TRANSPORT RESEARCH TRENDS AROUND THE WORLD

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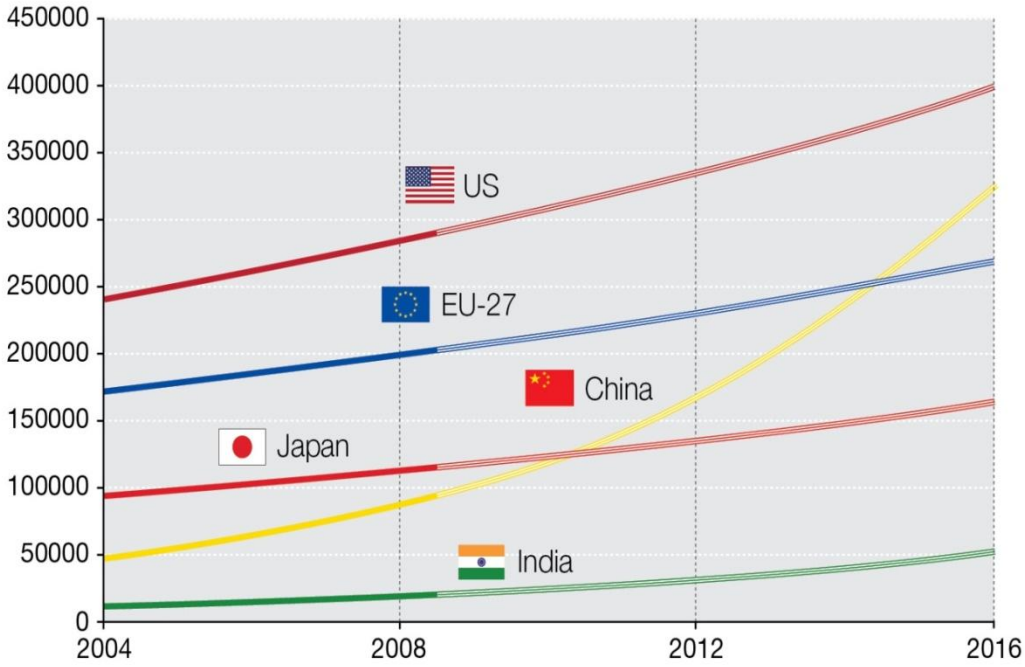
The scarcity of Transport research statistics

- Transport appears only in a handful of global innovation and research statistics.
- Transport is represented in the statistics mainly by the automobile industry usually as *"automobiles & parts"*.
- The public expenditure for research in the transport sector appears to be of the order of 7-8% of the total research public funding in both the EU, and the US. A bit higher for Japan.
- Private funding for *"automobiles & parts"* , *as a* percentage in the total research funding, *much higher in EU /Japan (23% and 26%), than in* the US *(around 7%).*
- Transport appears prominently in all major research work programmes around the world.
- Comparing statistics globally always a risky business …

Evolution of World R&D expenditure in real terms PPS(1) in millions € at 2000 prices

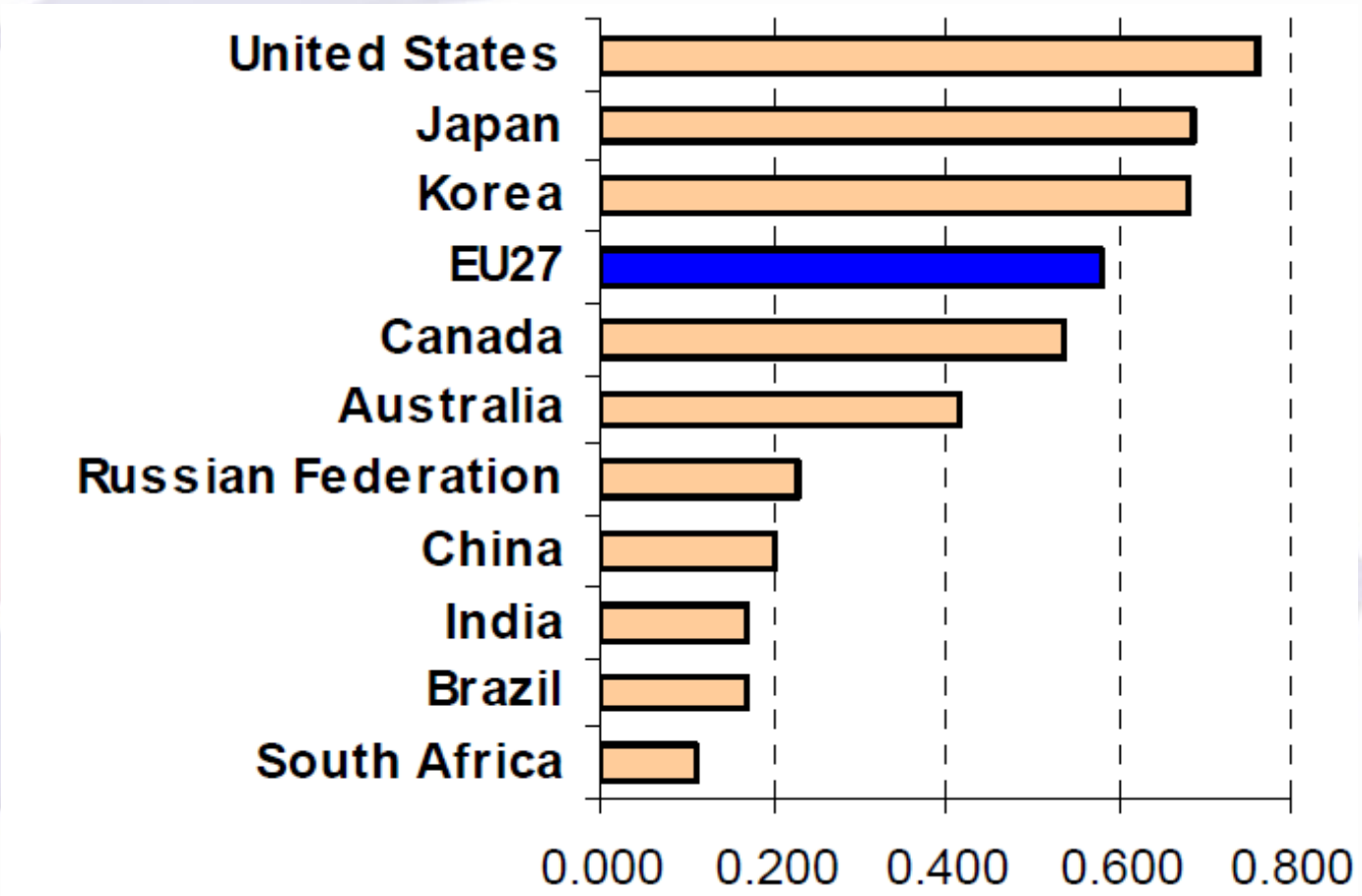
- *Ever stronger global competition for investments & markets*
- *US and Japan lead on innovation whilst emerging economies are quickly catching up*
- *On current trends, China is set to overtake the EU by 2014*



China excluding Hong-Kong
Source: European Commission

(1) Purchasing Power Standard

EU27 Innovation Performance compared to main competitors

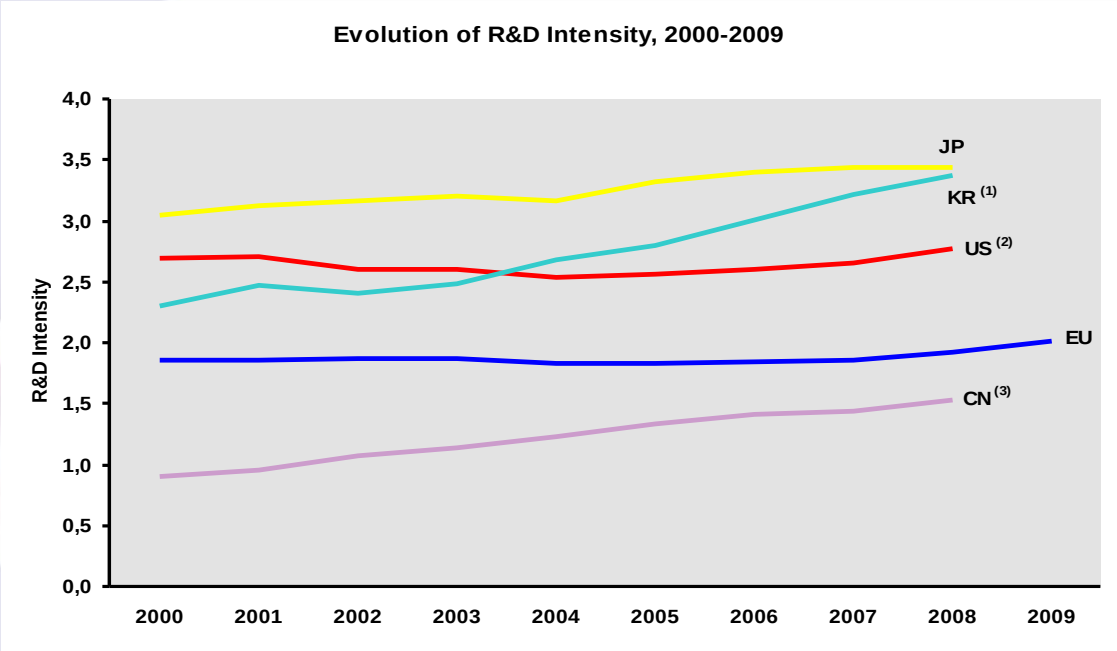


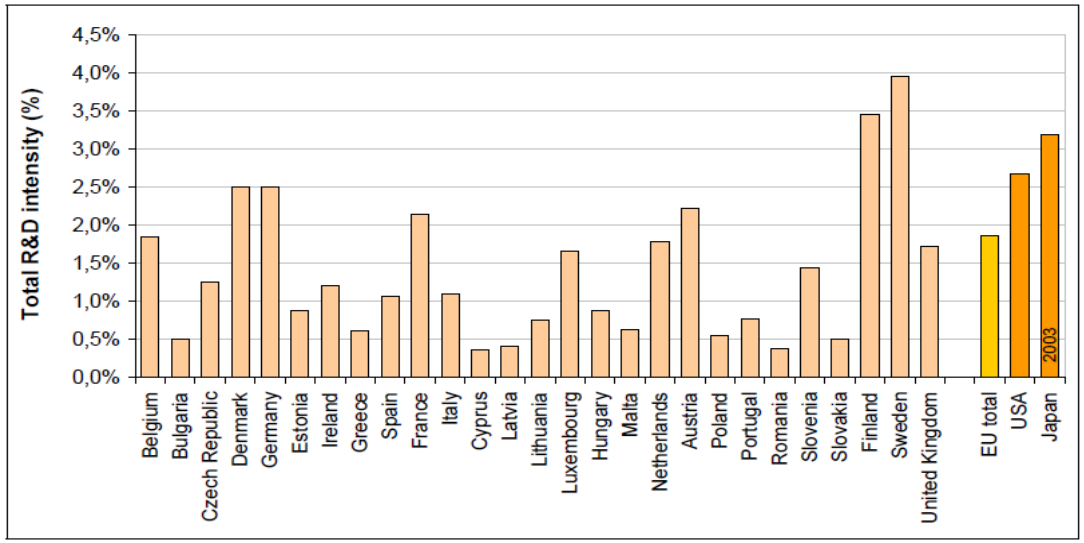
The dynamic performance is shown in a graph similar to that presented in the IUS 2010. China is catching-up to the EU27. The EU27 is slowly closing its performance gap to Japan and the US and increasing its lead over Canada and Brazil. The lead over Australia, India, Russia and South Africa has been stable. South Korea is increasing its lead over the EU27.

Source: *The Innovation Union's performance scoreboard for Research and Innovation, Innovation Union Scoreboard 2011*

R&D intensity (% expenditure over GDP)

Evolution of World R&D expenditure in real terms, PPS€ at 2000 prices and exchange rates, 2000 -2009





Total Gross Expenditure for R&D relative to GDP in 2004

Source: *A European Strategic Energy Technology Plan (SET-Plan), Commission of the European Communities*

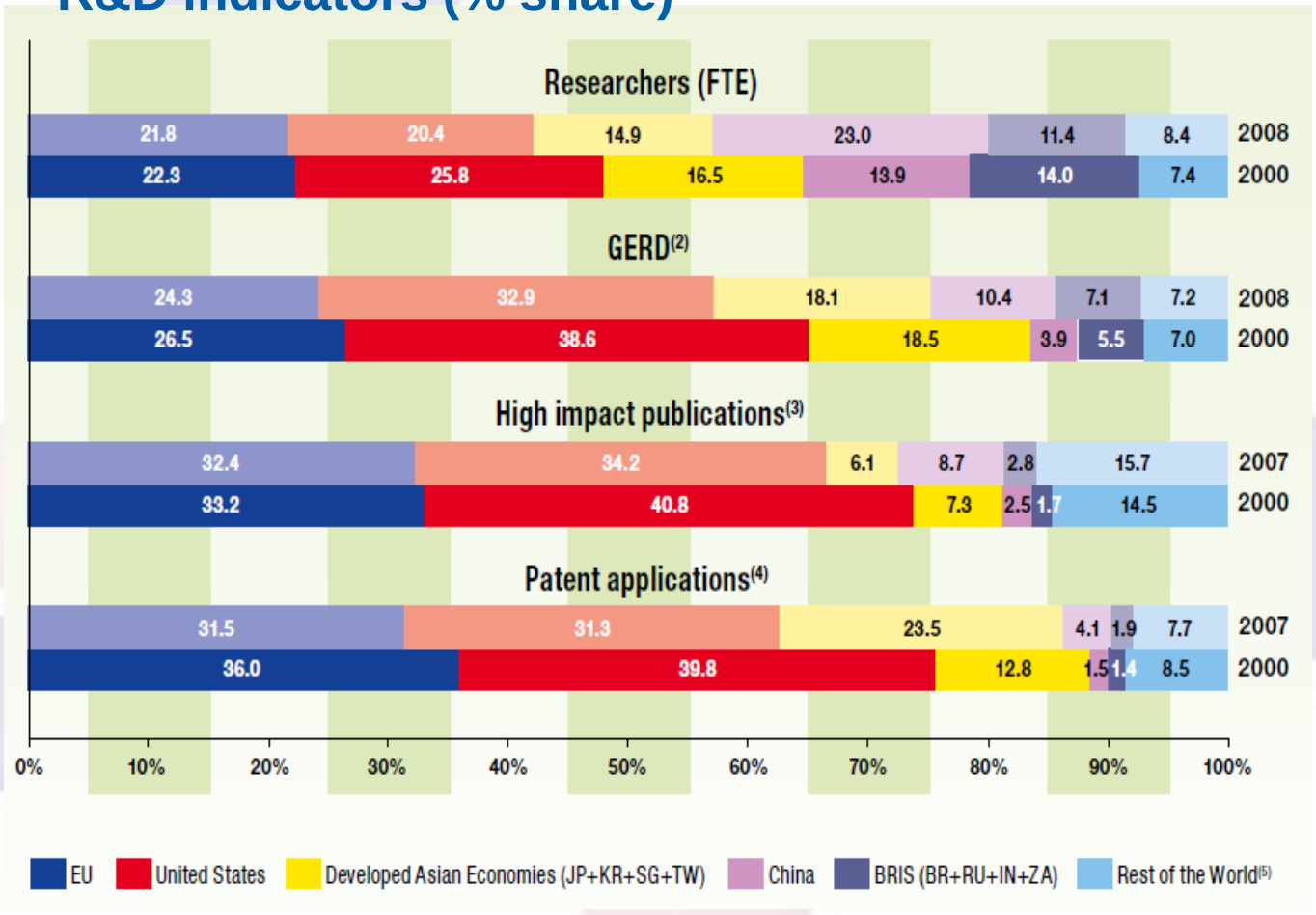
Basic research and innovation output statistics

	EU-27	US	Japan
New doctorate degrees (per 1000 population aged 25-34)	1.4	1.6	0.9
Tertiary educated population (% of population aged 25-34)	34	42	54
Expenditure on R&D (% of GDP)	2.0	2.8	3.4
Public-private co-publications (1) (per million population)	36	70	56
Patents invented (2) (per billion GDP in PPS€)	4	4.3	8.3
Medium-high- and high-tech product exports (% of total product exports)	47	59	75
License and patent revenues from abroad (% of GDP)	0.2	0.63	0.53

(1) Nr. of scientific publications with at least one author based in a public research institution and one author based in the private sector. Publications are assigned to the country in which the business companies or other private sector organisations are located. This number of public-private co-authored research publications is normalized by the population (in million inhabitants);
(2) Patent Cooperation Treaty patent applications by residence country of inventor.

Source: Innovation Union Scoreboard 2010, http://www.proinno-europe.eu/metrics

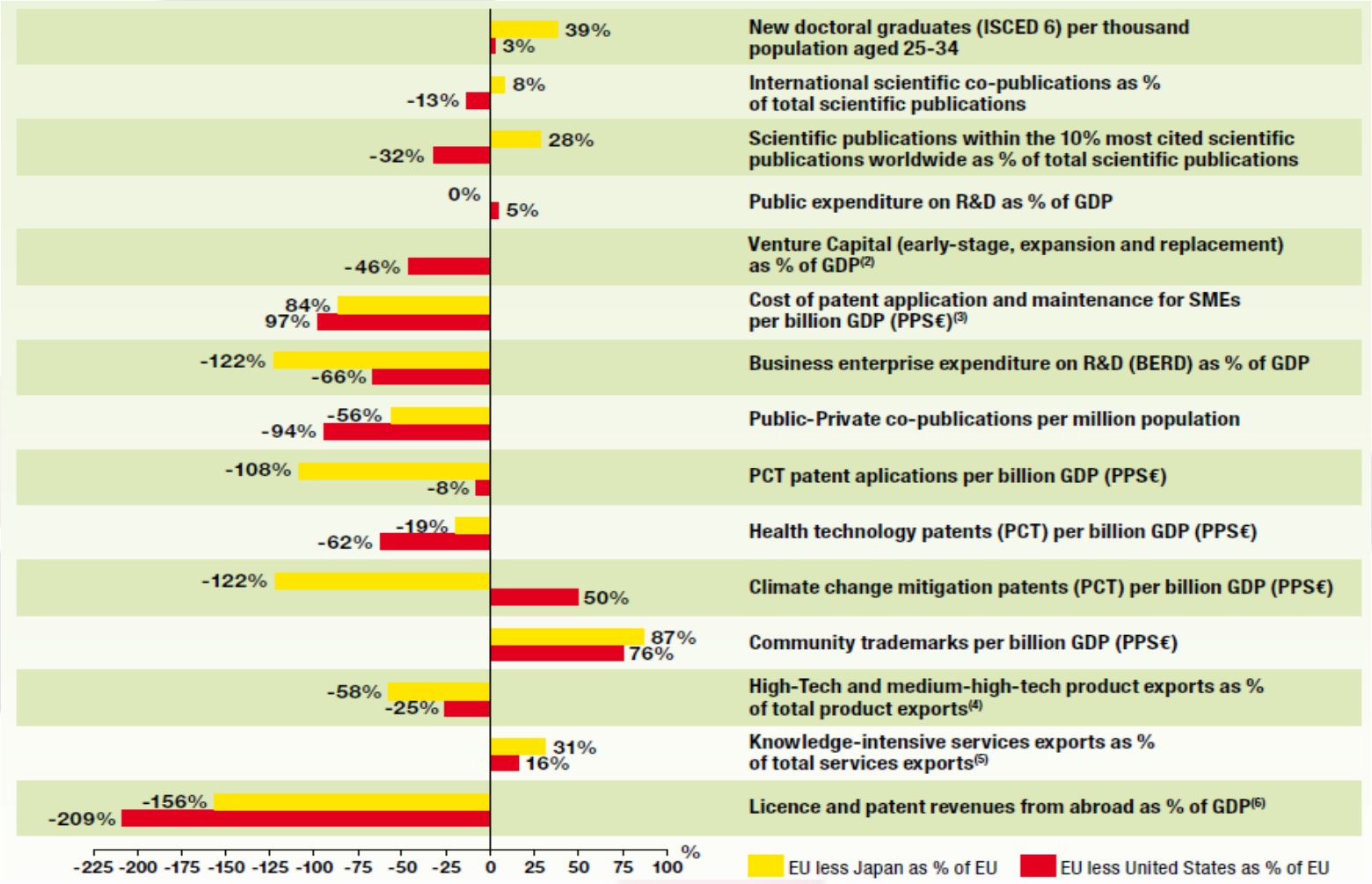
Participation of major countries / regions in global R&D indicators (% share)



Source: Innovation Union Competitiveness Report 2011

Notes: (1) Elements of estimation were involved in the compilation of the data.
(2) GERD : Shares were calculated from values in current PPS€.
(3) (i) The 10% most cited scientific publications - fractional counting method;
(ii) Developed Asian Economies does not include SG and TW.
(4) Patent applications under the PCT (Patent Cooperation Treaty), at international phase, designating the EPO by country of residence of the inventor(s).
(5) The coverage of the Rest of the World is not uniform for all indicators.

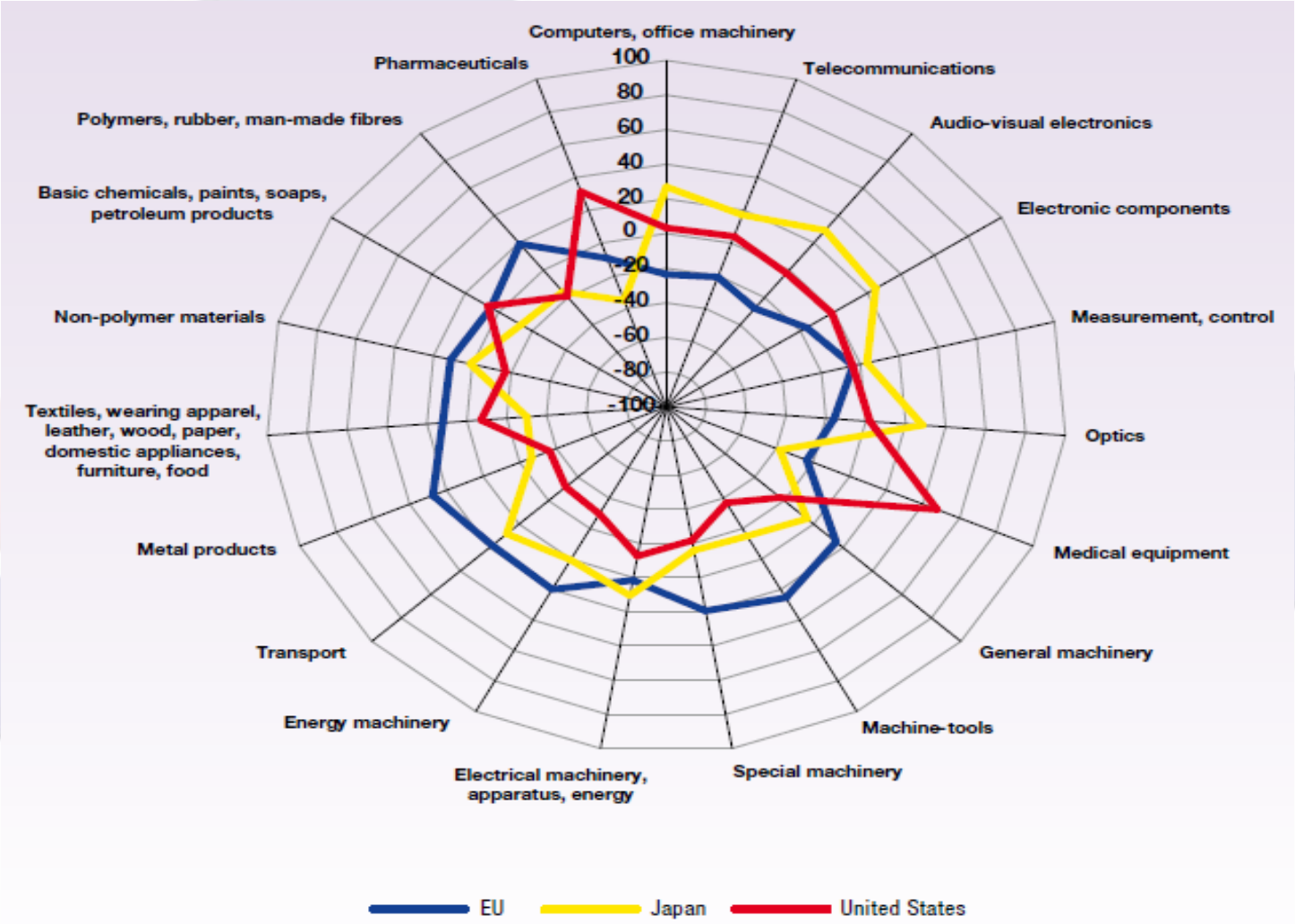
Differences between the EU and the United States and Japan in Research and Innovation indicators, 2009



Source: Innovation Union Competitiveness Report 2011

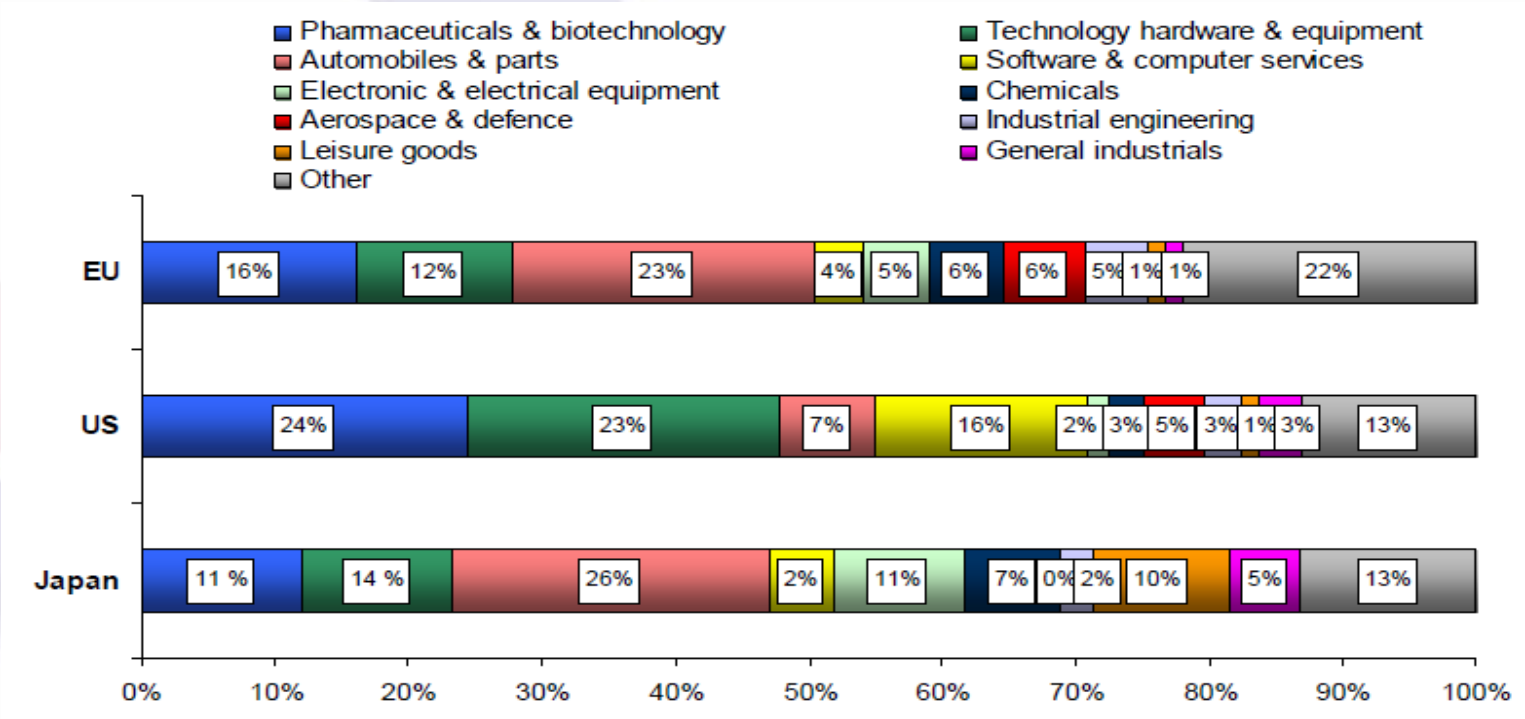
Notes: (1) The values refer to 2009 or to the latest available year.
(2) EU does not include EE, CY, LV, LT, MT, SI, SK.
(3) The values are on the left side of the graph because they express higher costs.
(4) EU includes intra-EU exports and was calculated from the uweighted average of the values for the Member States.
(5) EU includes intra-EU exports.
(6) EU refers to extra-EU.
(7) Elements of estimation were involved in the compilation of the data.

Technological specialization per sector (EU, US, and Japan / 2005-2006)



Source: Innovation Union Competitiveness Report 2011

R&D shares of sectors of the main world regions



Source: The 2011 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD

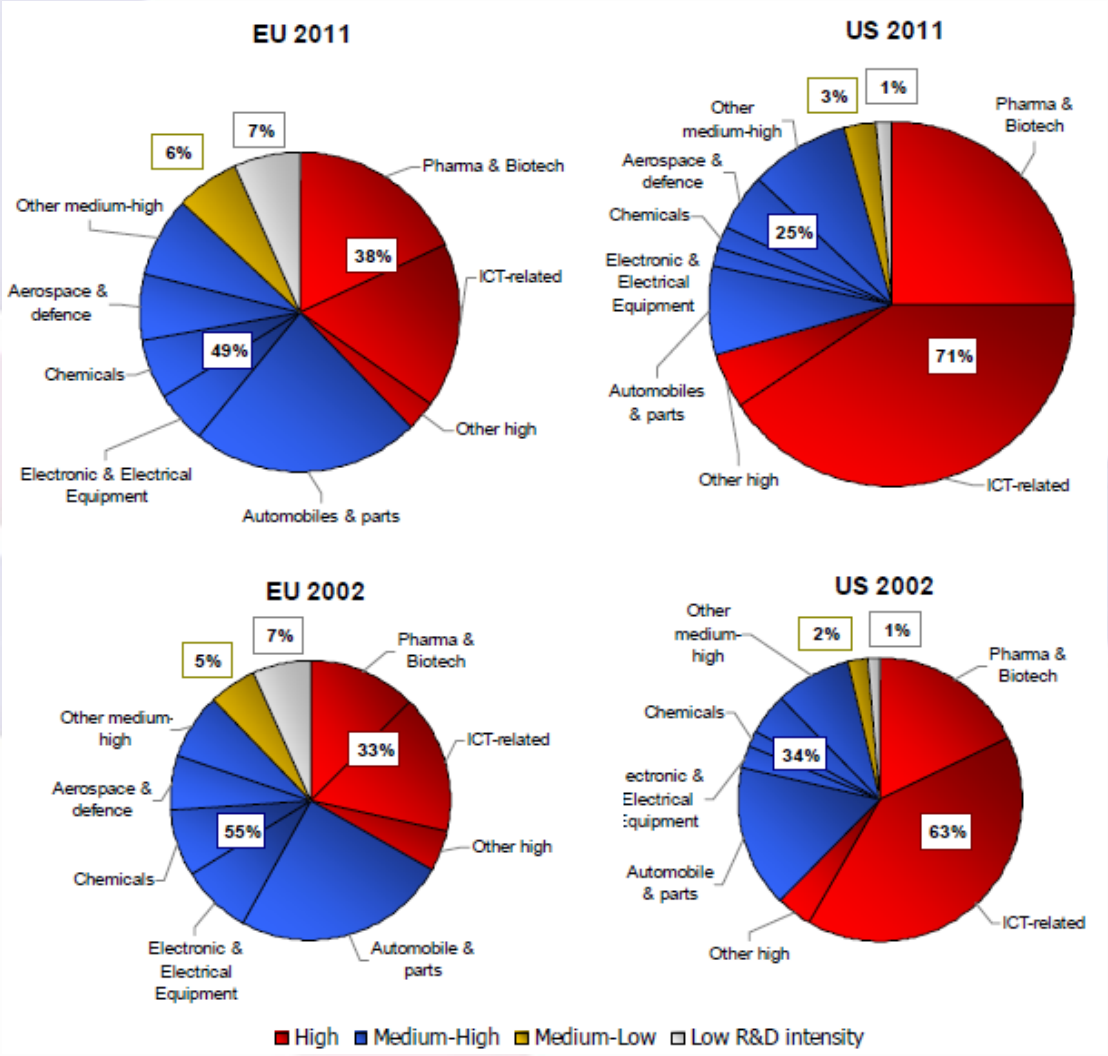
% R&D investment of EU and US companies by sector group

High R&D intensity sectors (R&D intensity above 5%) include Pharmaceuticals & Biotechnology; Health Care Equipment & Services; Technology Hardware & Equipment; Software & Computer Services.

Medium-high R&D intensity sectors (between 2% and 5%) include Electronics & Electrical Equipment; Automobiles & Parts; Aerospace & Defense; Industrial Engineering & Machinery; Chemicals; Personal Goods; Household Goods; General Industrials; Support Services.

Medium-low R&D intensity sectors (between 1% and 2%) include Food Producers; Beverages; Travel & Leisure; Media; Oil Equipment; Electricity; Fixed line Telecommunications.

Low R&D intensity sectors (less than 1%) include Oil & Gas Producers; Industrial Metals; Construction & Materials; Food & Drug Retailers; Transportation; Mining; Tobacco; Multi-Utilities.



Source: The 2011 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD

(For a sample of 489 EU and 361US companies for which data is available for all years Scoreboards. Data adjusted to the 2011 Scoreboard exchange rates. The area of the pies approximately corresponds to the respective total R&D investment amount.)

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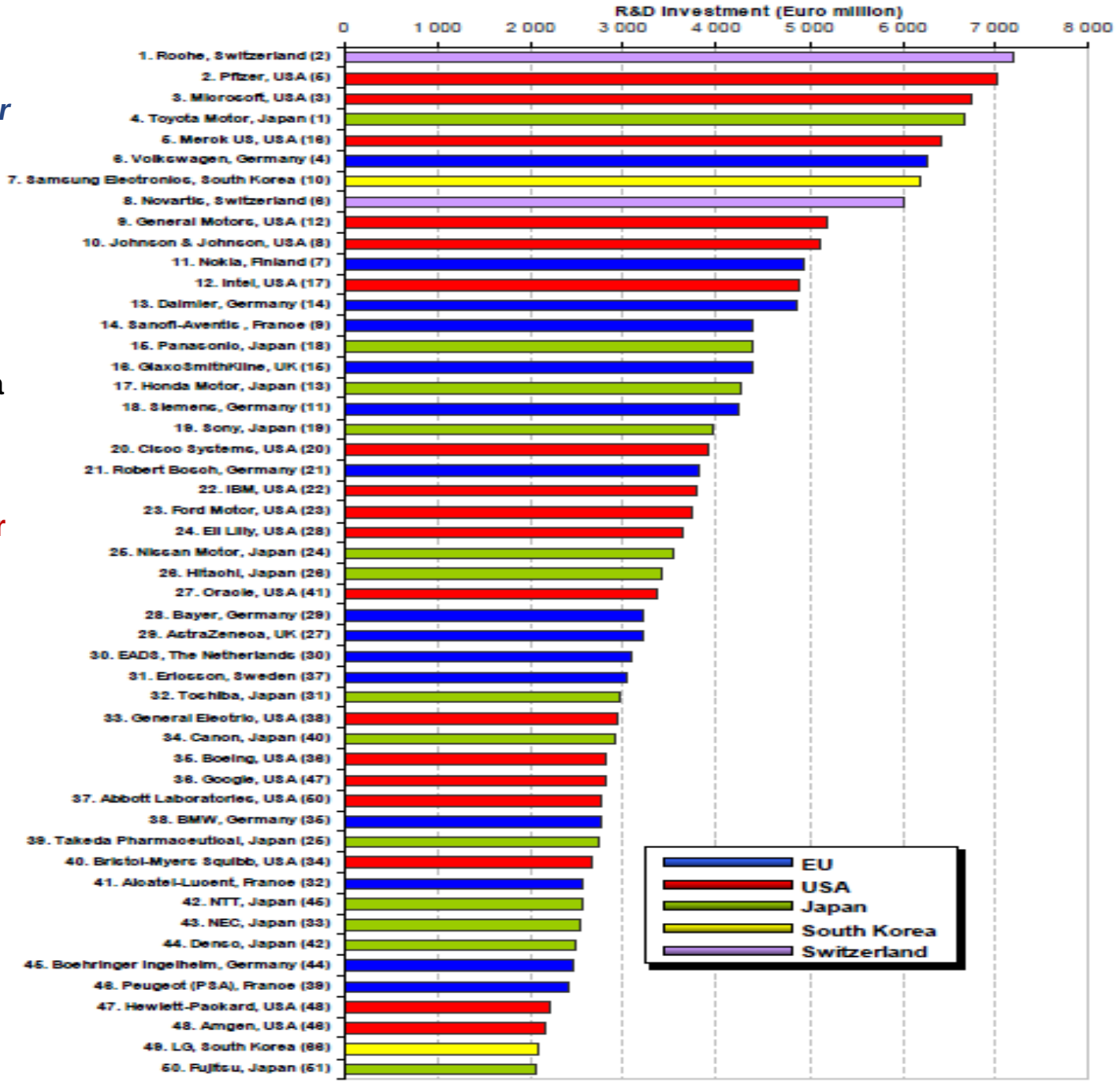
The world's top 50 companies by their total R&D investment in the 2011 Scoreboard

- **18 US**
- **15 EU**
- **13 Japan**
- **2 South Korea**
- **2 Switzerland**

- **11 in the transport sector (9 car, 2 airplane manufacturers)**

Source: The 2011 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD



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The trends in R&D follow the trends in global economics …

- **Globalization of challenges** (climate change / health and ageing / environment and natural resources / energy / transport / others)
- **Globalization of knowledge**
- **Globalization of research and innovation capacities**
- **Globalization of know how and innovation transfer**
- **Innovation of strategic importance**

… the impacts of the global economic crisis on Transport R&D are quite felt by region, on …

- **R&D priorities and** (especially private) **funding**
- **Public investment in R&D (**tends to increase through « recovery » packages)
- **Private participation in R&D** (reduced especially by SMEs)
- **Innovation becoming the overarching policy objective of governments** driving all other policies
- **increased emphasis on international research cooperation**

→ **Transport is one of the main fields suitable for international cooperation!**

Areas suitable for International cooperation in Transport research

Technologies

- Interoperability
- Cost-efficiency
- Economies of scale
- Integration
- Value - added innovation

Services

- Ubiquity
- Seamlessness
- Continuity
- Common standards

Business models

- Dispersed vs centralised
- End-to-end value added for all stakeholders
- Cost-benefit analysis
- Public-Private Partnership

Policy frameworks

- Bilateral or multilateral Governmental agreements
- Liability issues
- Data protection
- Security issues
- Quality standards
- Coordinated deployment

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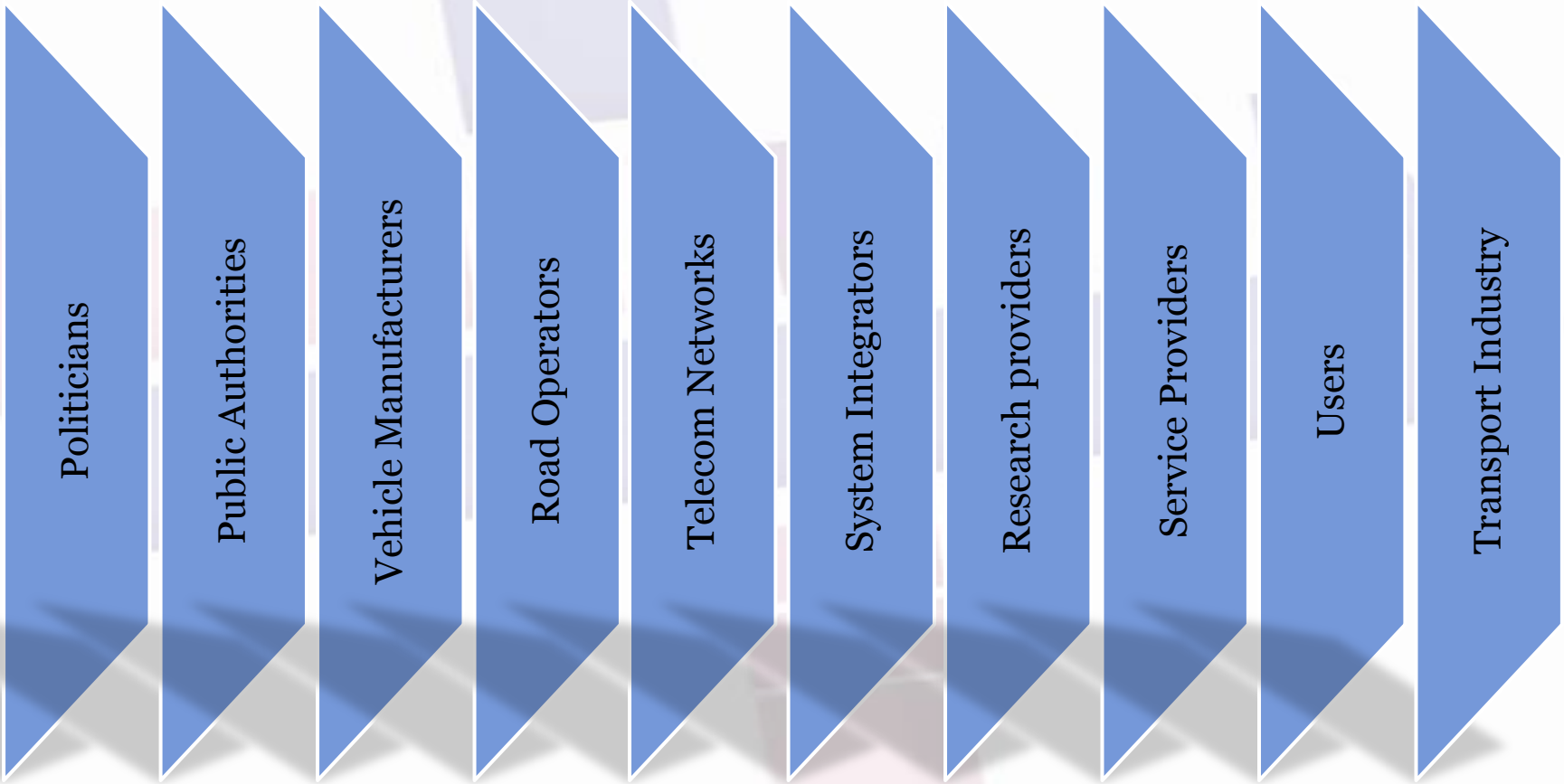
International cooperation in Transport R&D

a chance to create wider synergies and value added by involving all relevant stakeholders …



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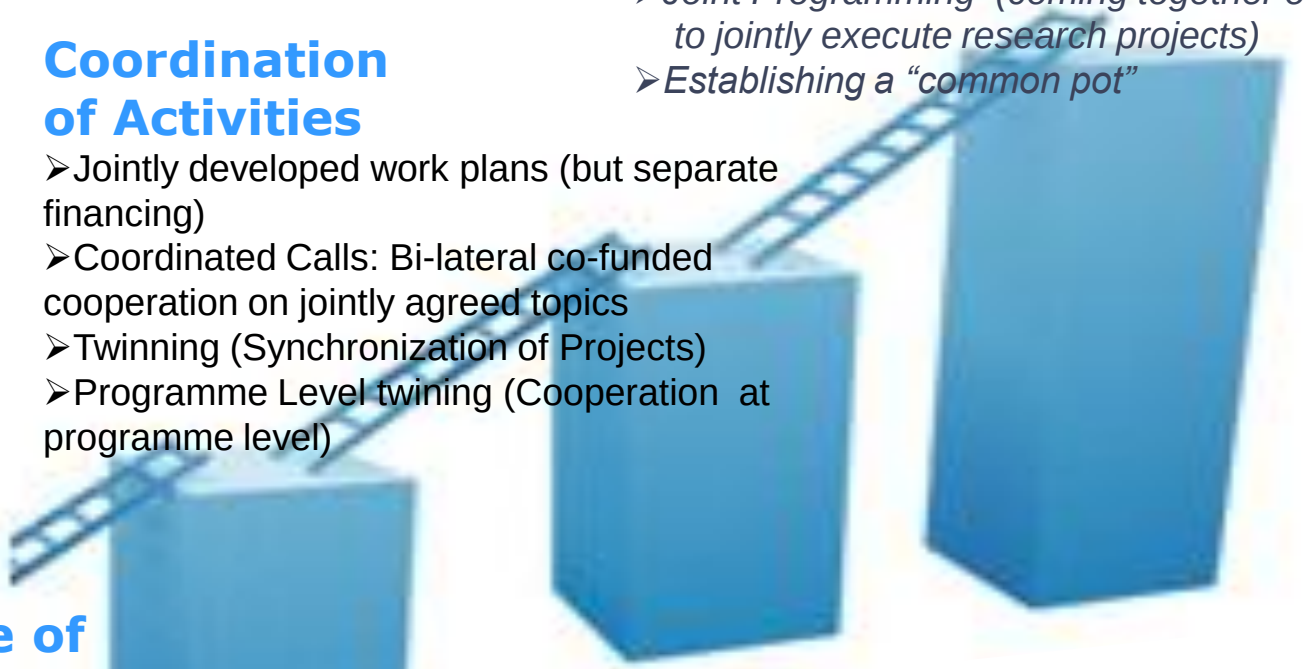
… through many levels and tools of cooperation

Pooling of Resources

- *Investing in foreign R&D (e.g. creating a research center in a foreign country)*
- *Joint Programming (coming together of partners to jointly execute research projects)*
- *Establishing a "common pot"*

Coordination of Activities

- Jointly developed work plans (but separate financing)
- Coordinated Calls: Bi-lateral co-funded cooperation on jointly agreed topics
- Twinning (Synchronization of Projects)
- Programme Level twining (Cooperation at programme level)



Exchange of Information

- Scanning tours & Piloting projects;
- Bilateral Sharing of Know-How
- Hosting of Scientists
- Knowledge Exchange through a Centralized Coordinating Entity.
- "Twining" of different government jurisdictions
- Scientist to scientist exchanges and bi- or multilateral meetings.

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Thank you for your attention

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