High Technology – its importance and policy challenges

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Innovation across Europe
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Outline

- High-tech, Innovation and R&D
- Facts and Challenges
- Policy measures
- Outlook

What are high-tech industries?

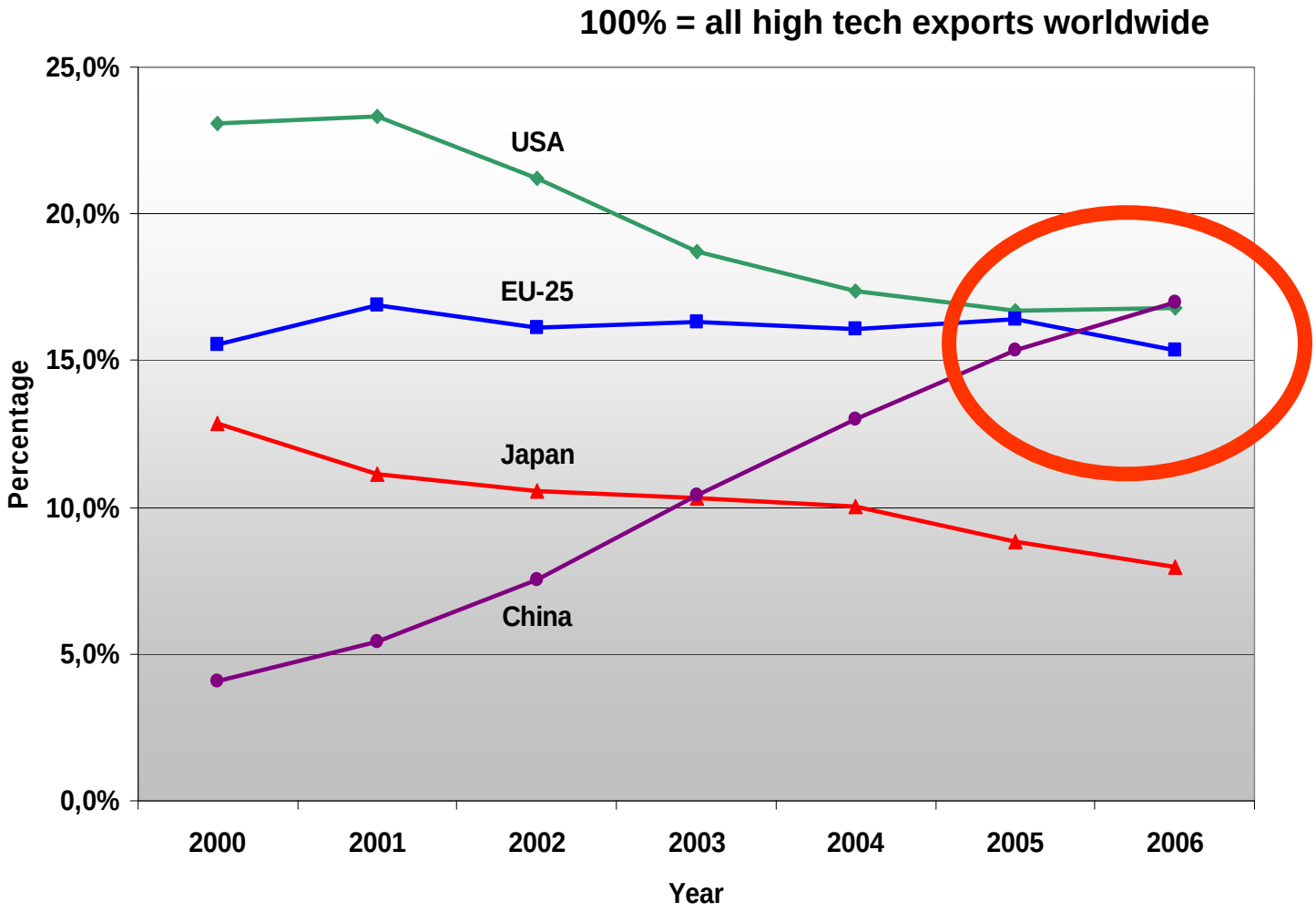
High-tech industries:

- defined via R&D intensity, the ratio of R&D expenditures to sales
- often classified in four sector groups:
  - **High R&D-intensity** (generally above 5%); examples: aerospace, pharmaceuticals, computers and office machinery, communication equipment, medical, precision, and optical instruments
  - **Medium-High R&D-Intensity** (generally between 2% and 5%); examples: car industry, chemicals, robotics
  - **Medium-Low R&D-intensity** (generally between 2% and 1%); example: steel production
  - **Low R&D-intensity** (generally lower than 1%); examples: food production, textile production

What is a high-tech product?

- OECD definition:
  - aerospace
  - computers and office machinery
  - electronics/telecommunications
  - pharmaceuticals
  - scientific instruments
  - electrical and non-electrical machinery
  - Chemistry
  - Armament
- This presentation is using both definitions

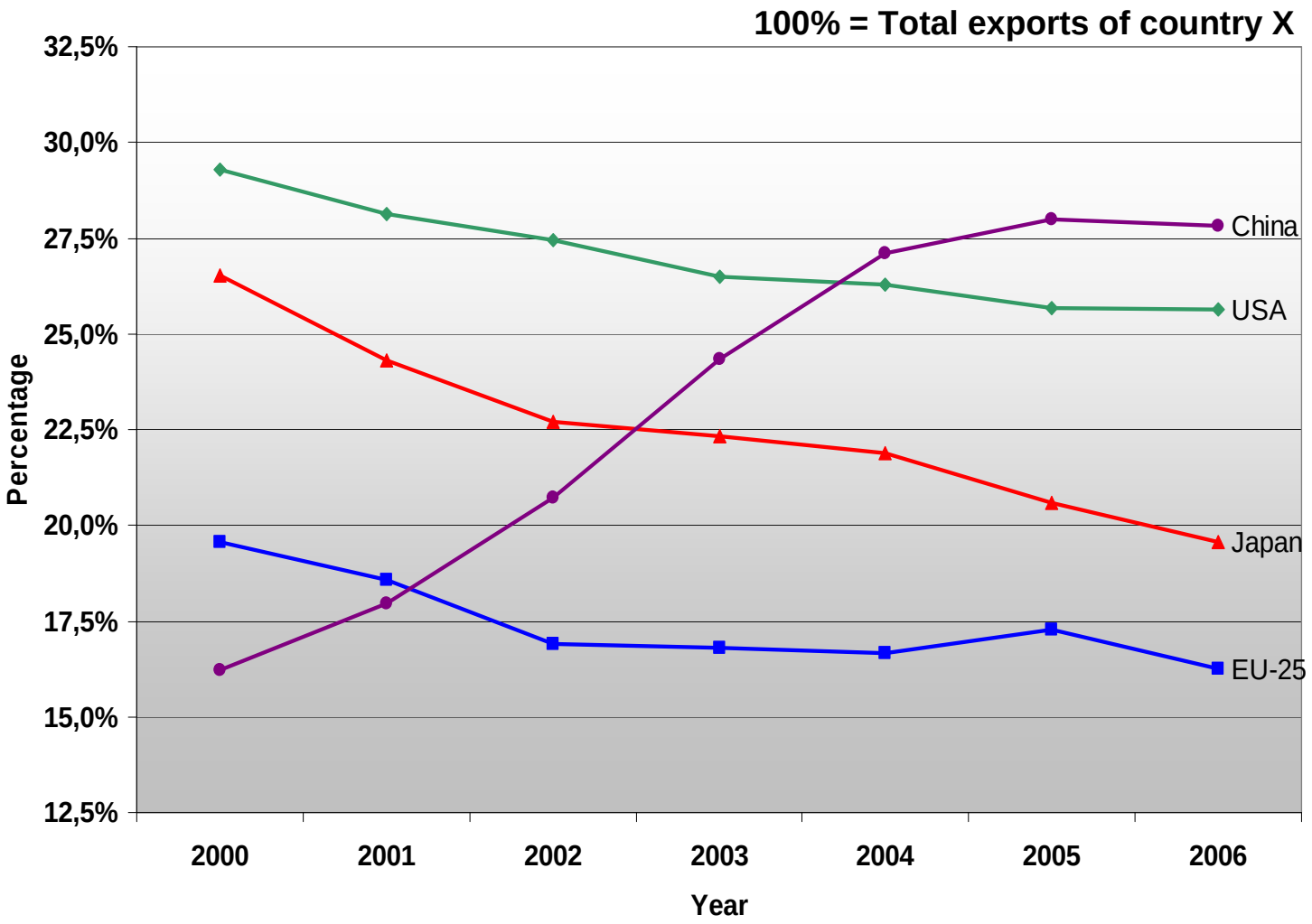
EU is keeping its World market share of high-tech exports … but has been overtaken by China



EU-25: without intra-Community trade

Source: Loschky A. *High-Technology Trade Indicators 2008 - An International Comparison of the Big Economic Areas and Countries*. EUR 23690 EN. Luxembourg (Luxembourg): OPOCE; 2008.

Share of high-tech exports in total exports is lower in EU than in China, US and Japan



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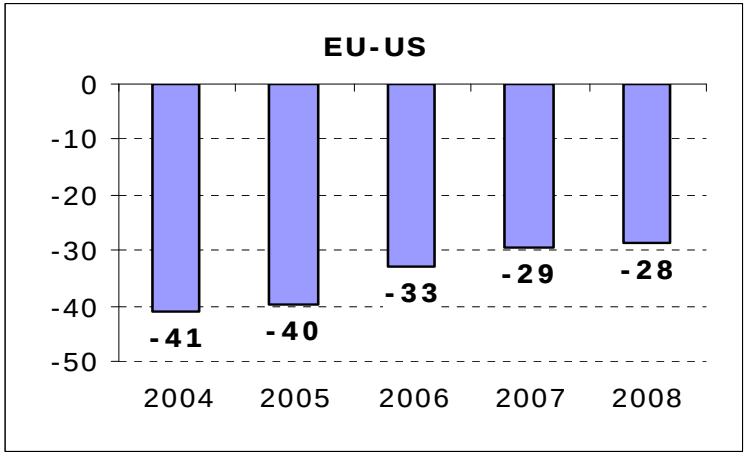
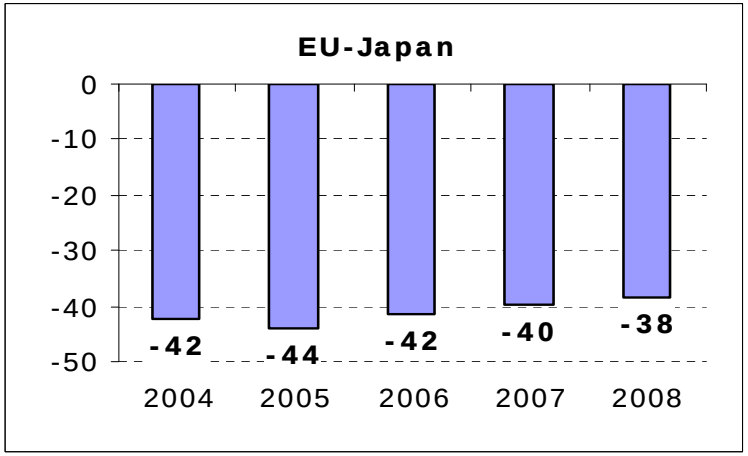
EU's Innovation Performance worse than that of US and Japan but improving

EU improving faster than US in all innovation indicators except for private R&D investments and patents. Particular improvements in human resources, broadband and venture capital.

EU still behind US and JP in many areas, e.g.: tertiary education, public private cooperation, international patenting, technology transfer



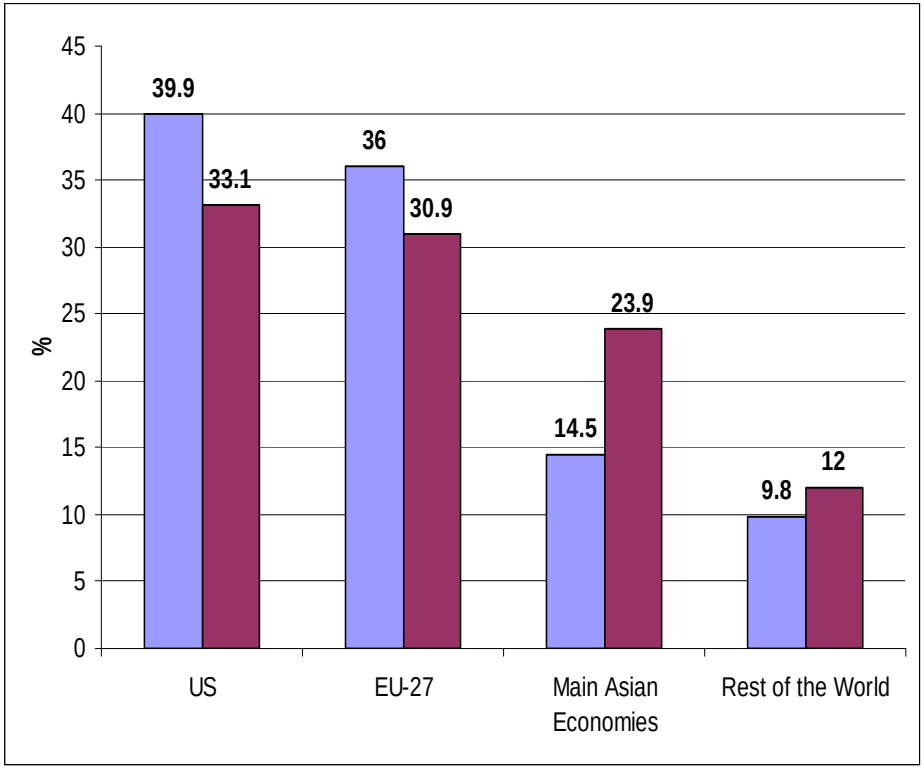


Source: EC, European Innovation Scoreboard 2008

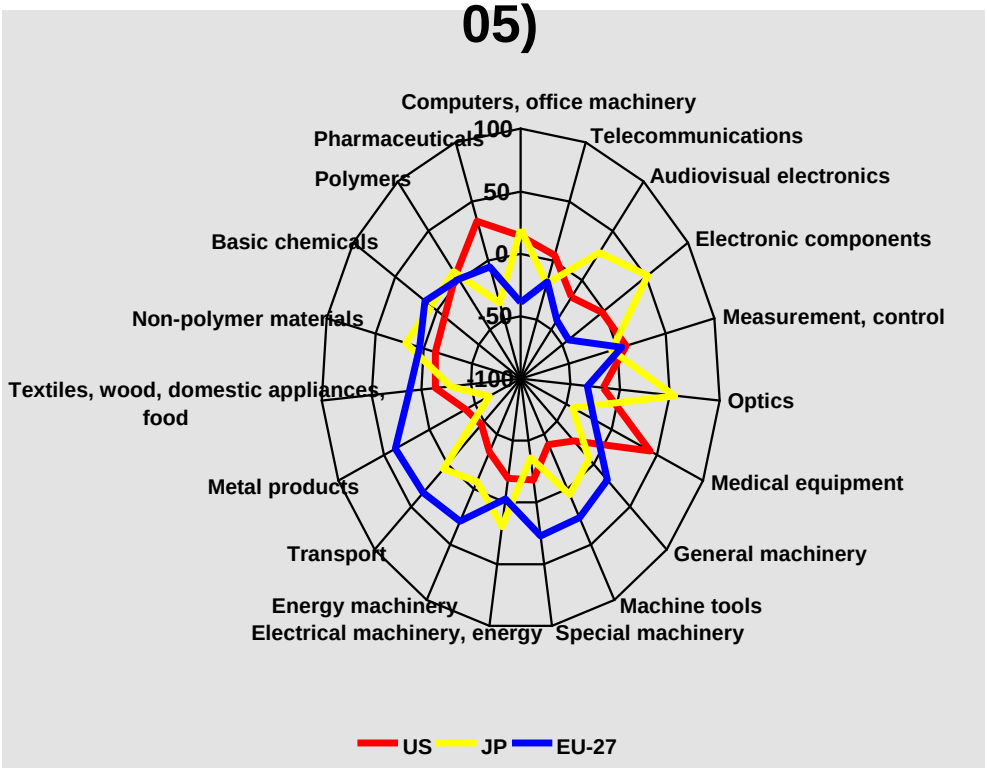
EU share in patent applications worldwide has decreased….

EU share in high-tech patent applications lower than US / JP

Share in patent applications



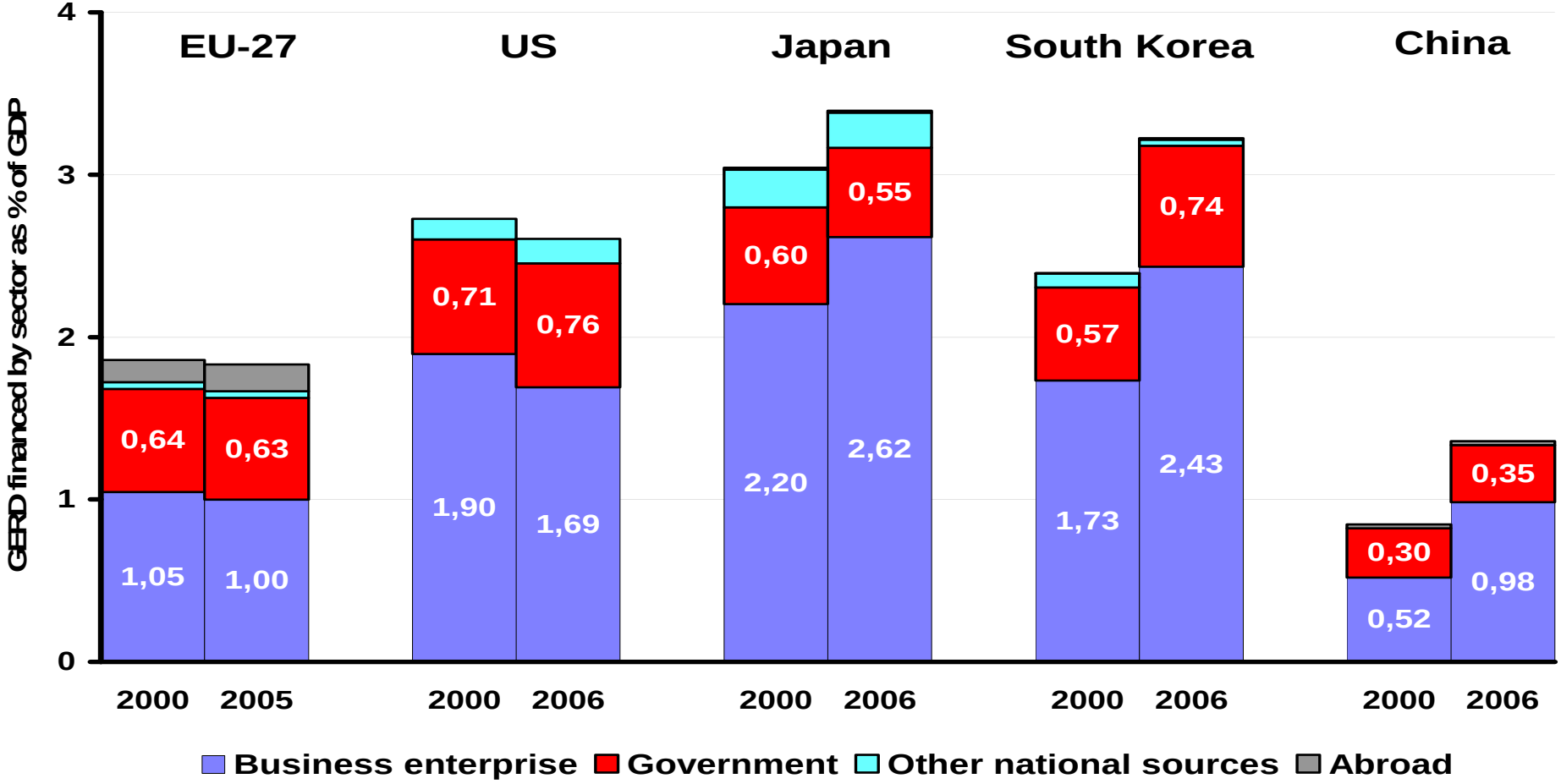
Patent applications per sector (2004-05)



Source: DG Research
Data: Fraunhofer ISI, EPO, WIPO

EU R&D intensity lower than in US and Japan – China is catching up very rapidly

Evolution of GERD financed by sector as % of GDP



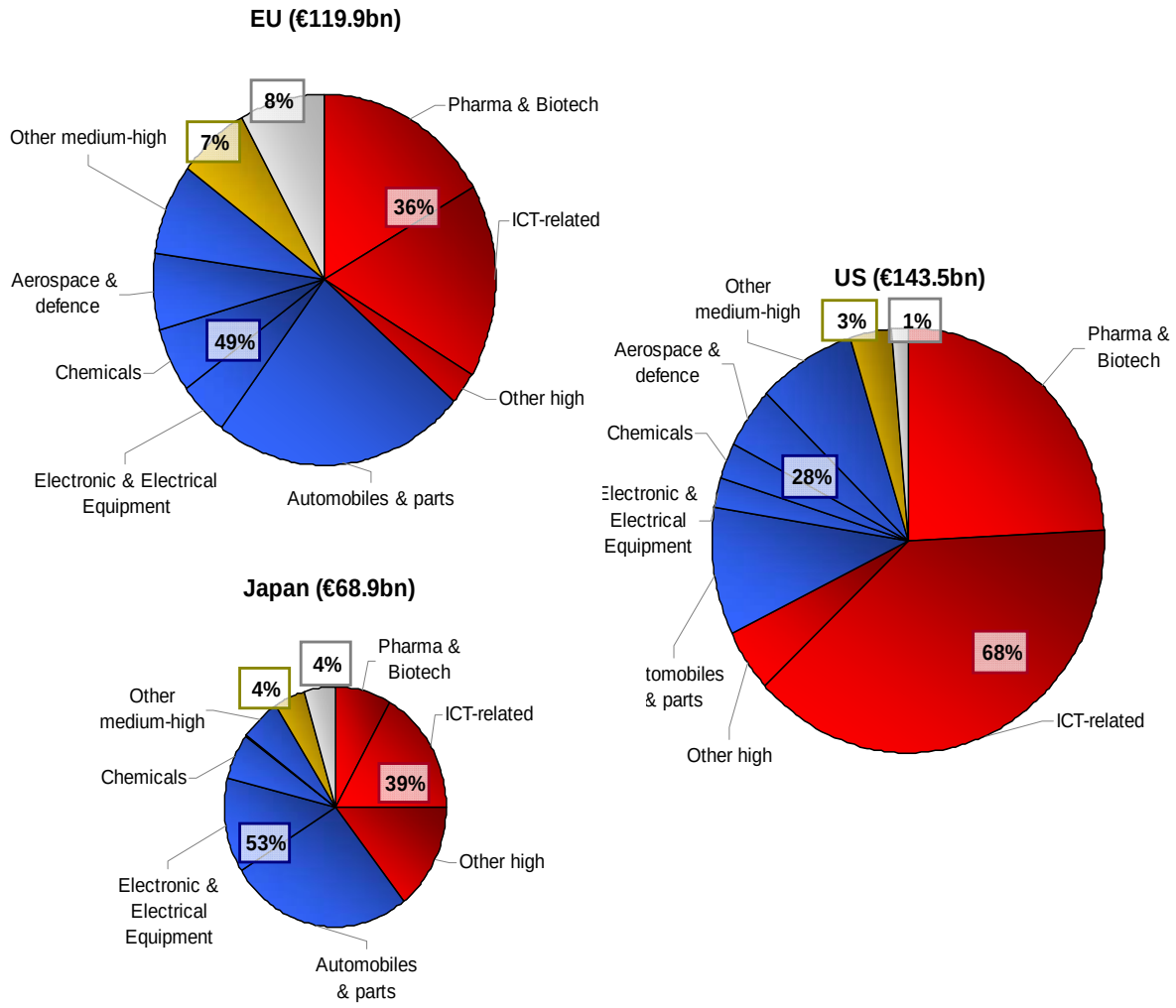
GERD = Gross Expenditure on R&D

Source: DG Research
Data: Eurostat, OECD

STC key figures report 2008

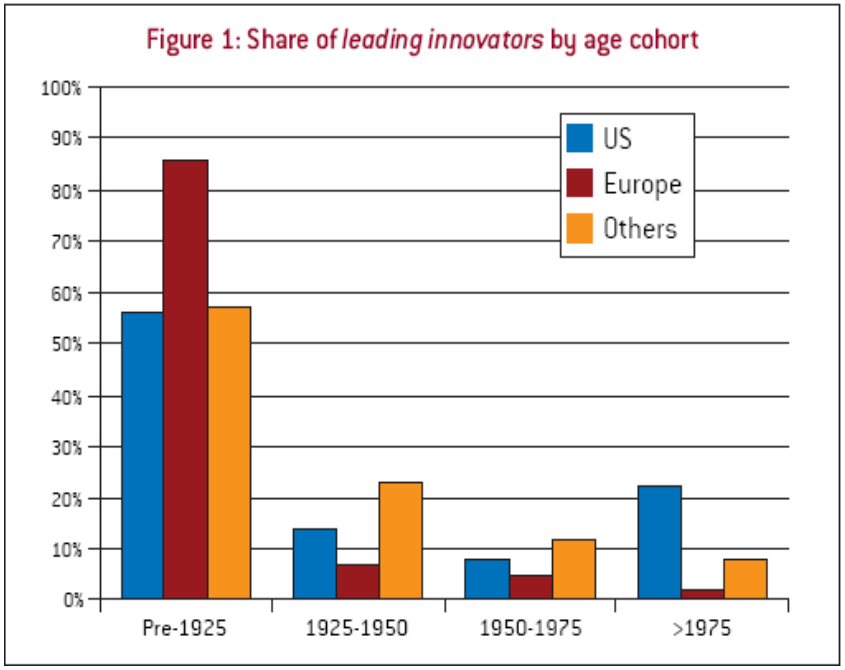
Share of R&D investments of high-tech companies in the EU is 44% of the share in the US

R&D investment shares of companies by world region and sectors



Source: JRC-IPTS, 2008

Only 3 of the 500 biggest companies worldwide were founded in the EU since 1975, 26 in the US and 23 in the emerging economies



*The graph is based on a sample of 226 companies, obtained from matching firms in the FT Global 500 (2007) with the **2007 EC-IPTS Top 1000 R&D scoreboard companies**. Leading Innovators are thus defined both by the size of market capitalization and R&D expenditures. The US has 80 companies in the sample, Europe 86 and other countries 60.*

Young is defined as founded after 1950; US has 24 young leading innovators in sample, Europe 7; The total is the sum of all 226 leading innovators in the sample.

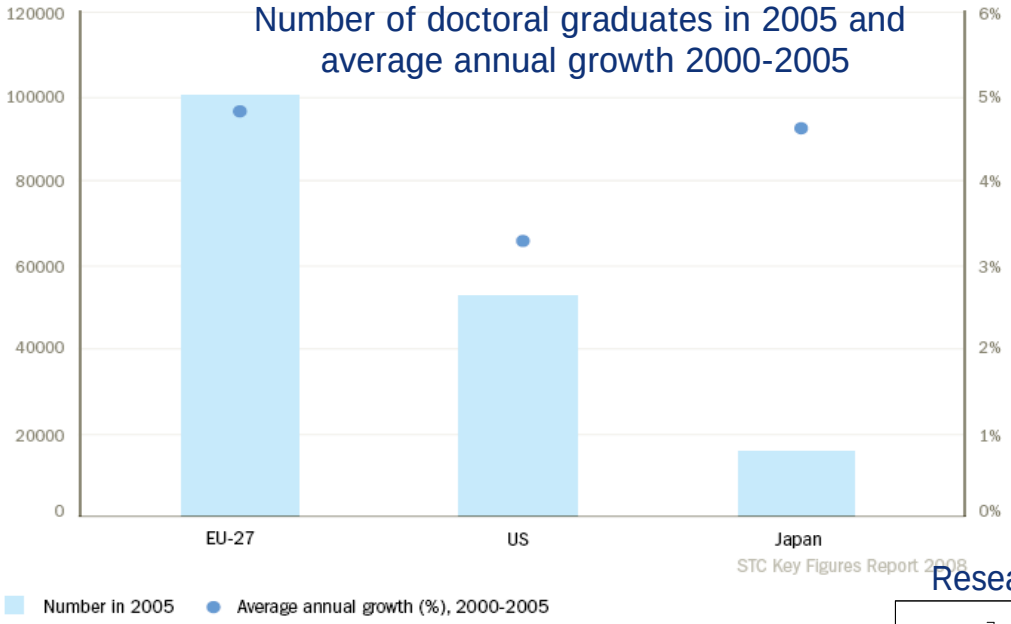
Table 1

Contribution of young leading innovators to total leading R&D and sales: US and Europe

	R&D	Sales
US	28%	15%
Europe	2%	6%
Total	16%	12%

Source: Buegel Policy Brief, Veugelers (2009)

More doctoral students, less “practising researchers” in the EU



Source: DG Research
Data: Eurostat

…but still lower share of researchers than in the US and Japan

A strong focus on Research and Innovation

Core of the Lisbon Strategy for Growth and Jobs (2005-2010)

Investments in Knowledge

- **Knowledge and innovation are engines of sustainable growth.**
- **The 3% R&D intensity target remains a Lisbon objective... even if it cannot be reached by 2010.**
- **Increase of public R&D investments, but private investments lag behind.**
- **Nearly 25% (or 86 billion €) of the total Cohesion Fund will be invested in R&D and innovation (from 2007-2013)**

- **Five concrete initiatives were launched in 2008:**

  - European Partnership for Researchers: **Better careers and more mobility**.
  - **Joint Programming** of research funding in the Member States
  - A new legal framework for **European Research Infrastructures** (ERICs).
  - Recommendation on the management of **intellectual property in knowledge transfer activities**
  - A Strategic European Framework for **International Science and Technology cooperation**.

An Agenda for Innovation

1. **New State Aid Framework**
   New rules allow for new support instruments to young innovative enterprises, innovation in services (process/organisation, advisory, support), qualified personnel, clusters, risk capital, eco-innovation

2. **Small Business Act for Europe (June 2008),** which included a chapter on financing SMEs, the promotion of skills in SMEs and all forms of innovation as one of its guiding principles

3. **Education investment, university modernisation**
   Target: 2 % GDP
   MS: Autonomy of universities, accountability
   EU: Support to national programmes for life-long learning (social fund)

4. **Pro-active standardisation**
   Improvement of the European institutional framework to support market-orientated setting of standards. White paper on future ICT standardisation in 2009.

5. **Community patent**
   No progress - need for a simplified and less costly patenting

Strategic initiatives for a better coupling of technology offer and demand

1. Joint Technology Initiatives (FP7): large “public-private partnerships” led by industry: innovative medicines, embedded computer systems, aeronautics and air transport (clean sky), nanoelectronics technologies 2020, hydrogen and fuel cells

2. Pilot Market Initiative: Stimulating the need for innovative products and services by standardisation, legislation, public tenders….

European Plan for Recovery of the Economy (2010-2013): Research, Development and Innovation are part of the way out of the crisis

- **Three new "public-private partnerships" 50% contribution of FP7 to R&D:**
  - "Factories of the Future" for the production sector (€1.2 billion for R&D)
  - "Energy efficient buildings" for the building sector (€1 billion for R&D)
  - "Green cars" for the automotive sector (€1 billion for R&D)

- **Communication from the Commission on key enabling technologies (September 2009)**

- **New innovation action plan under preparation: on request of the European Council it will be part of the post-2010 Lisbon strategy proposal to be submitted by the Commission in March 2010.**

Outlook

- **Huge societal challenges:**
  Sustainable growth, international competition, food safety, energy security, ageing society, pandemics, climate change…
- **These challenges cannot be tackled without technological innovation**
- **Potential solutions require societal consensus (GMOs, nuclear energy…)**
- **Further improvements of the institutional frameworks are needed (legislation, approval procedures, etc.)**

Thank you for your attention !

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