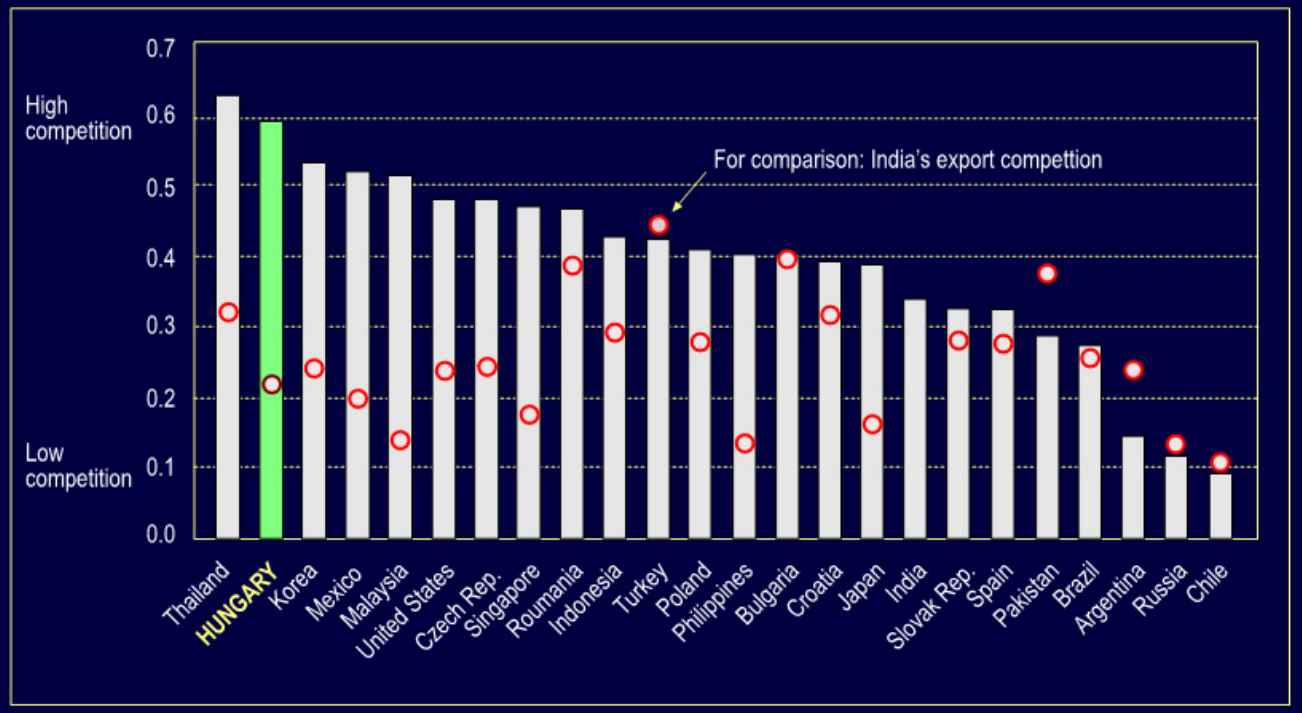


- Large-scale national programmes in priority areas (top down)
- Public-private partnerships (bottom-up)
- Better recognition of user-driven research in evaluation
- Improve HRST mobility

The agenda for leading and catching-up countries is converging

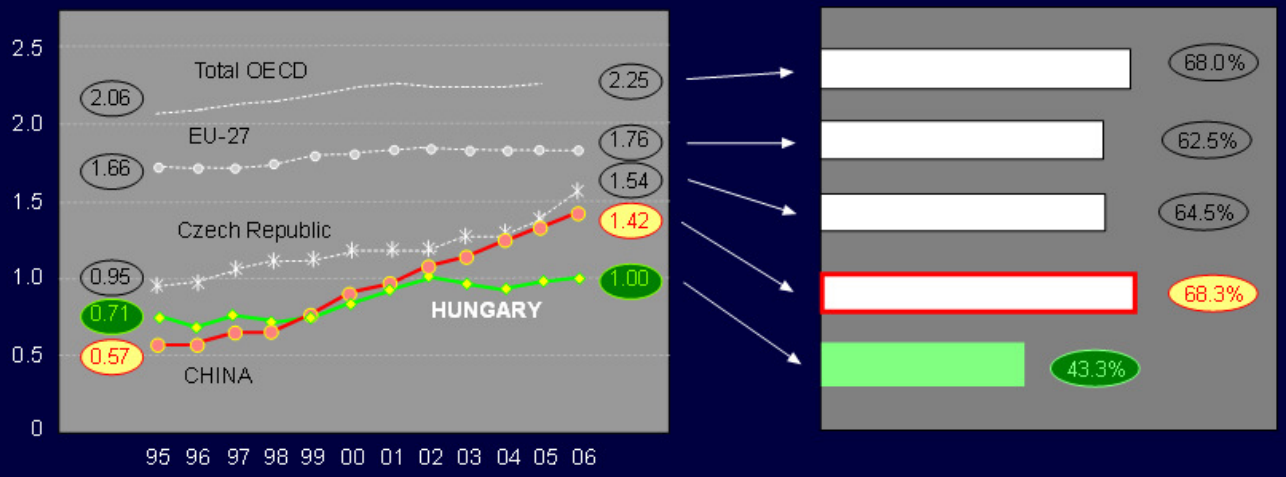
- **The idea of a trade-off between diffusion and creation of technology is misleading**
  - **The idea that countries need to "exhaust" their potential for catching up before entering "own" R&D activities is unhelpful for several reasons: own R&D enhances the efficiency of absorbing technology from abroad; the set of comparative advantage can be broadened to more knowledge-based production**
- The Knowledge-Based Economy is to some extent a self-fulfilling prophecy
  - Firms' evolving strategies drive structural changes globally but convergent government responses might also change the nature of competitive games, accentuating the role of science-based innovation
  - An ever growing number of developed countries adopt more articulated and ambitious innovation strategies (Lisbon strategy in the EU, US - competitiveness agenda; Japan - Innovation 25, Australia - Backing Australia's ability, UK, Finland, Germany, France, etc.)
  - But the most striking phenomenon is the commitment to science, technology and innovation of emerging economies, especially India and China

Export competition from China



Note: Measured by average coefficients of specialisation and coefficients of conformity.
Source: Latin American Economic Outlook 2008, OECD (2007).

R&D intensity (% of GDP)



% share of R&D performed in the business sector

Hungary’s innovation system

Overall performance
Distinguishing features
Strengths and weaknesses

Innovation performance

- Some forms of innovation have played an important role in explaining the robust growth of total factor productivity since the 1990s
  - These include the adoption of market institutions and related firm-level organisational change, as well as the importation, through foreign direct investment (FDI), of best production and marketing practices
- However, at this stage, Hungary's ability to make sustained improvement of productivity based on own innovations appears too limited
  - Many of the standard innovation performance indicators confirm that the overall level of innovation activity is low and innovation based on research and development (R&D) even weaker, by international standards

Hungarian rankings in international comparisons

Indicator	Year	Hungary's ranking among	
		OECD	OECD CEECs[1]
		Ranking/number of countries	
Business R&D intensity	2005	24/30	2/4
R&D personnel (per 1000 employment)	2006	24/29	3/4
Firms collaborating in innovation activities	2002-2004	21/26 (all firms) 23/26 (SMEs)	4/4
Triadic patent families	2005	22/27	2/4[2]
Scientific articles	2003	25/30	3/6[3]
Business use of Internet and websites	2006	28/28	4/4
Broadband penetration	2006	23/28	2/4
Broadband prices	2006	4/29	1/4

1. OECD CEECs (central and eastern European countries) include the Czech Republic, Hungary, Poland and the Slovak Republic.
2. Includes Slovenia but not the Slovak Republic.
3. Also includes Romania and Slovenia.

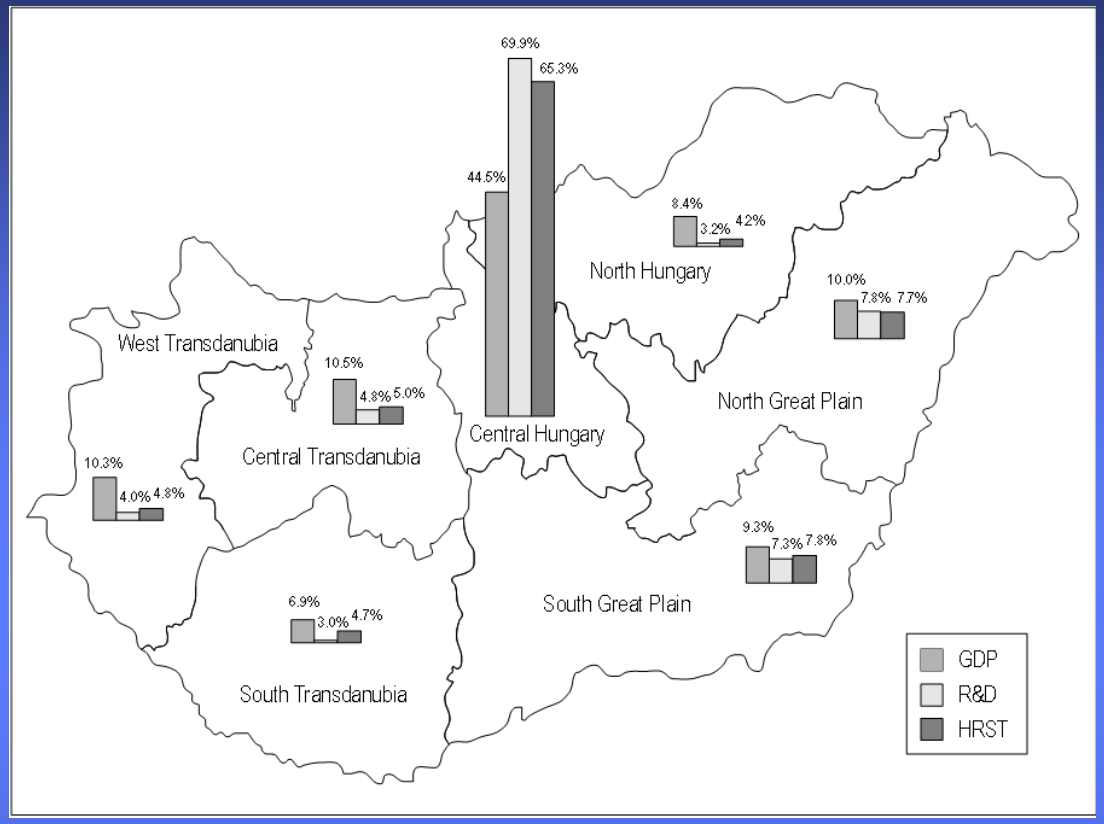
Total and business R&D intensity (% GDP), 2006

Country	R&D intensity	Business R&D intensity
Czech Republic	1.54	1.02
Hungary	**1.00**	**0.48**
Poland	0.56	0.18
Romania	0.45	0.22
Slovak Republic	0.49	0.21
Slovenia	1.59	0.96
Austria	2.45	1.66
OECD average	2.26	1.56
EU15	1.88	1.20
EU27	1.76	1.11
China	1.42	1.01
Chinese Taipei	2.58	1.74
Israel	4.65	3.64
Russian Federation	1.08	0.72
Singapore	2.31	1.52
South Africa	0.92	0.53

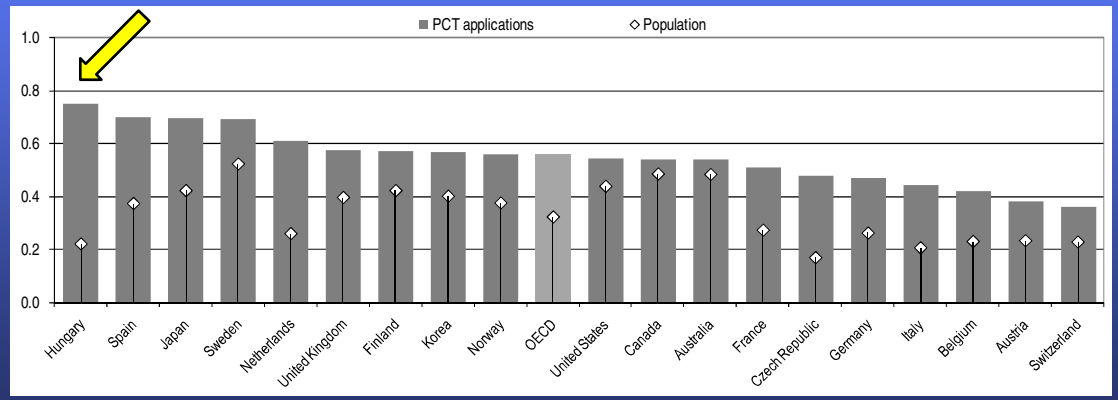
Distinguishing features

- Hungary's innovation system now encompasses all constitutional elements of what is commonly conceived as a fully fledged innovation system, notably:
  - Sizeable business R&D activities
  - Public research organisations
  - Intermediaries for technology transfer (e.g. "co-operative research centres" and "knowledge centres")
  - Government programmes to promote private and public R&D and innovation
- But, compared to countries with similar level of development, it exhibits some enduring specificities, notably:
  - The very high share of foreign firms in business R&D (the largest among OECD countries after Ireland)
  - The central role of the Academy of Sciences within public research
  - An exceptionally high regional concentration of R&D and innovation activities 

The concentration of activities in Central Hungary is even higher for R&D than for GDP



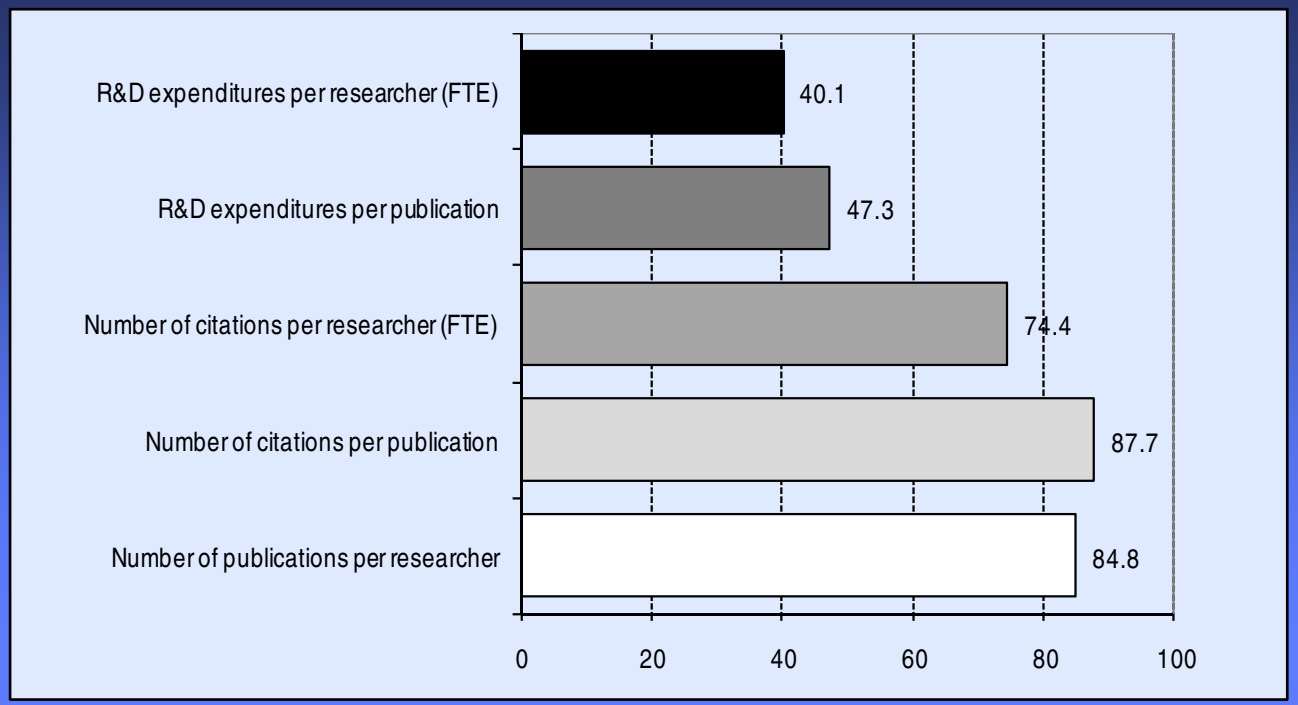
Measured for PCT patents, geographic concentration of innovation activities is exceptionally high by international standards



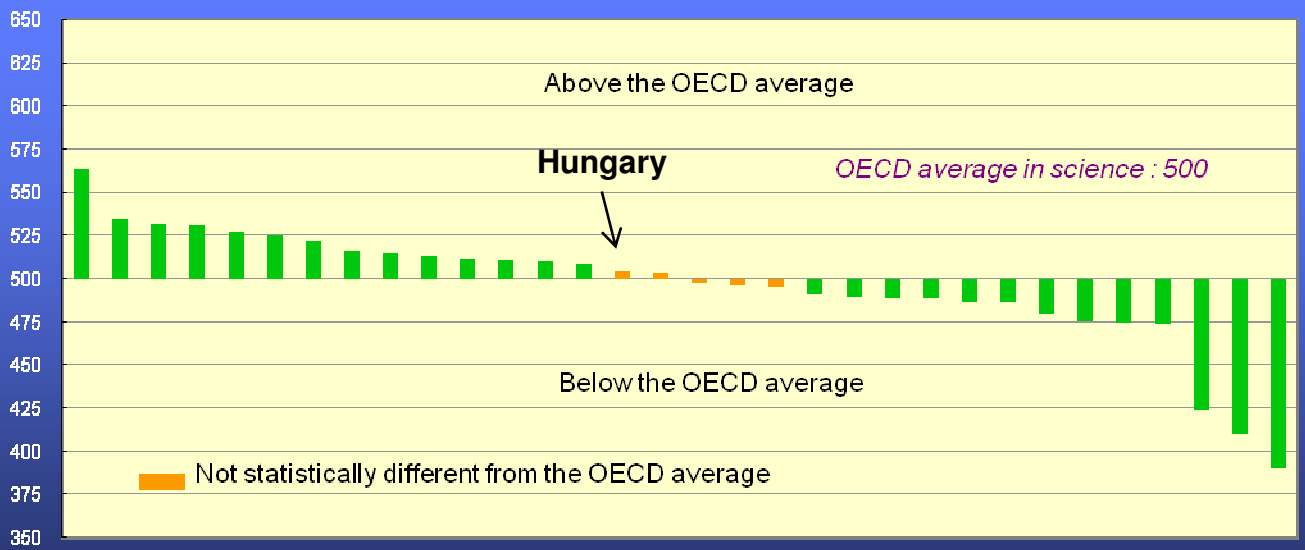
MAIN STRENGTHS AND WEAKNESSES

+	-
• High degree of international openess	• Low level of investment in R&D, especially in the business sector
• Generally well-skilled labour force	• Dual economy, with a weak, non innovation-oriented SME sector ★
• Growing manufacturing base and areas of strengths in industrial innovation	• Poor linkages among actors in the innovation system ★
• Solid tradition and poles of excellence in scientific research ☆	• Lack of R&D management capabilities in public research institution
• High participation in European research programmes	• Shortfall in the formation of human resources for science and technology
• Sound legal basis for STI policy	• Unstable public governance
• A rather complete policy tool kit for supporting investment in science and technology (e.g. Research and Technological Innovation Fund, Zoltan Bay Foundation) ☆	• “Manufacturing myopia” of innovation policy
	• Weak evaluation culture

The relative performance of Hungarian science is good (EU15 = 100, 2004)

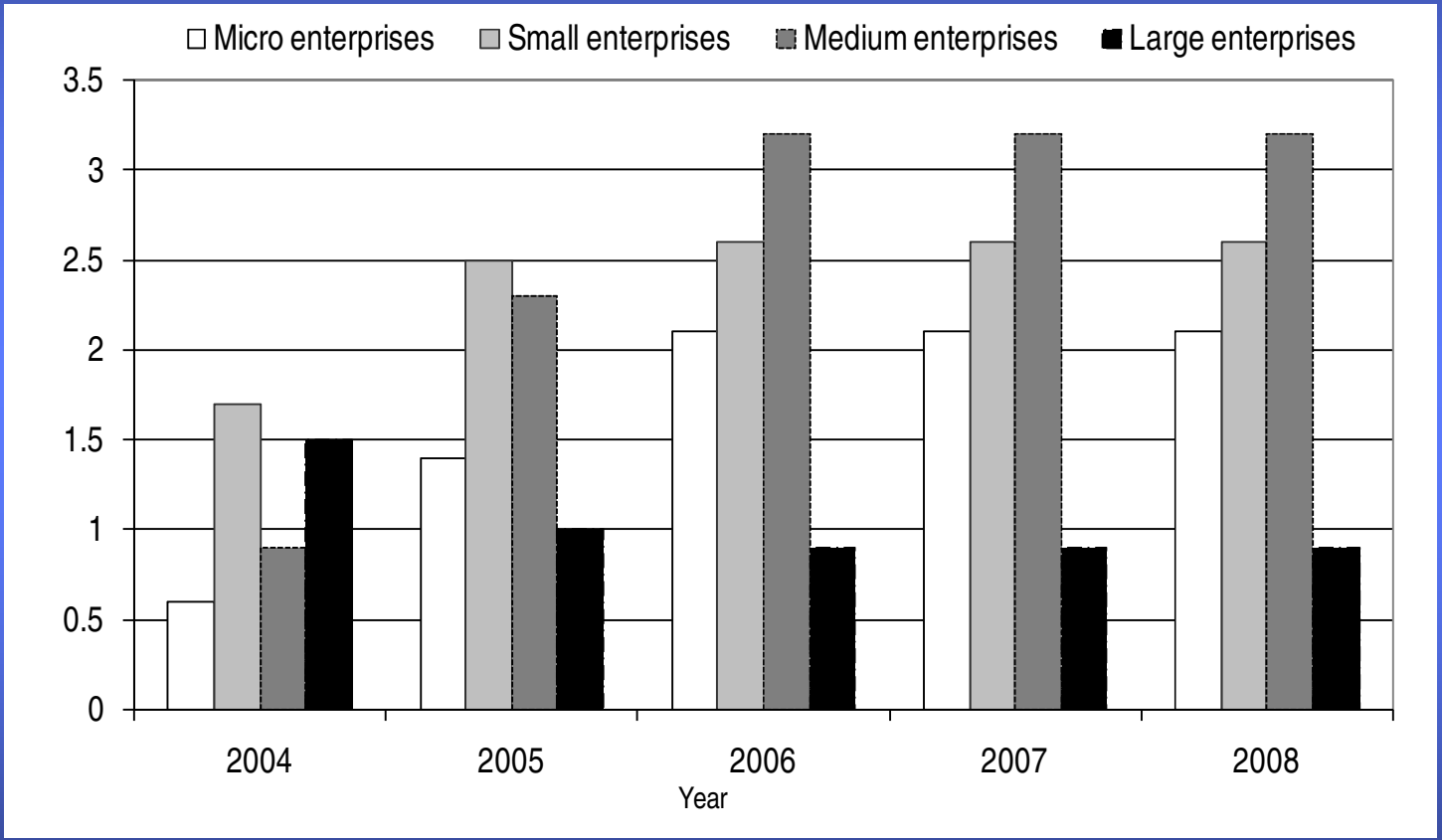


Performance of students in science is average, i.e. above a number of other OECD countries (OECD PISA, 2006)



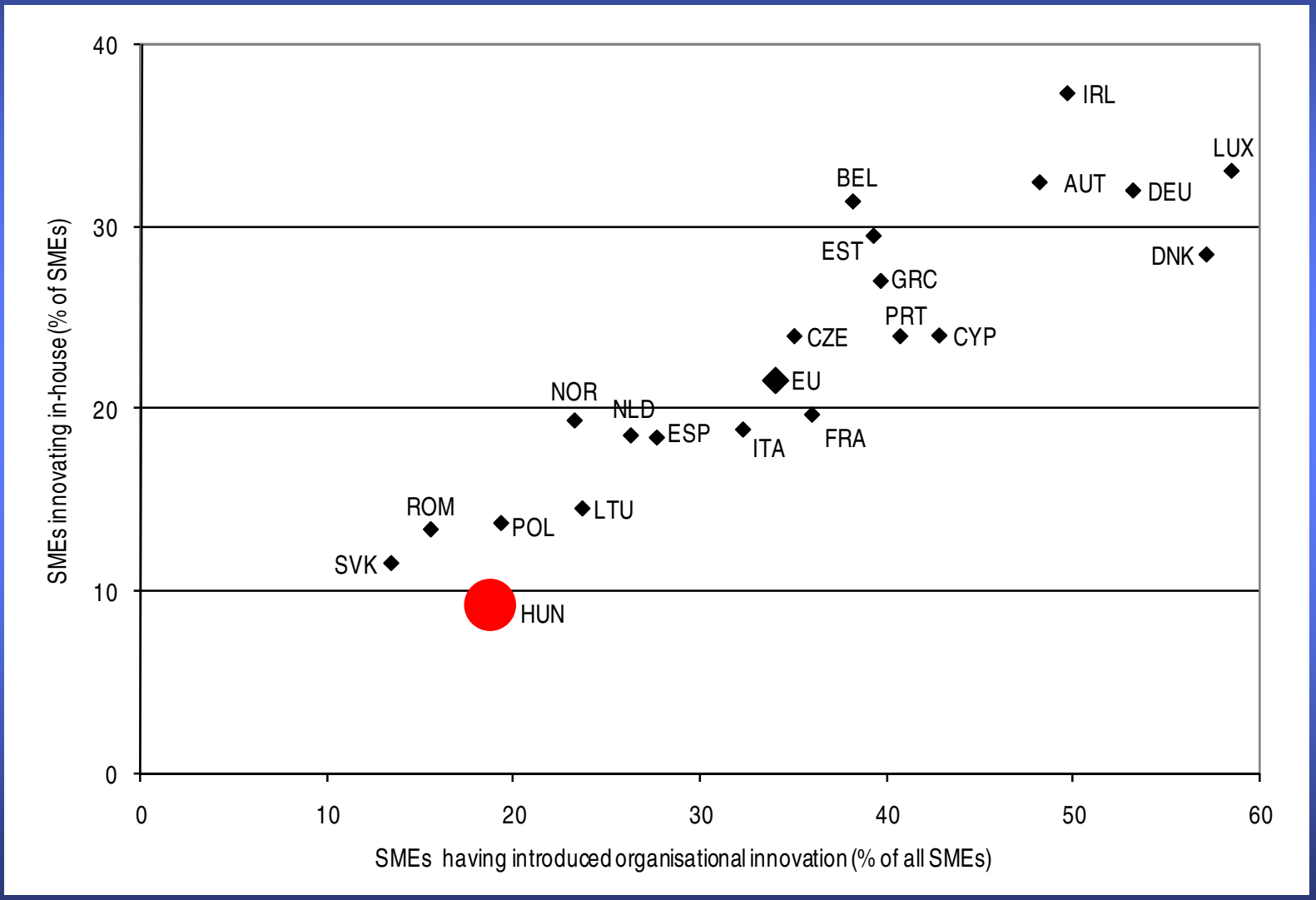
Promising trends of Innovation Fund's support

Support by firm size (billion HUF)



A very low level of innovation activities within SMEs

In-house and organisational innovation at SMEs in the EU

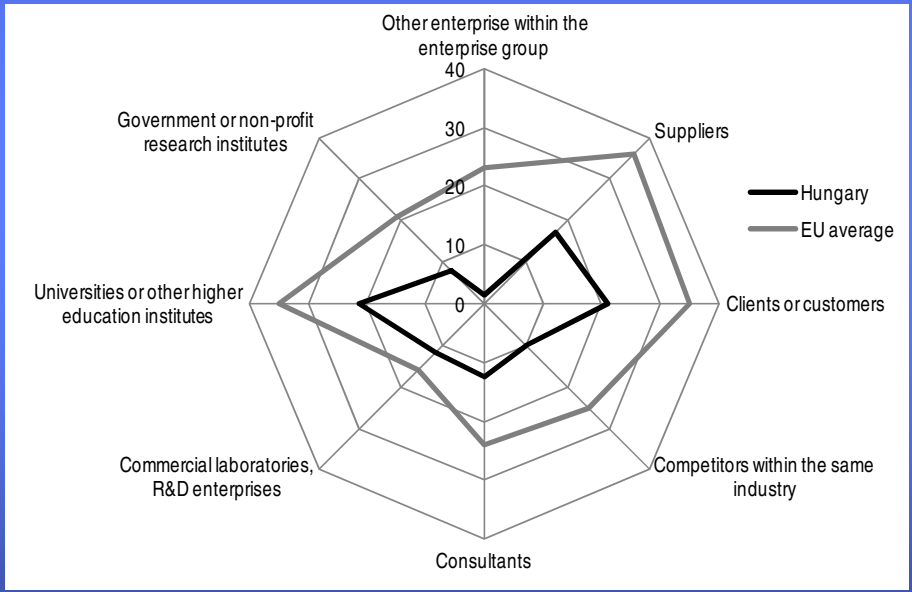


Source: EU Innovation Scoreboard 2007.

A weakly linked innovation system

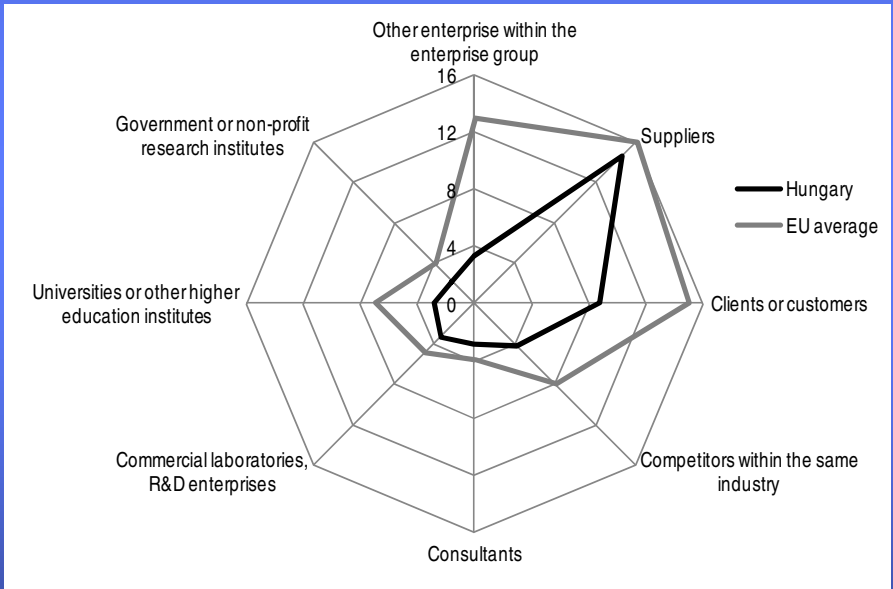
Nationally …

Firms collaborating on innovation with national partners as a percentage of all firms*
Hungary vs. EU average, 2002-04



… and internationally

Firms collaborating on innovation with partners in EU15 as a percentage of all firms*
Hungary vs. EU average, 2002-04



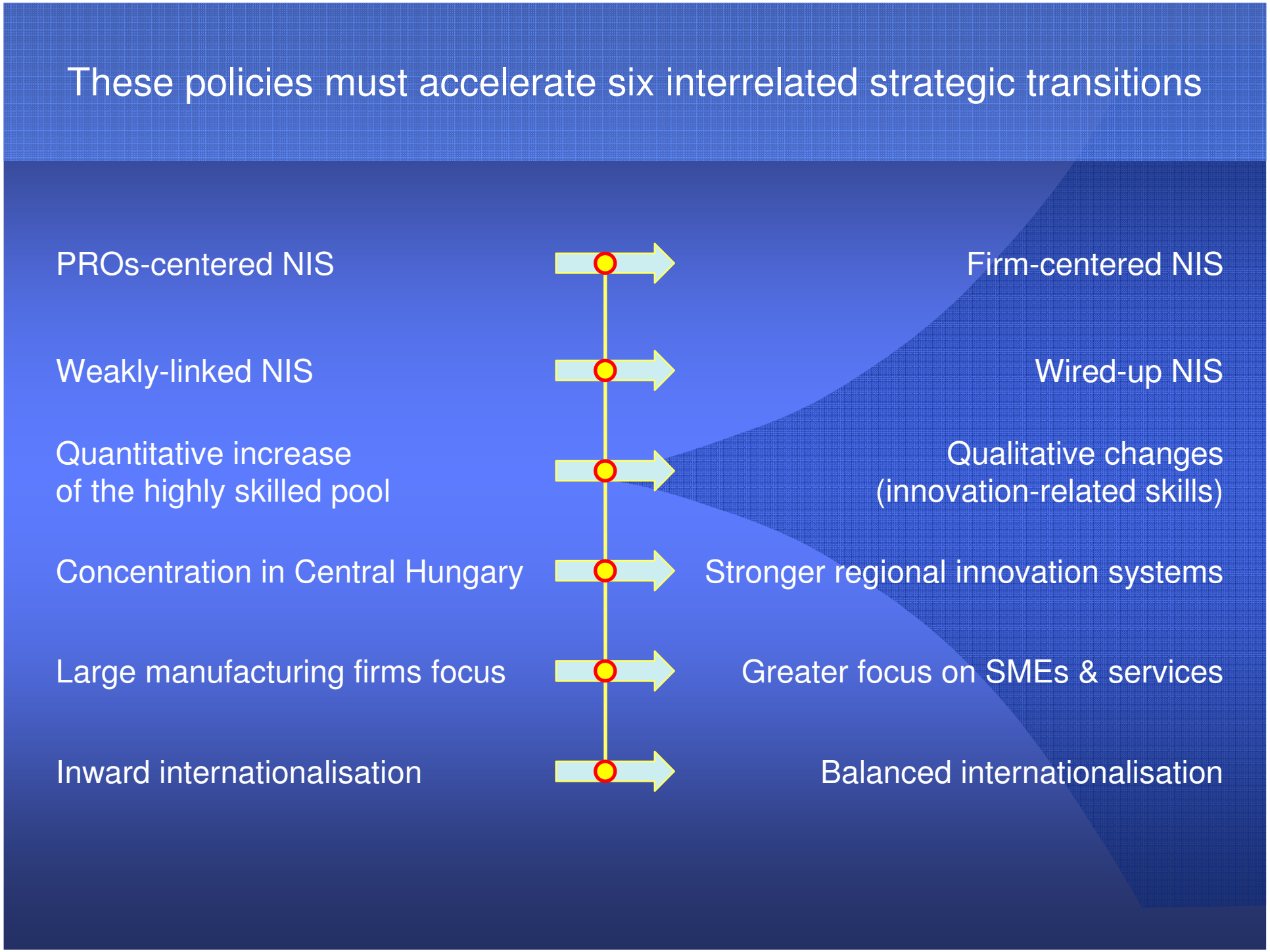
* Innovative firms with more than 10 employees.
Source: Compiled by Balázs Borsi for A. Havas (2004).

Policy recommendations

Strategic tasks

- To further catch-up in terms of income and technological capacities vis-à-vis the most advanced countries while coping with growing competition from emerging countries, Hungary needs to improve the adaptive efficiency of its innovation system (NIS)
- Adaptive efficiency of the NIS is determined in particular by:
  - The framework conditions for innovation *(not analysed in this Review)*
    - *Competition* which strengthens the incentives of firms to innovate
    - *Openness*: A low level of restrictions on foreign direct investment and openness to foreign talent improves cross-border knowledge transfers
    - *Stable macroeconomic conditions* help to encourage the growth of innovation activity.
    - *The availability of internal and external finance*
    - *Intellectual property rights* provide important incentives to innovate
    - Good conditions for new innovative firms and *entrepreneurship* are important as these help bring new ideas to the market.
  - Specific S&T and Innovation Policies

These policies must accelerate six interrelated strategic transitions



Specific recommendations

Improving overall governance

- Stability
  - Ensure a minimum of institutional stability in formulating and implementing STI policy
- Leadership
  - Permanently upgrade the representation of STI policy to the highest level of government in order to secure policy attention and commitment
  - Commitment
  - Safeguard public funding for STI against “crowding out” by short term demands
  - Leverage EU funding and make sure it does not substitute for national budgetary effort
  - Coordination and participatory governance
  - Ensure an effective policy coordination and stakeholders’ participation through renewed Science and Technology Policy Council and Science, Technology and Competitiveness Advisory Board
  - Evidence-based policy
  - Strengthen evaluation procedures and build up relevant competences in all institutions involved in policy making and implementation
  - Increase the participation of international experts in evaluations

Improving the policy mix

- Avoid the proliferation of instruments
  - Increased EU funding should not result into a fragmentation of an already well differentiated toolkit
- Evaluate the current policy mix along several dimensions
  - Direct versus indirect support; balance of support for different types of firms; impact of public support and incentives structures on the orientations of public research
  - Strike a better balance between supply-side and demand-side measures
  - The new technology platforms and other forms of public-private partnerships can be used to better align innovation capacities with demand
  - Review procurement policy with a view to ensure that it is conducive to innovation

Developing the human resource base for STI

- Strengthen education in mathematics, technology and science in the primary and secondary schools
- Consider further measures to increase the share of S&E graduates
- Encourage universities to focus more on the quality of education and graduates through changes in funding and accreditation criteria
- Reinforce the mechanisms through which the business sector can help adjust curricula to evolving needs

Promoting innovation in the business sector

- Put more emphasis on measures to reinforce the innovation capabilities of SMEs
- Facilitate the participation of SMEs to innovation networks
- Ensure that the support system, including the innovation fund, is well adapted to the specific needs of the services sector
- Continue strengthening the regional dimension of STI policy, notably with a view to better “embed” MNEs into the innovation system
- Combine bottom-up measures (e.g. “cluster-based policies” and top-down policies (e.g. strengthening local knowledge infrastructures)
- Foster the diffusion of new technologies, especially ICTs
- Ensure that programmes to foster industry-science relationships does not encourage mainly projects that are university-driven
- Assess the effectiveness of technology transfer organisations at universities against international good practice

Fostering excellence and relevance in public research

- Better link funding to performance in order to ensure critical mass and reinforce centres of excellence with international visibility
- Continue to reform the governance structure of the Academy of Sciences with a view to :
  - allow for a more strategic approach to managing its portfolio of institutes
  - increase its responsiveness to new research opportunities
  - increase its attractiveness for talented young researchers
- Increase competitive funding for basic research
  - Competitive funding through OTKA ought to be stepped up considerably ..
  - … but the selection process for funding research projects must be improved, including through greater involvement of international peer reviewers

Maximizing the benefits from the internationalisation of R&D

- Continue to help Hungarian researchers to access international networks and international research infrastructures
- Support an active outward strategy in Hungarian firms, beyond export promotion (e.g. a presence in innovation hot spots in advanced and emerging countries)
- Take a global approach to international co-operation

Thank you for your attention

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Web Resource:

www.oecd.org/sti/innovation/reviews