Ways of successful science, technology and innovation cooperation between Europe and the USA

BILAT-USA Symposium, Vienna, 23-24 April 2012

EU-USA S&T cooperation in a global context

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Overview

- Changing landscapes of knowledge production
- Internationalisation, collaborative research
- EU and U.S. in global research and in FP7
- Facilitating collaboration
- New EU policy context 2014-2020
- Summary

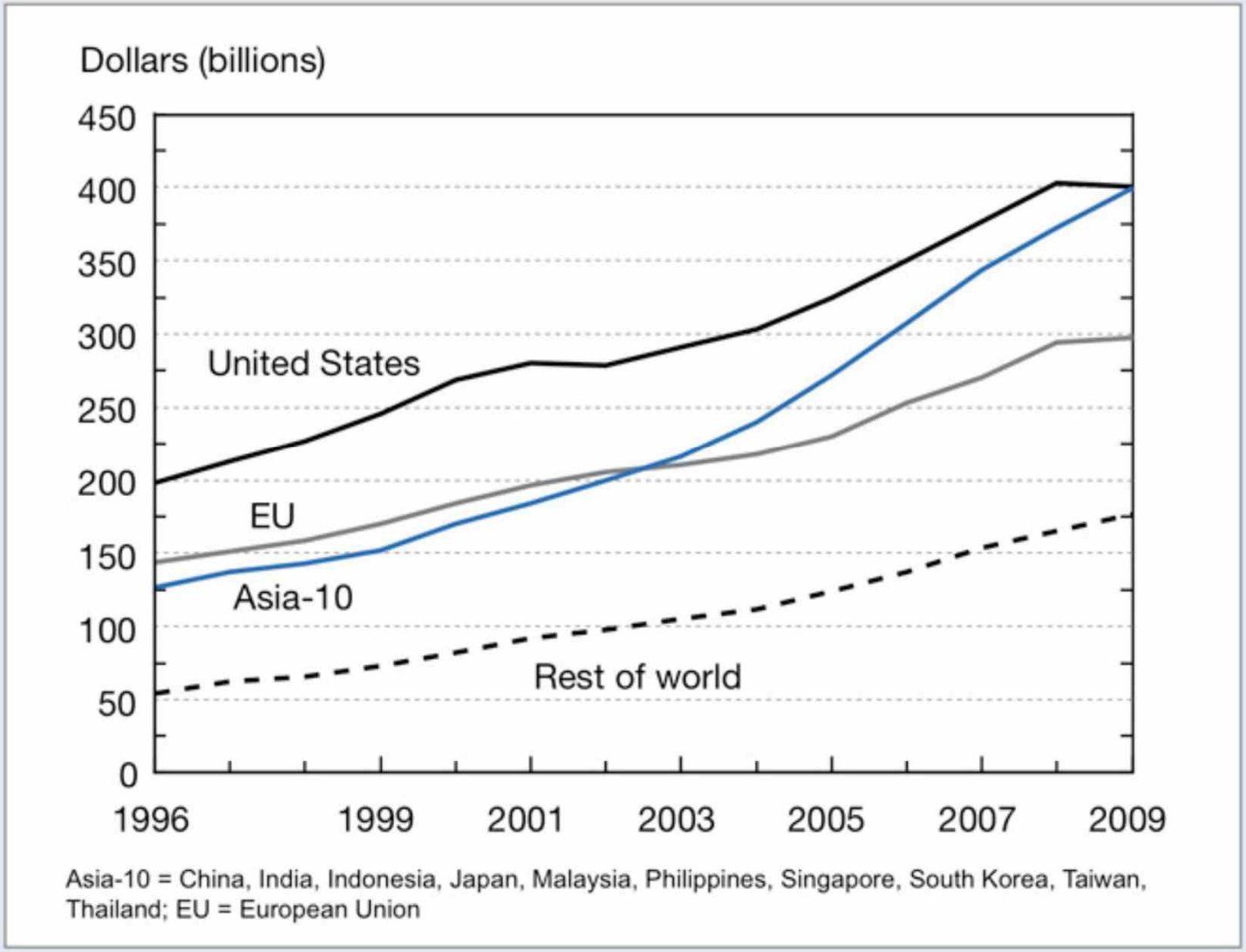
Changing landscapes of knowledge production
Towards a multi-polar S&T world

- **UNESCO Science Report 2010:**
  "The USA and Europe still lead the global science research effort, but their future is uncertain."
- **China from 2000 to 2011:**
  - Expenditure for R&D: € 11.3 bn ($ 10.8) bn to € 103.8 bn ($ 136.2 bn)
  - GERD to GDP: from 0.90% to 1.83%
  - Enterprise sector: from 60% to 73% (by 2008)
  - Number of researchers (2002-2007): 0.81 mio to 1.42 mio
  - Scientific publications (SCI): second only to US
- **Universities from emerging countries moving up in the ranking lists and a dynamic growth of the S&T workforce**

➢ **A need for new approaches and changed paradigms in S&T**

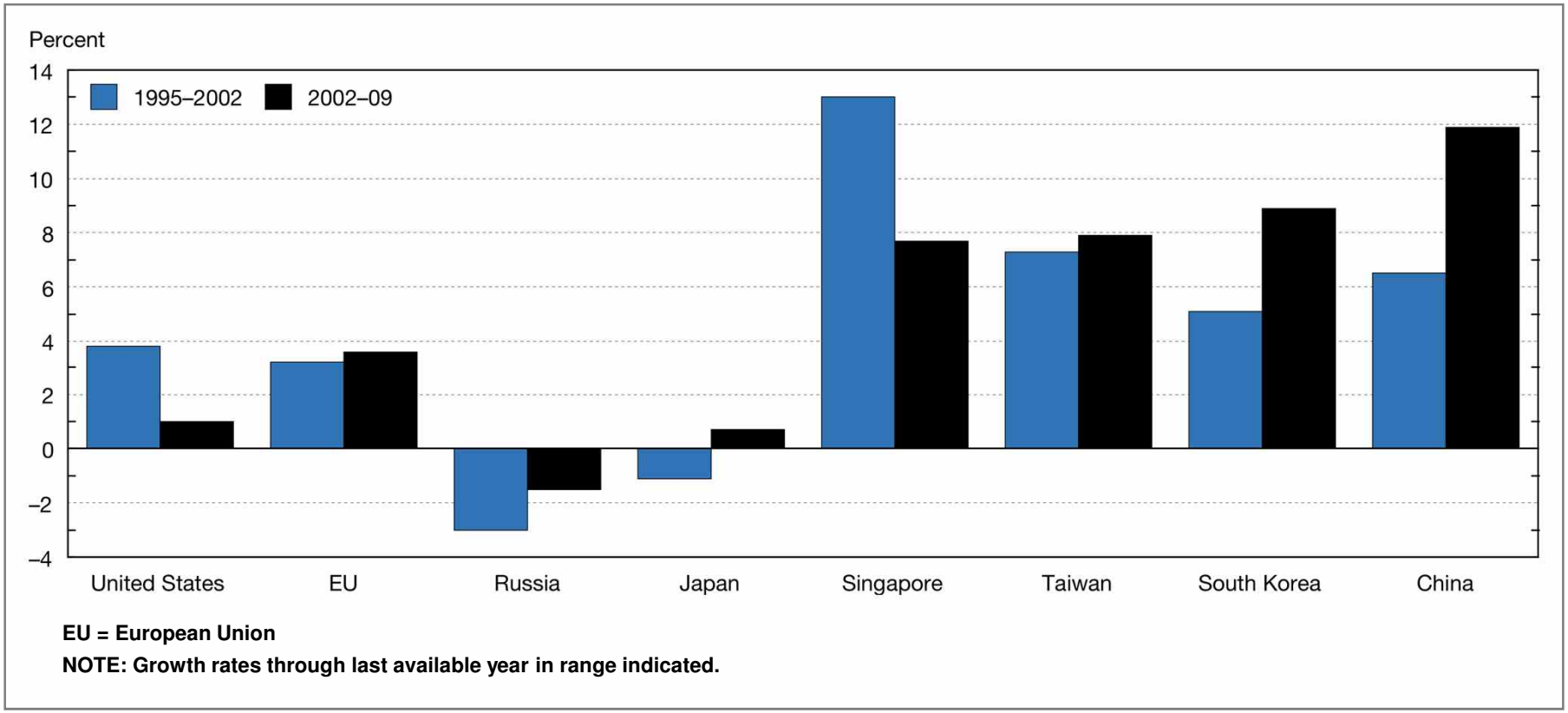
- The "New Sputnik Moment" (Obama, Chu, Friedman)
- Balancing between competition and collaboration
- From globalisation to "globality"

R&D expenditures for United States, EU, and 10 Asian economies: 1996–2009



SOURCE: National Science Board, *Science and Engineering Indicators 2012*

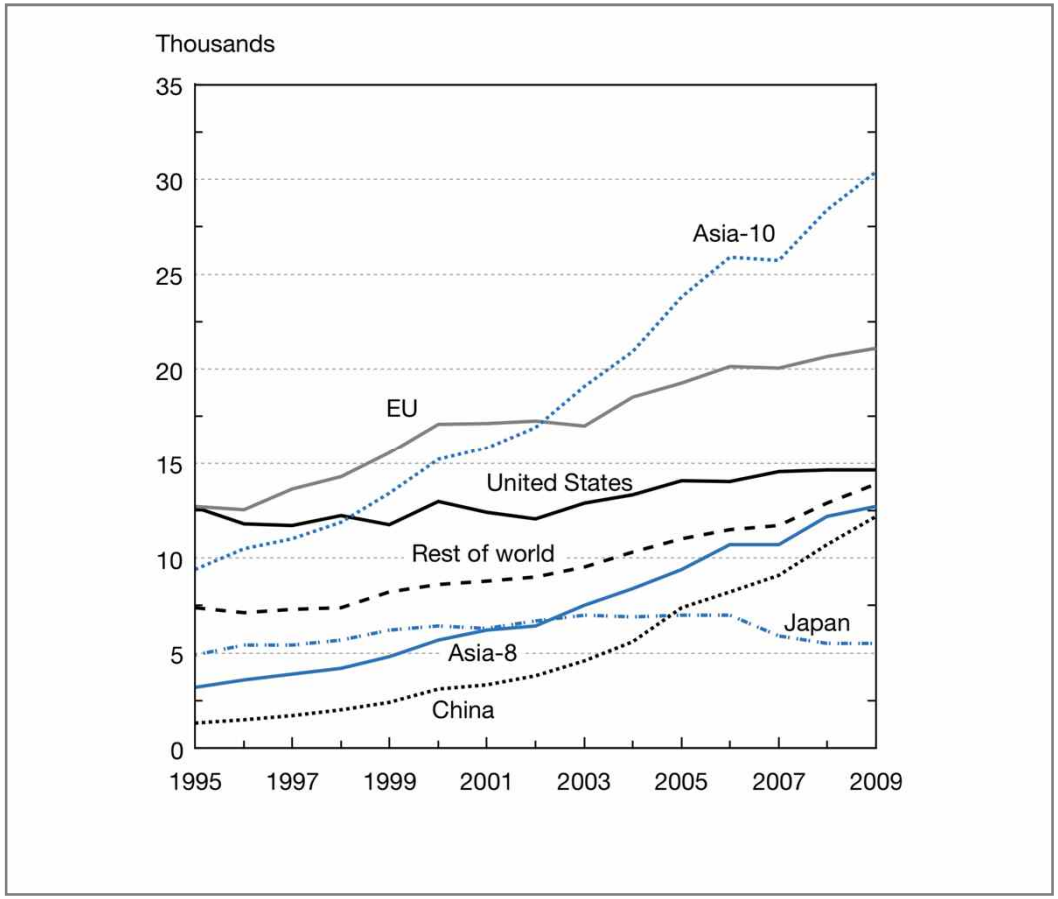
Average annual growth in number of researchers, by region/country/economy: 1995–2002, 2002–09



EU = European Union

NOTE: Growth rates through last available year in range indicated.

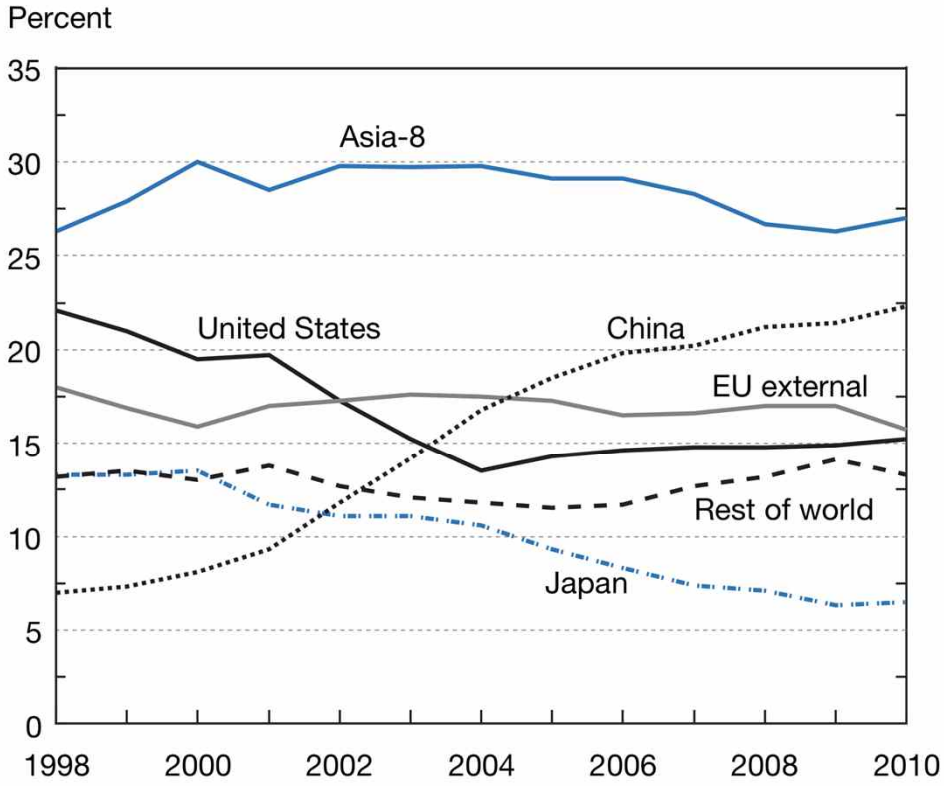
Engineering journal articles produced, by selected region/country: 1995–2009



Asia-8 = India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand; Asia-10 = Asia-8 plus China and Japan; EU = European Union

National Science Board: Science and Engineering Indicators 2012

Share of global high-technology exports, by selected region/country: 1998–2010



Asia-8 = India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand; EU external = European Union trade excluding intra-EU exports

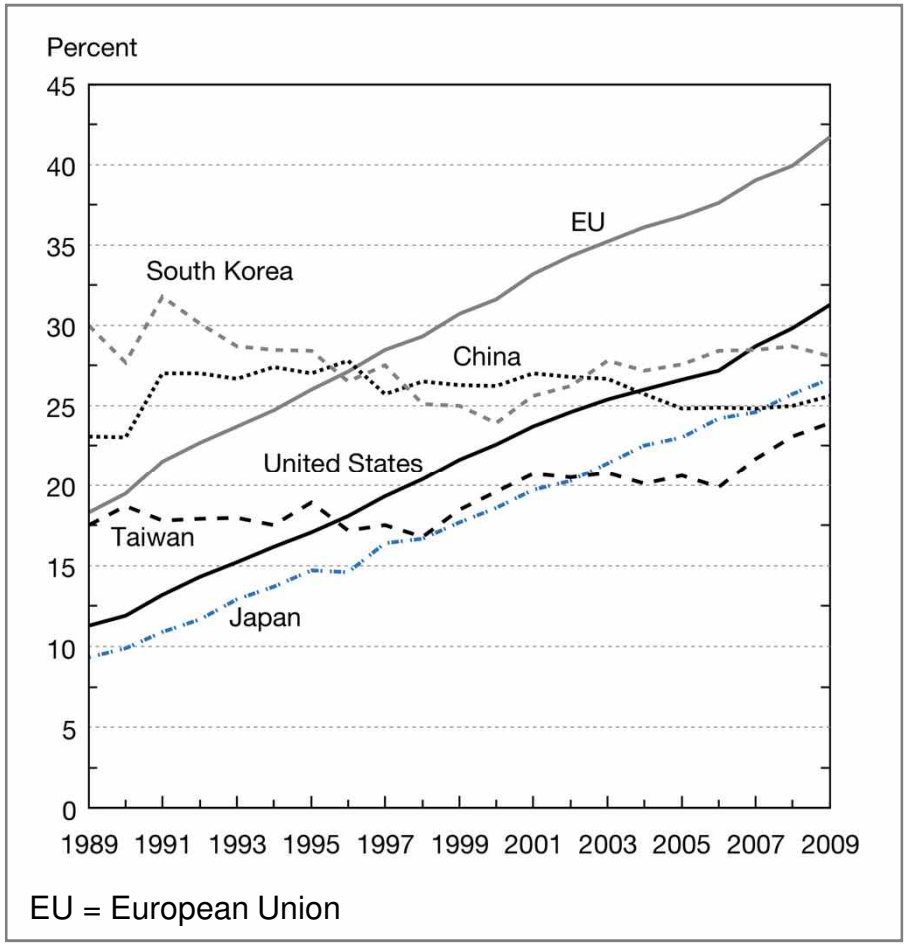
NOTE: Industries defined by Organisation for Economic Co-operation and Development.

National Science Board: Science and Engineering Indicators 2012

Internationalisation of S&T

- **Increasing international collaboration**
  - 35% of articles published in international journals are internationally collaborative, up from 25% 15 years ago.
  - Average collaboration distance: 1980: 334 km, 2009: 1,553 km
- **e-science, networked science**
  - ICT infrastructure supporting collaborative research
  - Virtualisation of science – Virtual institutes, centres, labs, …
  - “The rising tide of scientific data” (J. Wood et al.)
  - On-line joint research programmes
  - Improved insights of benefits of collaboration and team cognition
- **Europe as a fore-runner of collaborative research**

Research articles with international coauthors, by selected region/country/economy: 1989–2009



National Science Board: Science and Engineering Indicators 2012

Drivers of international cooperation
Main actors

- **Individual researchers**
  - To work with the best scientists in the world
- **Research institutions**
  - Universities and research centres forming strategic alliances
- **Business**
  - Internationalisation of business R&D
  - Globality: utilizing knowledge resources worldwide
- **Governments, intergovernmental arrangements, EU, etc.**
  - To improve the quality and critical mass of national science bases
  - Joining forces for addressing complex problems and global challenges
- **International initiatives, e.g. ICPC, CGIAR; CERN, ITER, SKA**
  - Addressing global challenges, complex S&T issues
  - Making large scale research facilities possible

Drivers for international S&T cooperation
Different paradigms

- **Narrow paradigm**
  - Supporting S&T excellence and access to complementary expertise
  - Exploiting the potential for creativity in collaborative teams
  - Access to unique environments, resources and advanced infrastructures
  - Increased visibility and impact
  - Capacity building, human resource development
  - (Complementary) funding

- **Broader paradigm**
  - Strengthening global competitiveness
  - Addressing global challenges
  - Development of less advanced countries (MDG)
  - Higher education policy, attracting talent, forming strategic alliances
  - Accessing new markets
  - Foreign policy for science; internationalisation strategies of nations
  - Science diplomacy

➢ **Bottom-up vs/and top-down**

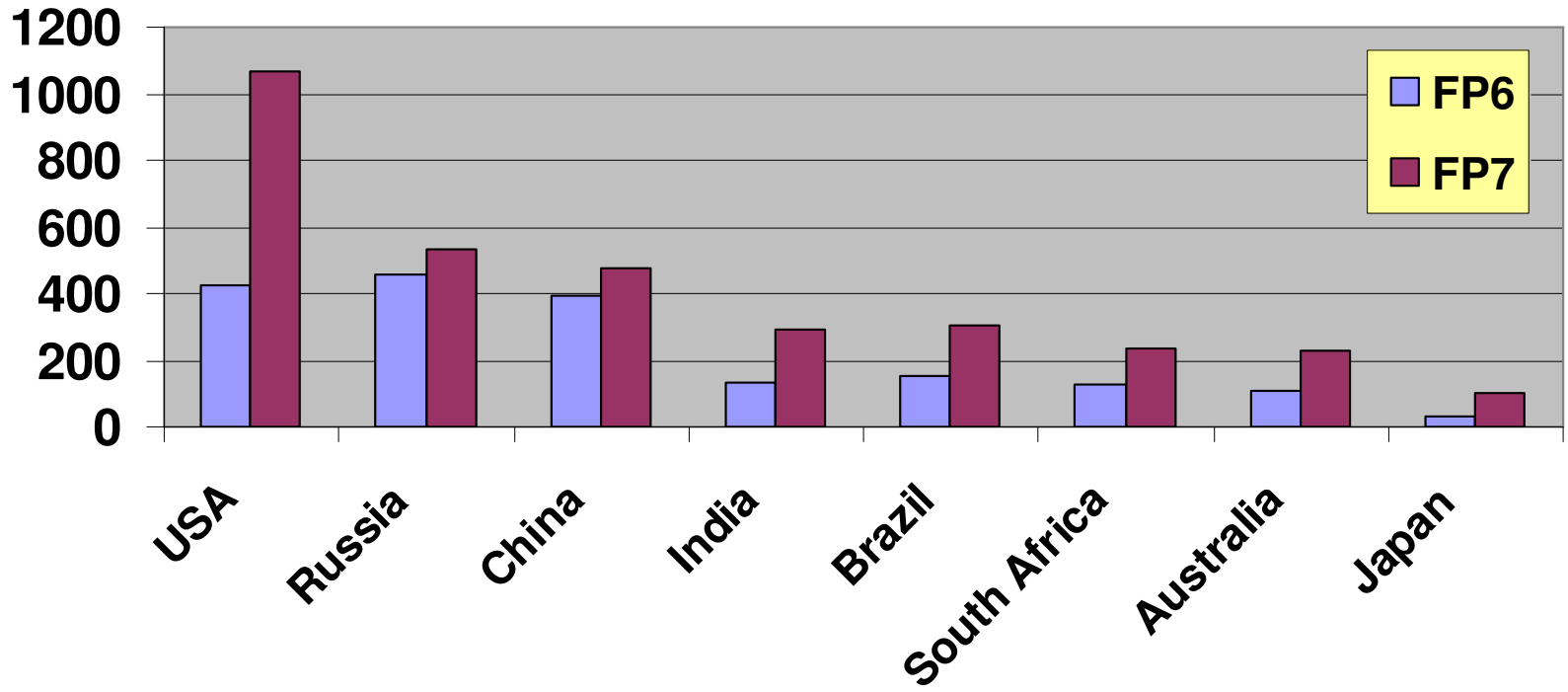
See e.g.: Boekholt et al.: Drivers for Research Collaboration, technopolis, 2008

EU and USA in global R&D
A strong partnership

- **Researchers:**
  - EU is home to 23% of the world's researchers
  - US 26.8%
- **World's publications in 2006**
  - 37.6% with EU co-author
  - 31.5% with US co-author
- **Patent applications:**
  - EU produces 36%
  - US 39.7%
- **Increase in R&D investment 2000-2006:**
  - EU 14.8%
  - US 10.1%
- **Top 1.400 R&D Companies in the World**
  - EU 30.6%
  - US 34.3%
- **R&D investments of firms (MNEs)**
  - US firms invested € 13.24 bn in EU
  - EU firms invested $ 13.24 bn in US

EU-U.S. Collaboration in FP6 and FP7

Is the potential fully exploited?



All participations in FP6 (2003 - 2006): 74.400

Participations in FP7 (2007 - Feb 2012): 79.167

Data: European Commission

EU-U.S. Collaboration in FP6 and FP7

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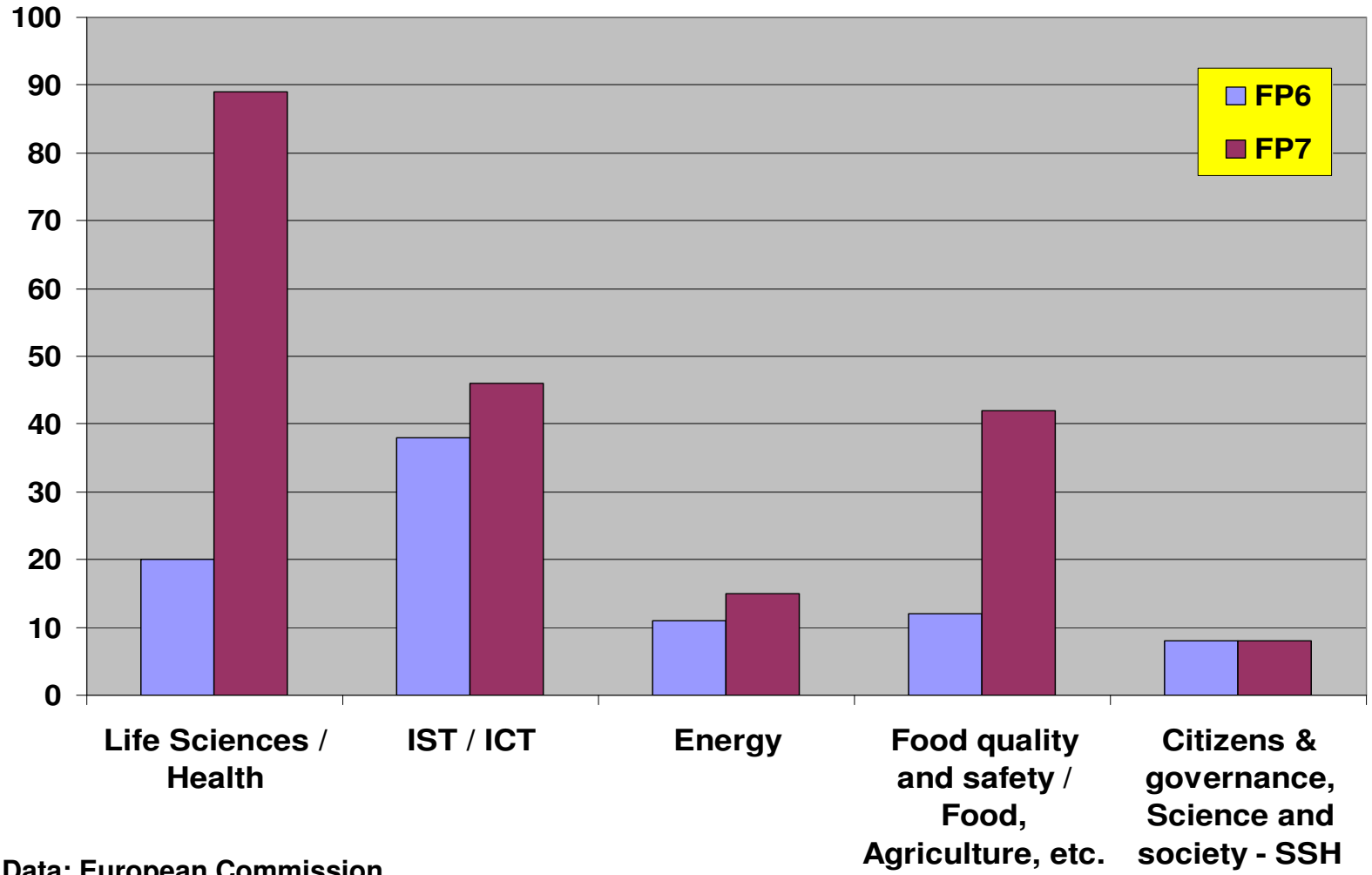

Data: European Commission

Benefits of EU-U.S. Collaboration in FP7

Some lessons learned

- **Access to specific expertise**
- **Improvement of scientific excellence**
- **Expected higher impact**
- **Establishing of wider collaboration network**
- **Improved EU-US relations in S&T**
- **Expectations of technological advantages and/or breakthroughs**

See: BILAT-USA: Analysis of Existing Instruments, Regulations and Obstacles for US participation in FP7, 2011
M. Horvat & K. Harrap: Review of Review of the Science and Technology Cooperation between the European Community and the United States of America 2003 – 2008, January 2009

Barriers to EU-U.S. collaborations in FP7

Some lessons learned

- **Lack of funding for US partners for international collaboration**
- **Applicable law and jurisdiction**
- **Different legal systems and institutional settings**
- **Contractual arrangements & administrative burden**
- **Low relevance of FP7 for US university administrators**
- **Different management approaches and cultures**
- **Communication & exchange of information**
- **Lack of awareness, information and support**

See: BILAT-USA: Analysis of Existing Instruments, Regulations and Obstacles for US participation in FP7, 2011
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Facilitating EU-U.S. collaboration
Joining forces for mutual benefit

Providing favourable framework conditions

- Interoperability of programmes, procedures & rules (incl. IPR)
- Aligning programmes facilitating the twinning of projects
- Forming alliances of programme owners and managers
- Establishing (virtual) joint labs and networks of centers of excellence
- Agreeing on standards of peer review & project selection
- Shaping researcher mobility for institutional collaboration
- Designing appropriate funding approaches (following the NIH-EC Potocnik-Zerhouni approach)
- Improving communication, raising awareness, visibility
- Better coordination and cooperation in EU and U.S.:
  EC DGs, EU Member States, U.S. Departments and Agencies

Changing EU policy contexts 2014-2020

- **New policy context for 2014-2020**
  - Europe 2020
    - Smart, sustainable and inclusive growth
    - Major Flagship Initiatives
  - Innovation Union
    - Key role of research and innovation
    - EU R&D investment 3% of GDP by 2020
  - The new R&I programming period 2014-2020
    - HORIZON 2020 – Framework Programme for R&I
    - Cohesion Policy Funds – R&D, Innovation, Entrepreneurship
    - Joint instruments EU – Member States – Private sector
      - Joint programming Initiatives
      - PPP: Public-Public and Public-Private Partnerships

HORIZON 2020 – Open to the world
A seven years perspective for research & innovation

- **Proposed budget: € 80 bn (2014-2020)**
- **Priorities**
  - Societal challenges:
    - Health, demographic change and well-being;
    - Food security, sustainable agriculture, marine and maritime research and the bio-based economy
    - Secure, clean ad efficient energy
    - Smart, green and integrated transport
    - Climate action, resource efficiency and raw materials
    - Inclusive, innovative and secure societies
  - Industrial leadership:
    - Key Enabling Technologies, SMEs
  - Scientific excellence:
    - European Research Council, Researcher Mobility, Future & Emerging Technologies, Research Infrastructures
- **The European Institute for Innovation & Technology (EIT)**

Some possibilities for joint EU-U.S. initiatives

- **General opening**
- **Programme level coordination**
- **ERA-NETs**
  - Joint actions between national programme owners
- **Joint Programming Initiatives**
  - E.g. Neurodegenerative Disease Research, A healthy diet for a healthy life, Urban Europe
- **Public-Public and Public-Private Partnerships**
  - Joint Technology Initiatives
    - E.g. Fuel cells & Hydrogen, Embedded Computer Systems, Nanoelectronics
  - PPPs Recovery Plan
    - Factories of the Future, Green Cars, Energy-efficient Buildings
  - European Institute of Innovation and Technology (EIT)
    - Knowledge and Innovation Communities
      - Energy, Climate, ICT; Added–value manufacturing, Food4future, Innovation for healthy living and active aging, Raw materials, Smart secure societies
- **European Research Council, Marie Curie, Research Infrastructures**
- **Joint labs and virtual institutes (see also: SAVI)**
- **SFIC**: Identifying Member States' and EC's priorities for joint initiatives**
- **Joint Consultative Group, EU-US Energy Council, EU-US Task Forces, etc.**

*** SAVI: Science Across Virtual Institutes (NSF)**
**** SFIC: Strategic Forum for International Cooperation**

Summary

- **Considering on researchers' needs**
- **Identifying areas of mutual interest and benefit**
- **Developing user-friendly frameworks and instruments for EU-US collaboration strategies and actions**
- **Choosing the right instruments creating win-win situations**
- **Mutual learning from EU and MS level approaches**

Thank you for your attention!

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