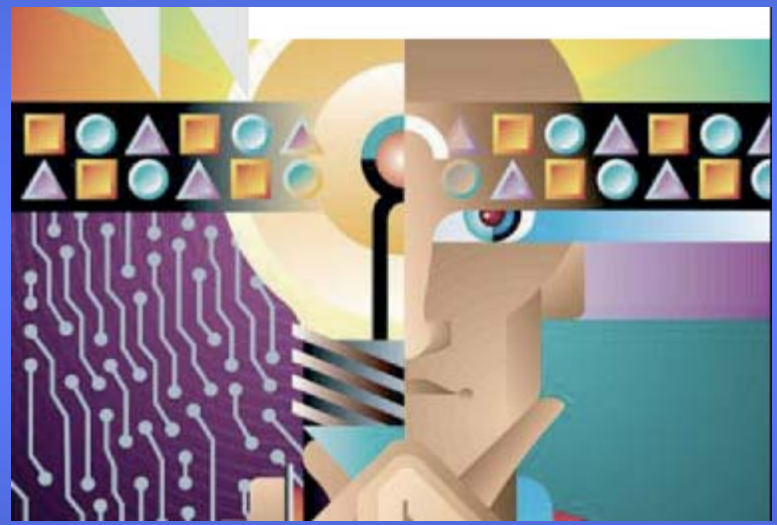
OECD Innovation Reviews

MEXICO

Overall assessment and recommendations



Jean Guinet, Head, Country Review Unit, OECD Directorate for Science, Technology and Industry

Daniel Malkin, Consultant to the OECD

"Innovación para la Competitividad en Mexico", Mexico City, 12-13 January 2009

Outline

- Introduction: Context, nature and process of the Review
- Innovation and economic performance: Diagnostic on Mexico
- Mexico's innovation system: a SWOT analysis
- Boosting innovation in Mexico: Policy recommendations

Context and nature of the Review

- Following a request from Mexico, this Review has been undertaken as part of a programme implemented under the aegis of the OECD Committee of Scientific and Technological Policy (CSTP)
- It is an independent assessment. Its conclusions are therefore of the sole responsibility of the OECD
- It focuses on the role of government in promoting innovation, with a special emphasis on science and technology policies. It formulates a set of 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

Current status

- Completed and published:

  Luxembourg, Switzerland, New Zealand, South Africa, Chile, China, Norway, Hungary

- To be completed early 2009:

  Korea, Mexico, Greece

- Under launch:

  Russia, Turkey

- Requested or under discussion:

  Japan, Brazil, Italy, etc.

- The reviews already cover a wide range of countries, including non-member economies, high and middle-income countries, which should allow to draw some general lessons – a Synthesis Report is under preparation

The Review process

- The preparation of the Review involved:
  - Agreement on Terms of Reference
  - Preparation of a Background Report by a team of Mexican experts commissioned by Conacyt
  - Interviews with key stakeholders in Mexico by the OECD Review team
  - Preparation of a draft report by the OECD
  - Several rounds of consultations of Mexican authorities on the draft report
  - Presentations of the Overall Assessment and Recommendations by Angel Gurria, OECD Secretary General, to the General Council of Scientific Research and Technological Development (26 September 2008)
- It benefited from a strong support by the Mexican government, especially Conacyt
- The next and final step will the publication by the OECD of the full report (March 2009)

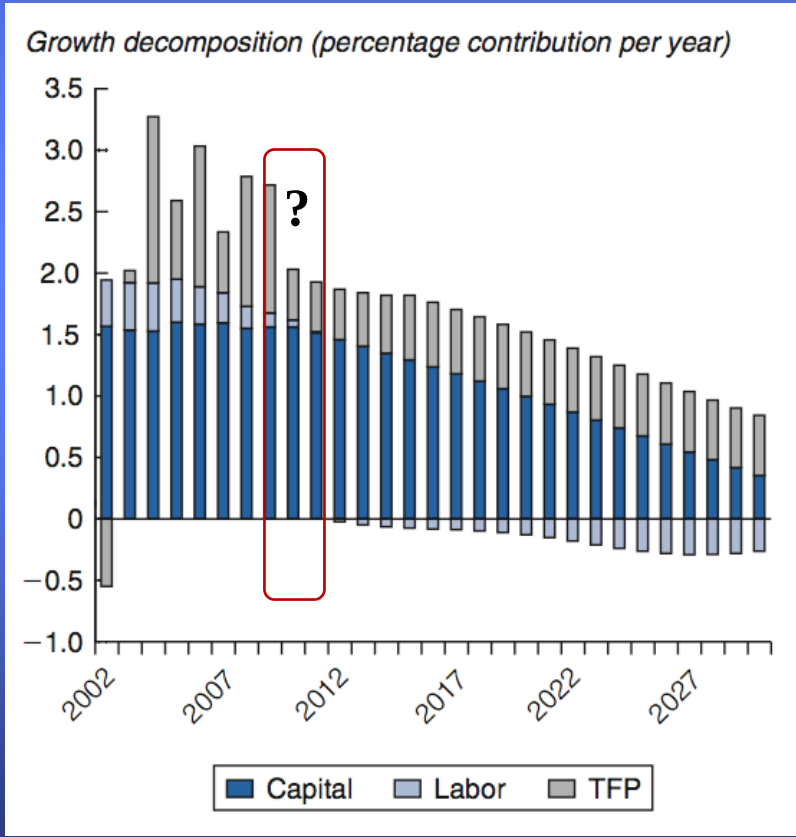
Innovation and economic performance

Diagnostic on Mexico

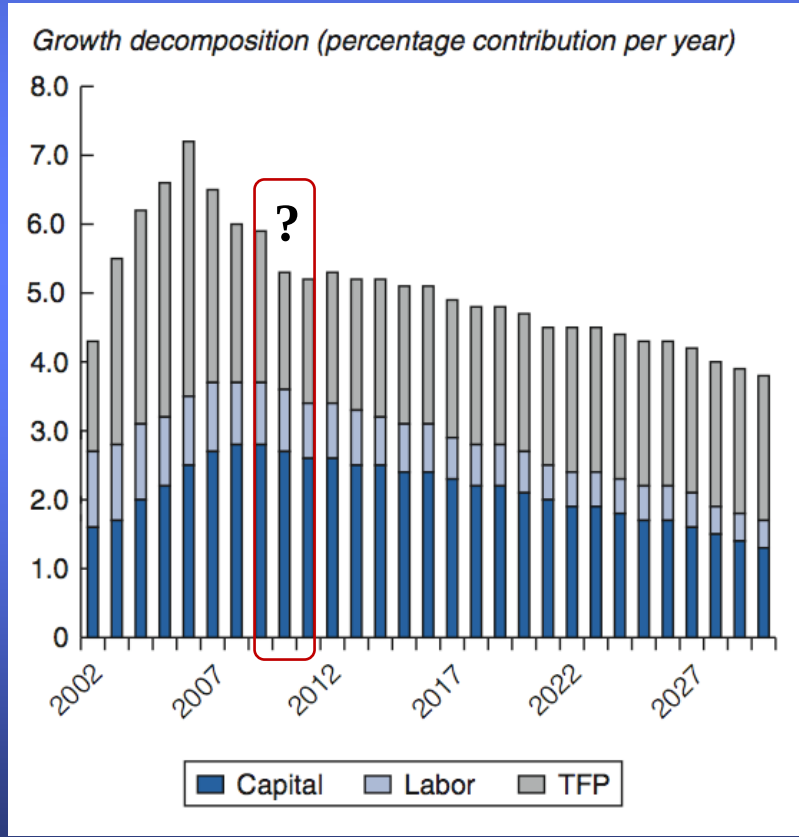
Innovation capabilities condition more than ever long-term growth potential

Contribution of Total Factor Productivity (TFP) to economic growth

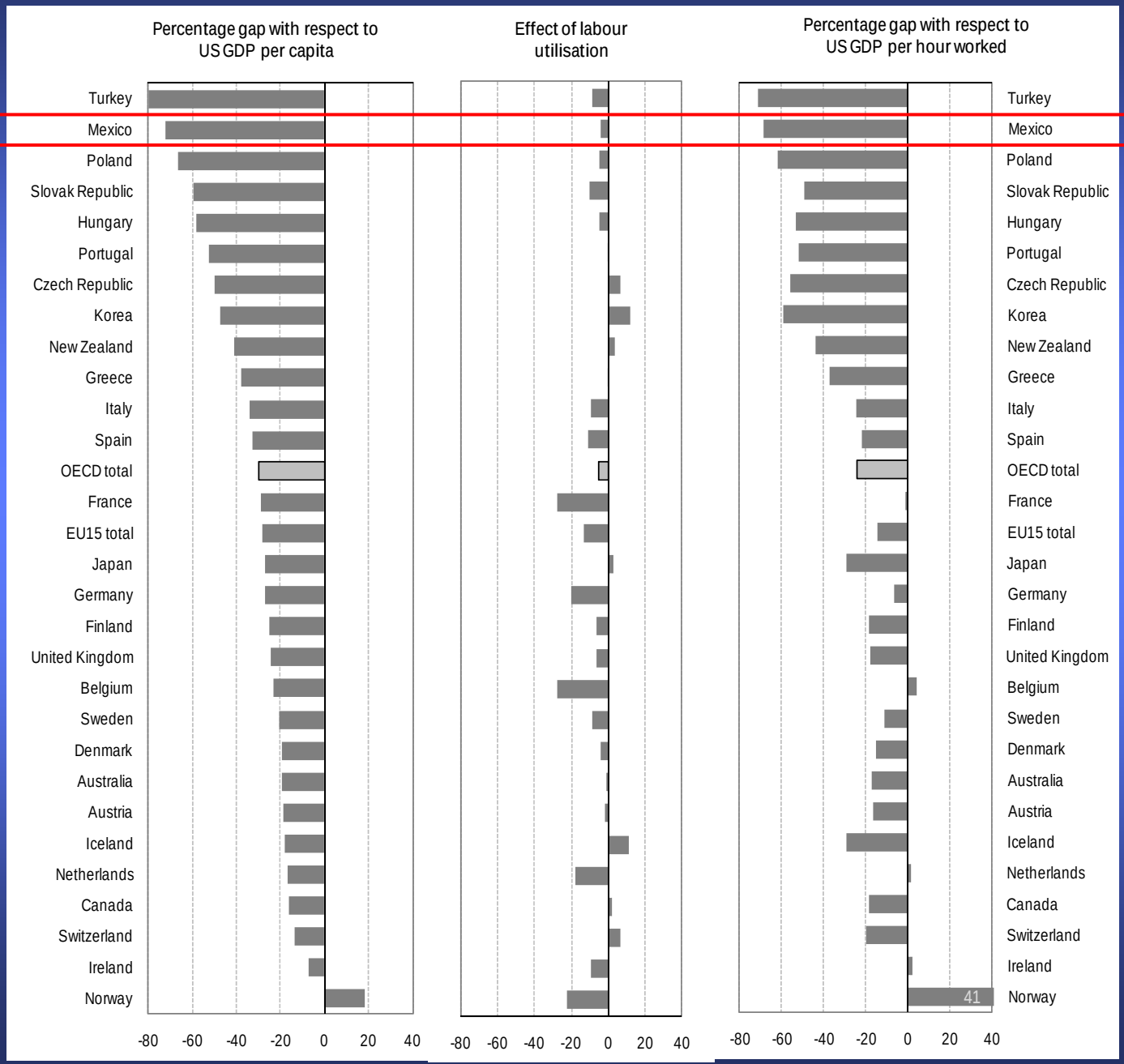
Developed countries



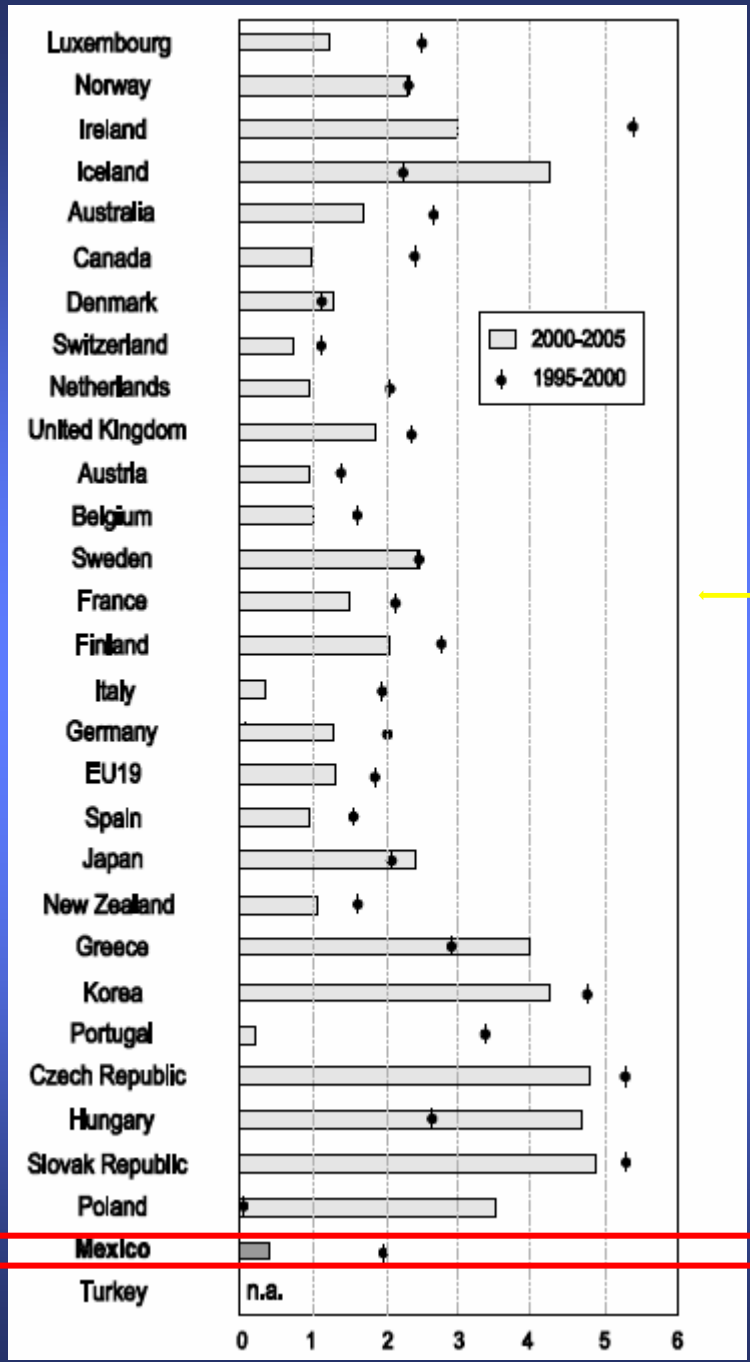
Developing countries



Income and productivity levels, 2006



Productivity improvement has been very slow in Mexico since the beginning of the decade



Growth of labour productivity, 1995-2000 compared with 2000-2005, % change at annual rate

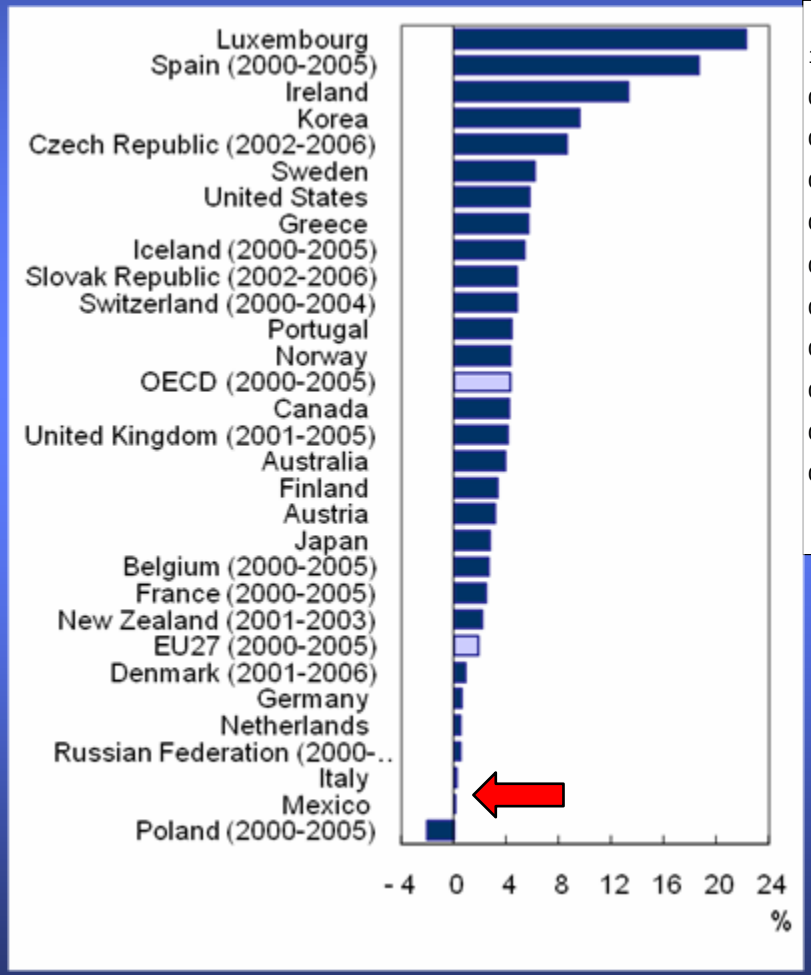
- Mexico’s ability to make sustained improvement of productivity based on own innovations appears too limited
  - Most of the standard innovation performance indicators confirm that the overall level of innovation activity is very low and innovation based on research and development (R&D) even weaker, by international standards

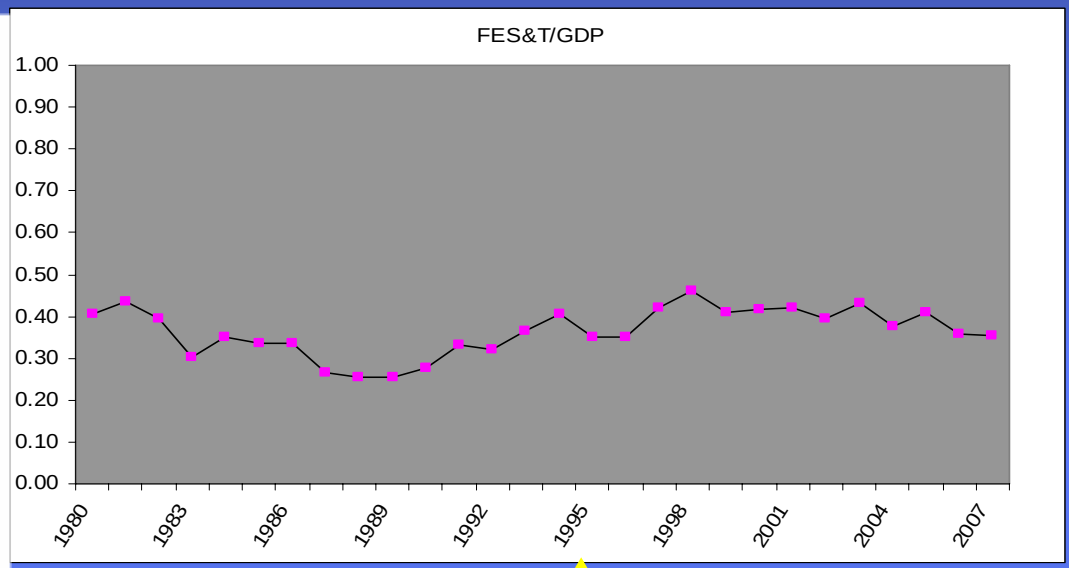
Mexico’s innovation system

A SWOT analysis

STRENGTHS	WEAKNESSES
• A set of top quality universities (both public and private) and public research centres • A sizeable pool of qualified scientists and engineers • A relatively large domestic market • A set of globalised, internationally competitive firms • Regional and sectoral clusters of excellence • Geographical proximity to the United States • Attractiveness for FDI inflows into specific sectors • The accumulated experience of some public agencies for the promotion of science, technology, innovation and economic development • Good natural resources endowment • Cultural diversity as a source of creativity	• Poor performance of the education system; low qualification of the labour force • Low budget allocation and weak political commitment to science, technology and innovation policy • Insufficient technological infrastructure • Low technological absorptive capacity of the vast majority of SMEs • Weak culture for intellectual property rights • Little competition in some sectors; barriers to enterprise creation; deficient corporate governance in the publicly owned industrial sector • Premium on imported technology • Financial markets ill-adapted to innovation-related investment • A very low level of public/private co-operation; low mobility of human resources in science and technology • Inefficient governance of the national innovation system • Unbalanced policy mix • Bureaucratic management of support programmes

In the past the Government did not give STI policy the budgetary support required to develop the set of instruments that was needed to meet its stated objectives



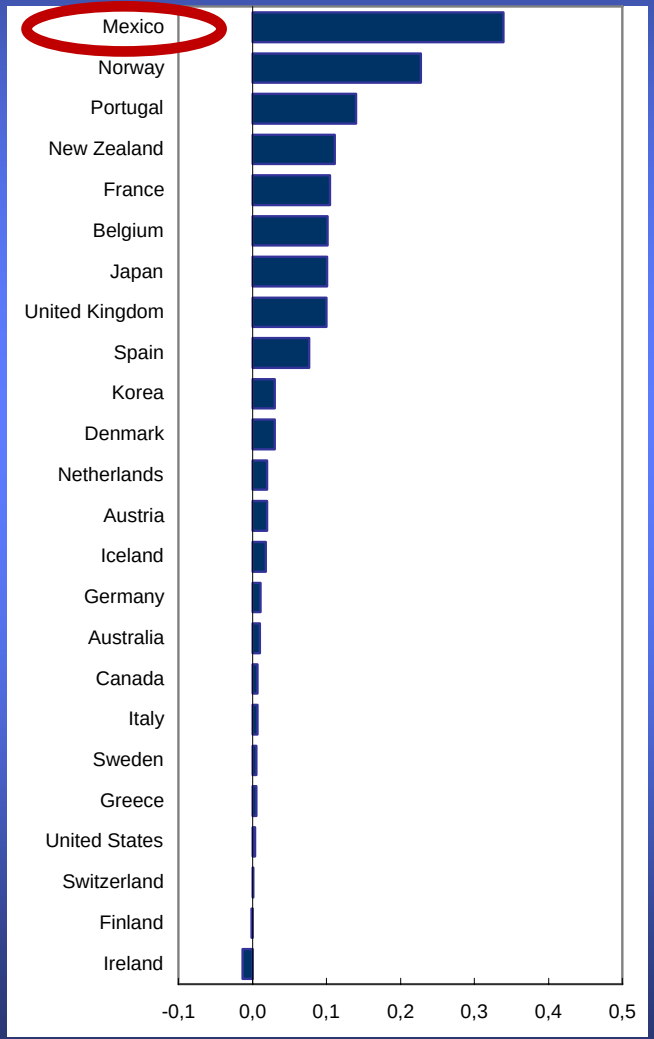


Mexico's Federal expenditure in S&T activities (as % of GDP)

Change in R&D government budgets, average annual growth rate, 2000-2006

Policy mix: Direct *vs* indirect support to business R&D

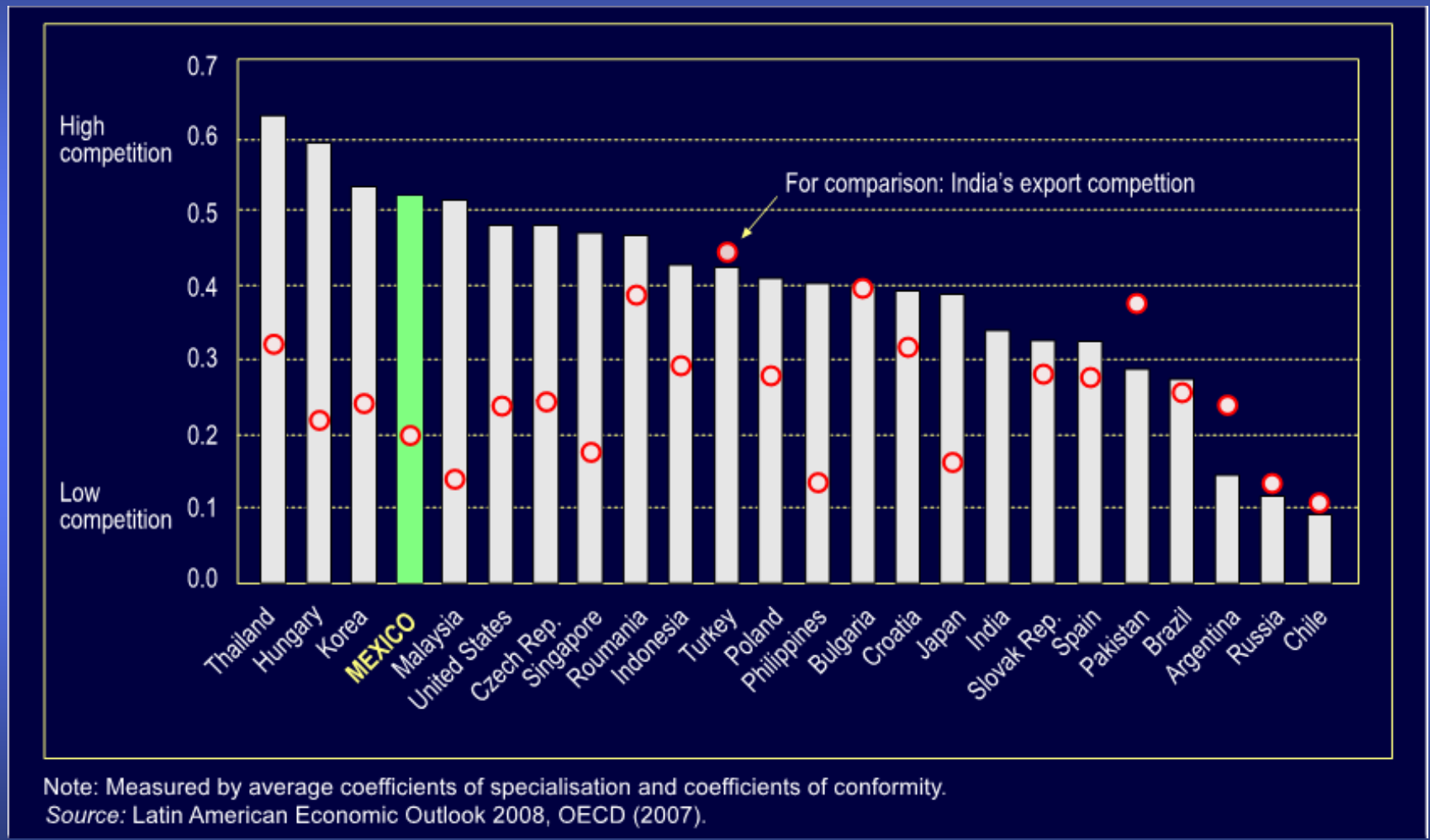
Change in the rate of tax subsidies for 1$ of R&D between 1999 and 2007



Building on strengths to correct weaknesses is both possible (opportunities) and urgent (threats)

OPPORTUNITIES	THREATS
• A young population • Incipient development of a significant pool of engineers • Growing demand for knowledge-intensive social goods • Insertion in global knowledge networks and technological platforms • Diversification of production and trade towards goods and services with higher knowledge content • Engaging SMEs in more innovation-driven strategies • Technology diffusion around multinational enterprises in line with the development of innovation-based global value chains • Biodiversity as a potential economic asset • Additional income from high energy prices	• Growing competition from emerging economies • Accelerated expansion of the scientific and technological frontier • Intensifying global competition for talent • High economic and technological dependence on low-growth economies • Poor linkages with dynamic emerging regions experiencing rapid economic, scientific and technological development • Regional concentration of innovation capabilities + **Impact of the financial crisis**

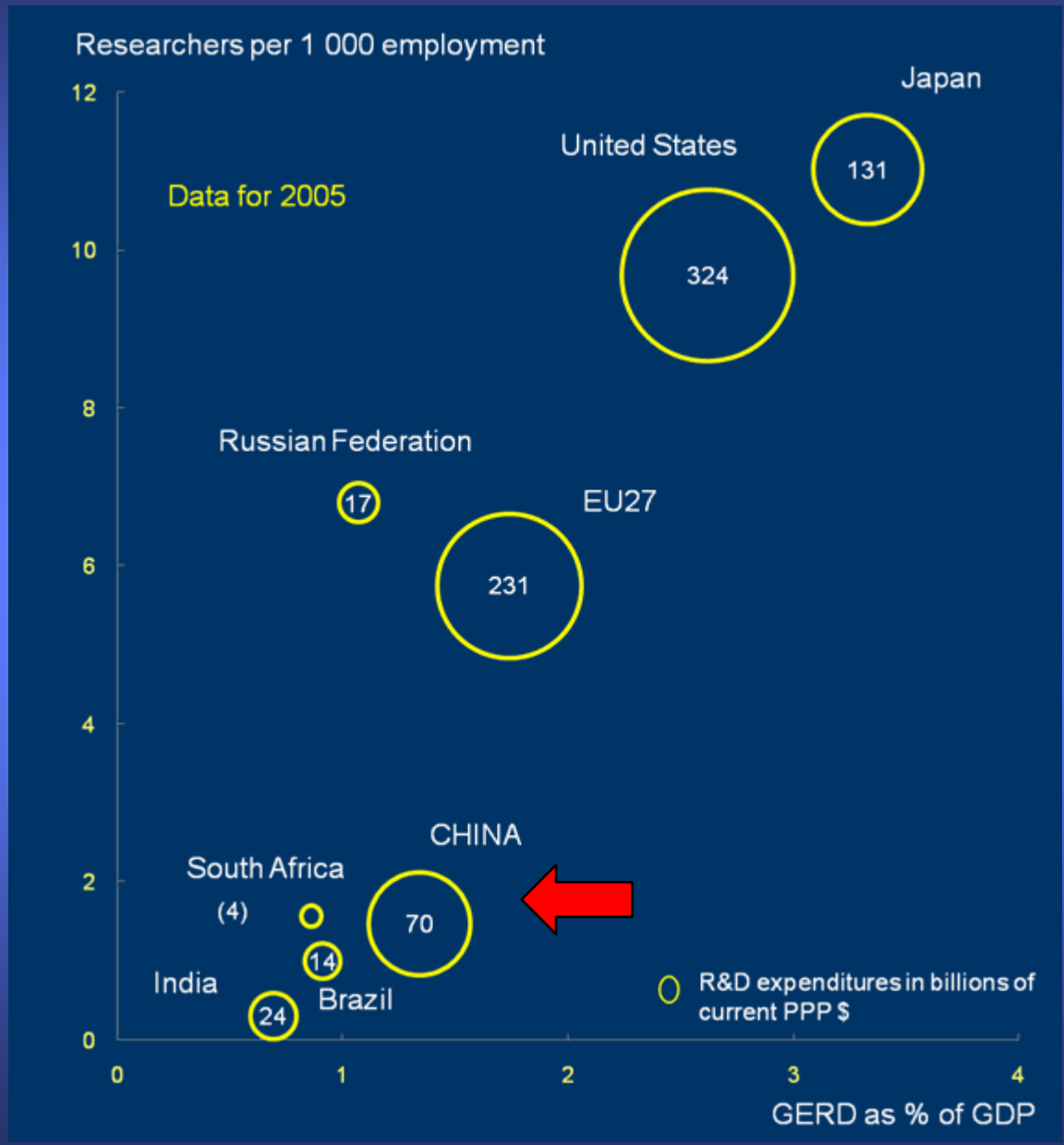
Degree of similarity with China in export specialisation



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

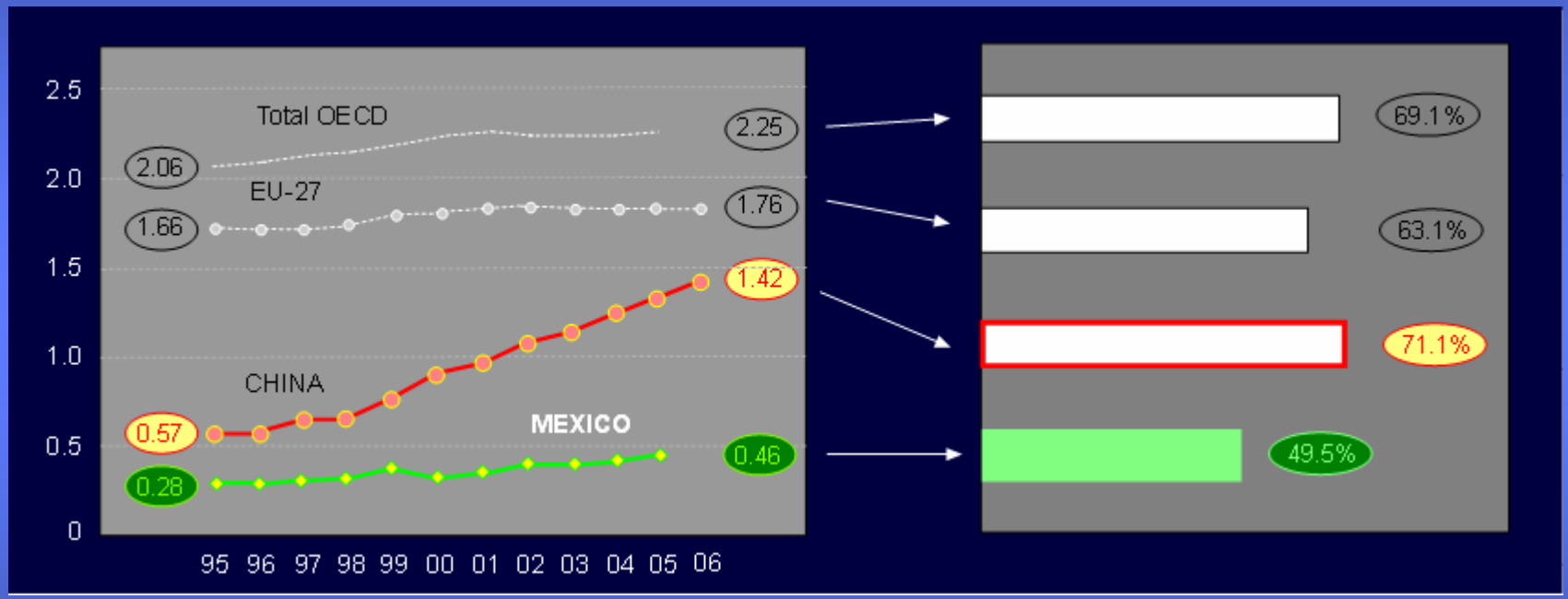
China is now a major R&D player

- China is now the third largest investor in R&D globally – with a target to reach an R&D intensity of 2.5% by 2020
- China's growth of R&D spending has been on average 18% a year since 1995
- China now counts close to 1000 foreign R&D labs, accounting for about 25% of business R&D
- Some firms now undertake R&D for the global market in China



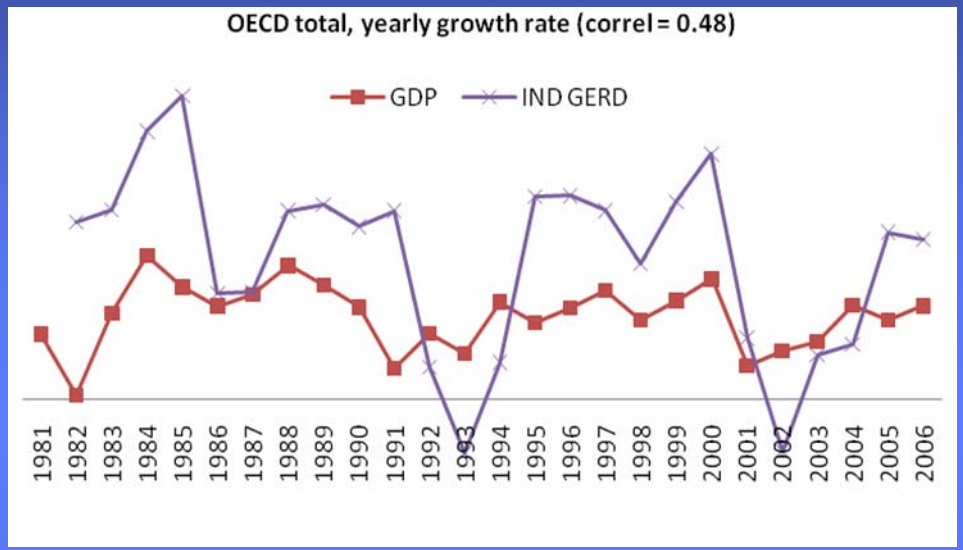
R&D intensity (% of GDP)

Share of R&D performed in the business sector



The impacts of and responses to the financial crisis

- Experience demonstrates that private investment in innovation is pro-cyclical



- ✓ Supply-side factors: declining profitability and will affect the level and patterns of self-financed investments
- ✓ Demand-side factors: some lead markets for innovative products and services will suffer

- The impact is likely to be biased against firms which are more dependent on external financing (e.g. SMES and start-ups) and against product innovation, as opposed to cost-cutting process improvements
- Risk of negative feedbacks on public research ("mutual de-leveraging")
- Reduced propensity to invest in ICTs and human capital and lower incentives to innovate for a greener economy

Policy responses

- Ensure that framework conditions remain conducive to innovation (notably by avoiding that industrial restructuring reduces competition and that protectionism impairs the expansion of innovation-enhancing trade and FDI)
- There is also an urgent need to include in stimulus packages policy measures to mitigate the negative impact of the financial crisis on the level and orientation of innovation activities
  - Support to private investment in R&D and innovation through counter-cyclical measures (e.g. grants as opposed to tax incentives)
  - Public investment in the knowledge infrastructures, both tangible and intangible, and in human resources for innovation
- These short term responses will also help to harness the new opportunities brought about by the crisis, to the benefit of long term sustainable growth
  - The "cleaning " effect of the crisis will provide new opportunities to the most efficient, innovative, firms
  - The resource allocation and risk management processes will improve, with investments in innovation suffering less from the competition of alternative investments with "artificially" boosted higher returns

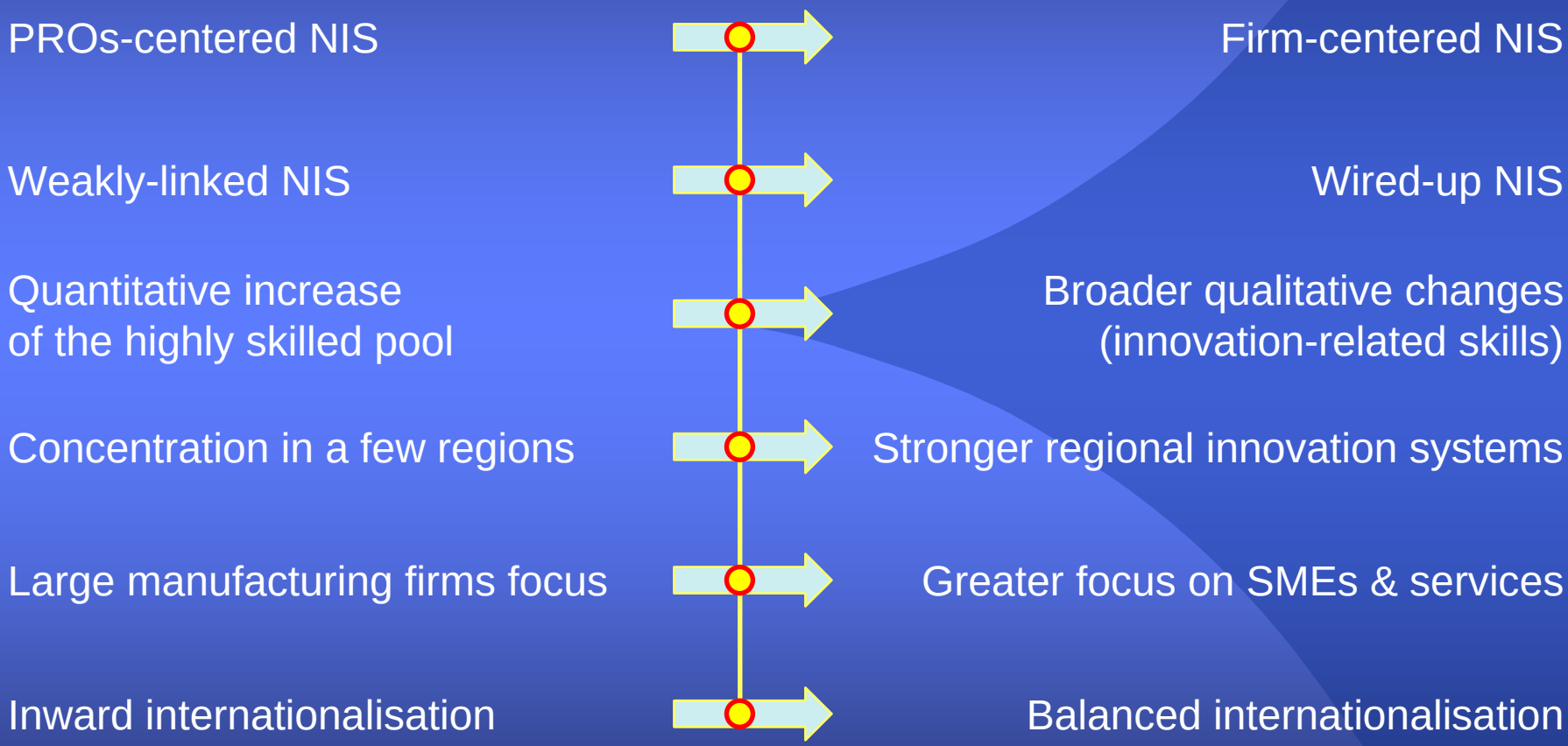
Boosting innovation in Mexico

Policy recommendations

Strategic tasks

- To further catch-up in terms of income and social well-being vis-à-vis the most advanced countries while coping with growing competition from emerging countries, Mexico needs urgently to increase its innovation capacities. This requires:
  - Improved framework conditions for innovation
  - More powerful and efficient specific S&T and innovation policies

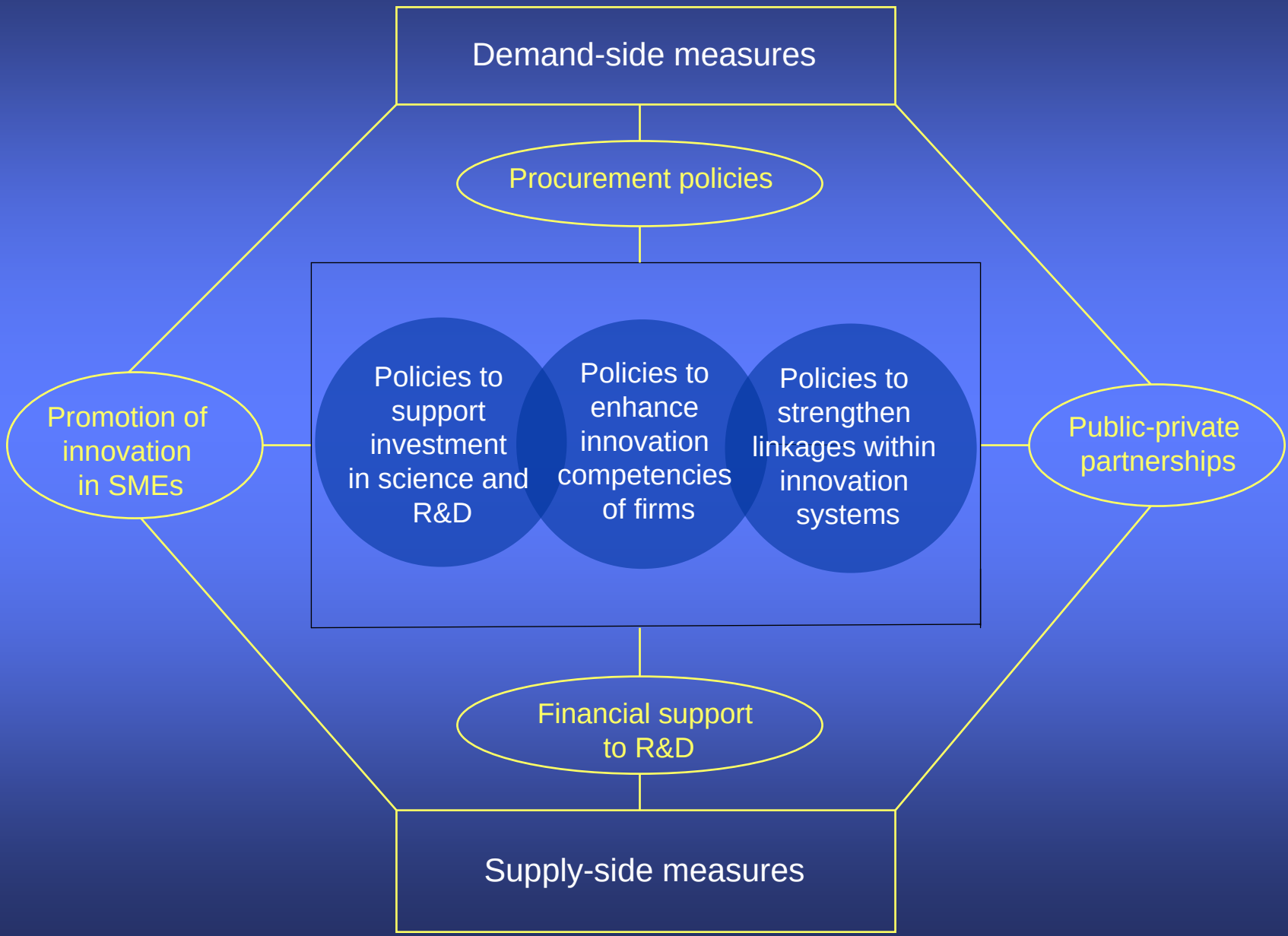
These policies must accelerate six interrelated strategic transitions



Improving framework conditions

- Reforms introduced in recent years to make the business environment of Mexican firms more conducive to innovation have certainly borne fruit, but they are often incomplete or insufficiently enforced. There is large room for improvement in many fields, especially:
  - ✓ Education: upgrading skills at all levels and throughout the economy remains an imperative
  - ✓ Competition policy: competition remains weak in key sectors such as financial and telecommunication services, energy production and distribution, and transport.
  - ✓ Financial markets: New technology-based firms and innovative firms more generally have difficulty accessing private financing
  - ✓ Entrepreneurship: Many barriers still hamper entrepreneurial activity
  - ✓ Corporate governance: Deficiencies in corporate governance, notably in the public sector, reduce incentives to pursue efficiency gains and introduce a bias against R&D and innovative activity

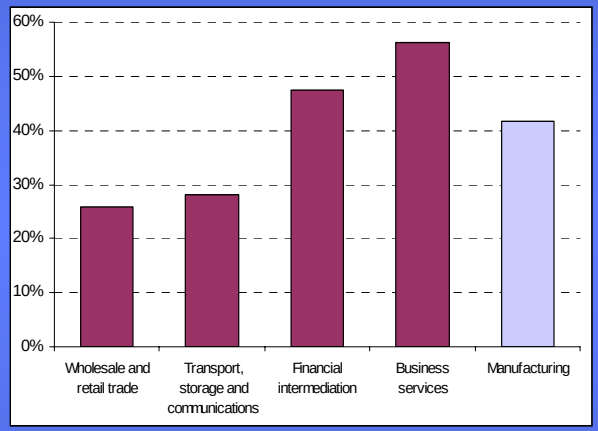
Improving STI policies



Guiding principles

1 Innovation is a broad and increasingly demand-driven process

- Beware of High-Tech myopia ! the importance of non technological innovation is increasing (e.g. changes in organisation, in marketing, in design, etc.), and services can be as innovative as manufacturing

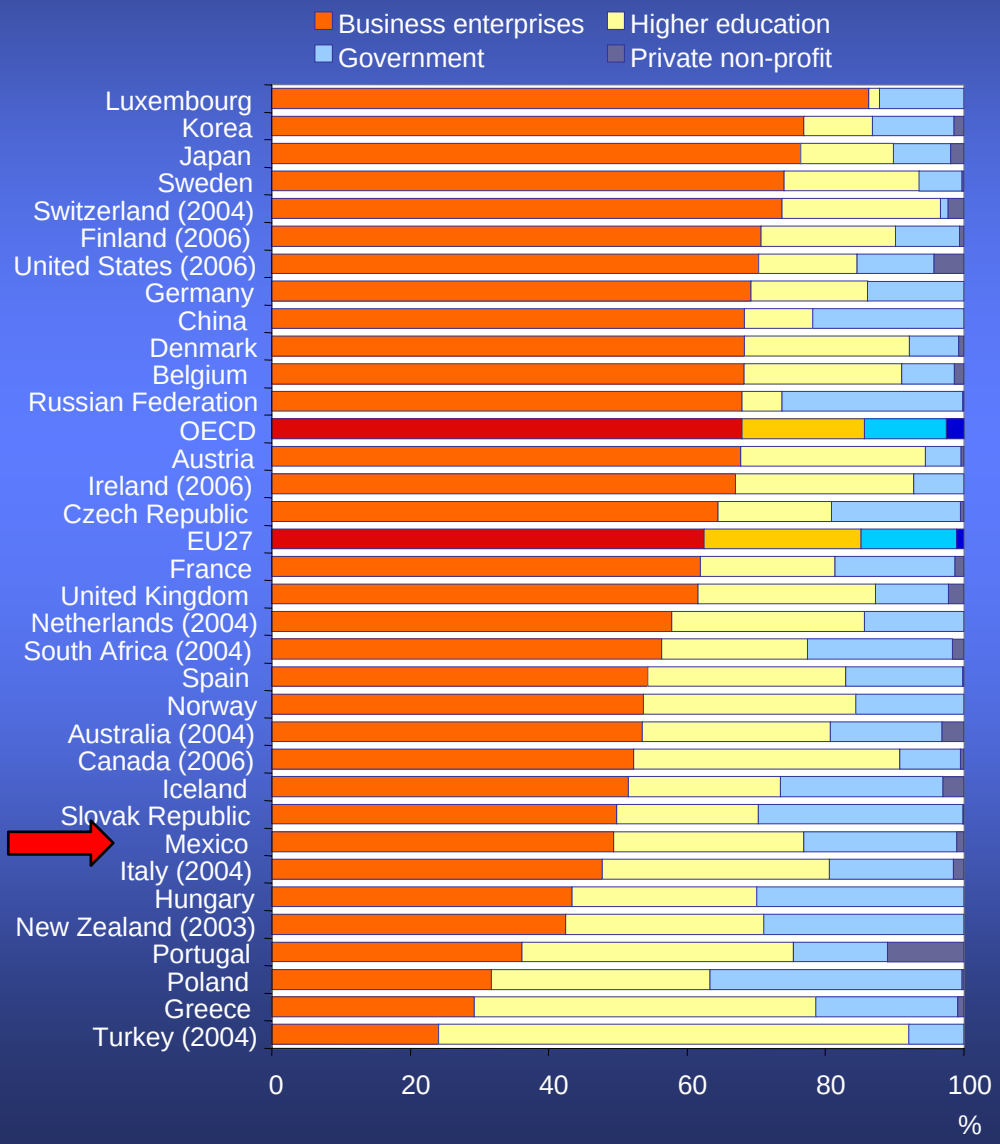


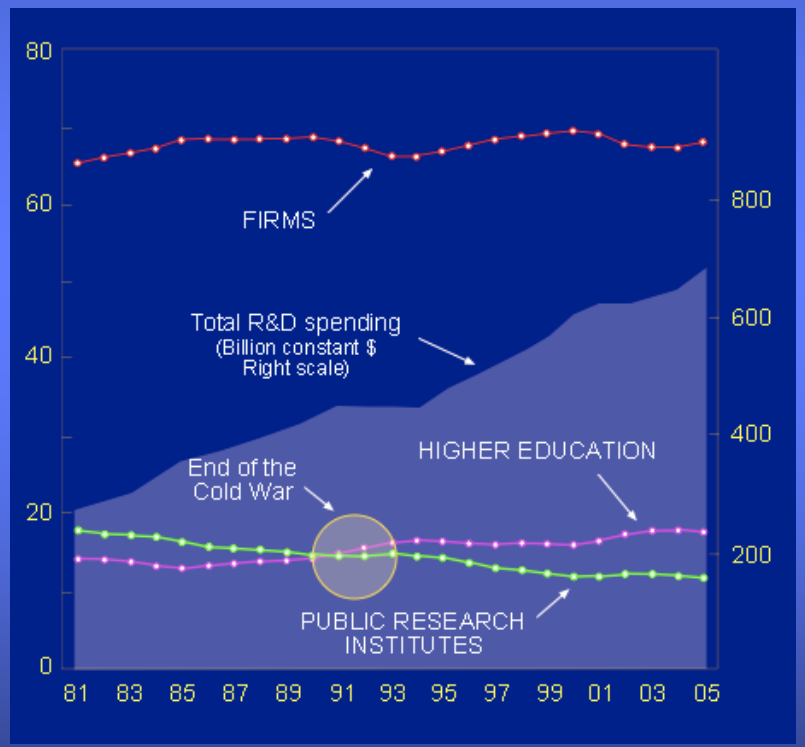
Innovative firms in Europe as % of all firms in an industry, 2002-2004

- The complexity and scope of innovation processes requires a wide range of skills, not only engineers and PhDs
- End-users become more influential within innovation networks
- Increasing role of “social capital”, facilitating to achieve a balance between competition and co-operation; saving on transaction costs incurred by increasingly complex innovation systems

Guiding principles

2 High performing innovation systems are firm-centered ...





Guiding principles

3

… but public research retains a key role

- Basic *vs* applied research is an obsolete dichotomy. Borderlines become increasingly blurred, making the intensity and 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

Specific recommendations: Governance

- An **effective inter-ministerial Council** (in absence of a dedicated S&T Ministry) responsible for S&T policy orientations (whole of Government) and budgetary allocations
- Involvement of stakeholders in priority setting (academic and business communities; social sectors)
- More systematic evaluation and improved feedback mechanisms to ensure that the results of evaluation influence policy delivery and resource allocation
- An improved division of labour and cooperation between Conacyt and Economia

- An evolving role for CONACyT
  - Management of competitive funds to finance R&D intensive projects or programmes (e.g. Basic Science Fund; public/private research and innovation consortia, AERIs; Avance institutional fund)
  - S&T Infrastructure
  - Oversight of and financing of institutional component of Public Research Centres
  - Management of interface with sub-federal entities for the development of STI capacity (mixed funds)
- An evolving role for the Ministry of Economy
  - Technological Innovation Trust Fund (matching funds or grants for innovation project development mainly by SMEs)
  - Technological infrastructure (e.g. clusters, metrology, norms, IPRs)
  - Sectoral innovation support programmes in priority areas (e.g. PROSOFT) co-ordinated with and co-funded by private sector and intermediary institutions

Improving STI policy:
Policy mix in support to business R&D and innovation

- Eliminate distortions of the fiscal incentive system and/or replace it with direct funding schemes; upscale public-private partnerships' programmes
- Streamline existing Sectoral Funds; Develop sectoral support programmes in priority areas under the condition of matching resources
- Develop innovation-friendly public procurement policies
- Support SME's demand for, and access to, technological services
- Strengthen IMPI's activities in support of technology diffusion

Specific recommendations: Public research

- Increase the volume and share of competitive funding of universities in basic and applied research in areas of national priority
- Expand non-competitive institutional funding (submitted to evaluation) to cover infrastructure costs; use institutional funding to foster decentralisation of research capacities
- Further reform SNI evaluation criteria to better account for innovation activities
- Generalise performance contracts in Public Research Centres and move towards greater management autonomy

Specific recommendations: Human resources development

- Adopt a more strategic (selective) approach in Postgraduate Scholarship Programme (domestic and abroad)
- Strengthen existing programmes fostering insertion of highly skilled personnel in the business sector (IDEA) and remove obstacles to institutional mobility of researchers
- Facilitate temporary hiring of postgraduates in Public Research centres
- Consider entrusting teaching activities to SNI members
- In association with business organisations, foster (life long) training for technicians and engineers

Specific recommendations: Regional STI capacity

- Strengthen regional S&T infrastructure through institutional funding of Public Research Organisations
- Use sectoral funds to foster the development of regional innovation clusters (with matching funds from industry and local governements)
- Increase States' autonomy in decision making regarding funding and management of mixed funds (subject to reinforced evaluation)
- Consider the establishment of a "Structural Fund" dedicated to the development of S&T infrastructure in less developed States

Thank you for your attention

Muchas gracias por su atención

Contacts:

jean.guinet@oecd.org

malkindf@gmail.com

Web Resource:

www.oecd.org/sti/innovation/reviews