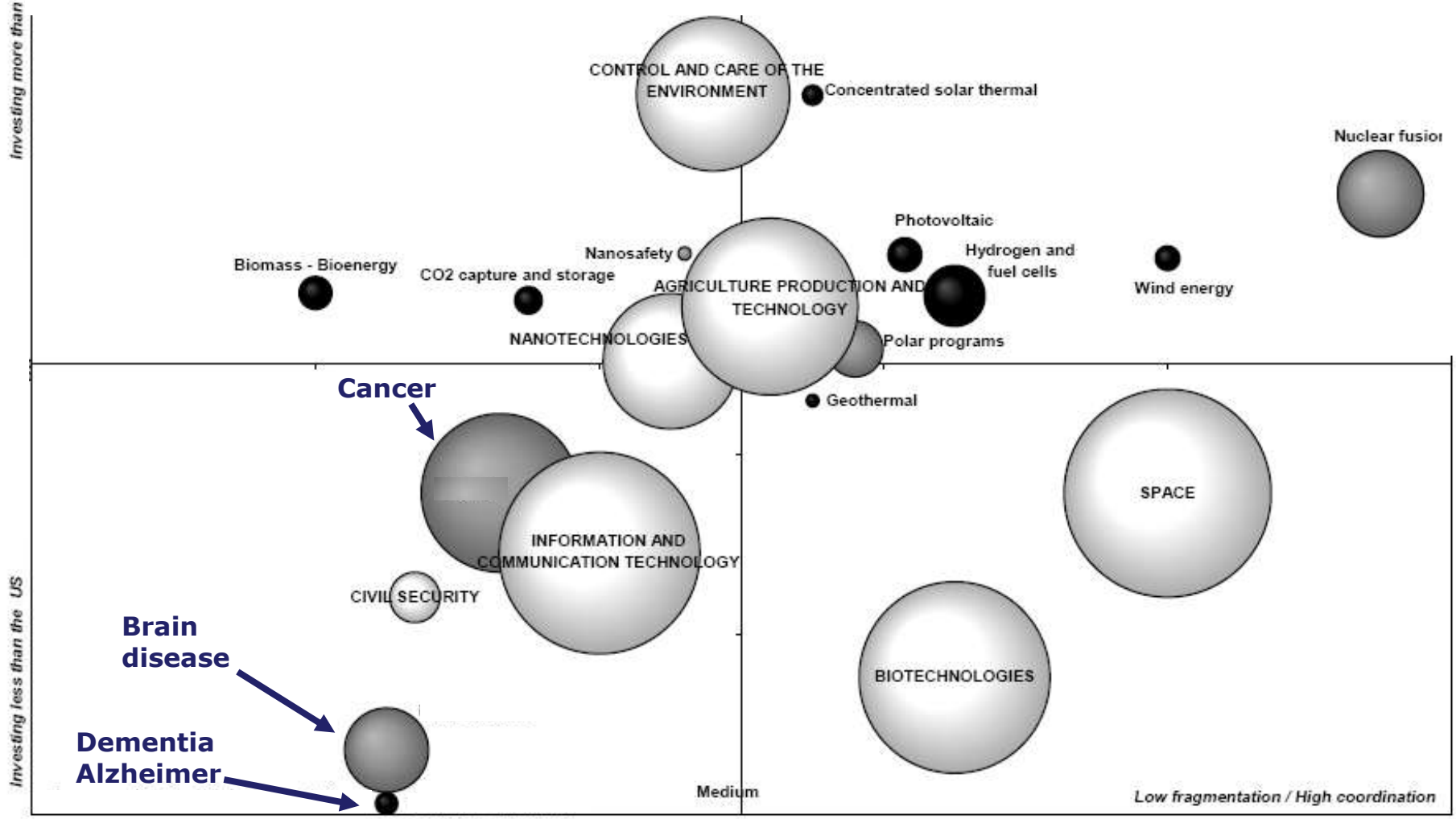
Science and Technology Cooperation between EU and Russia

A rewarding journey.

Didier Gambier, PhD
European Commission

Disclaimer: the views presented here are solely the one of its author and in no way can be considered or referred to as representing the views of the European Commission

Competitiveness of EU vs. US



Towards joint programming in research Working together to tackle common challenges more effectively, EU COM (2008) 468

EU Research and Innovation performance

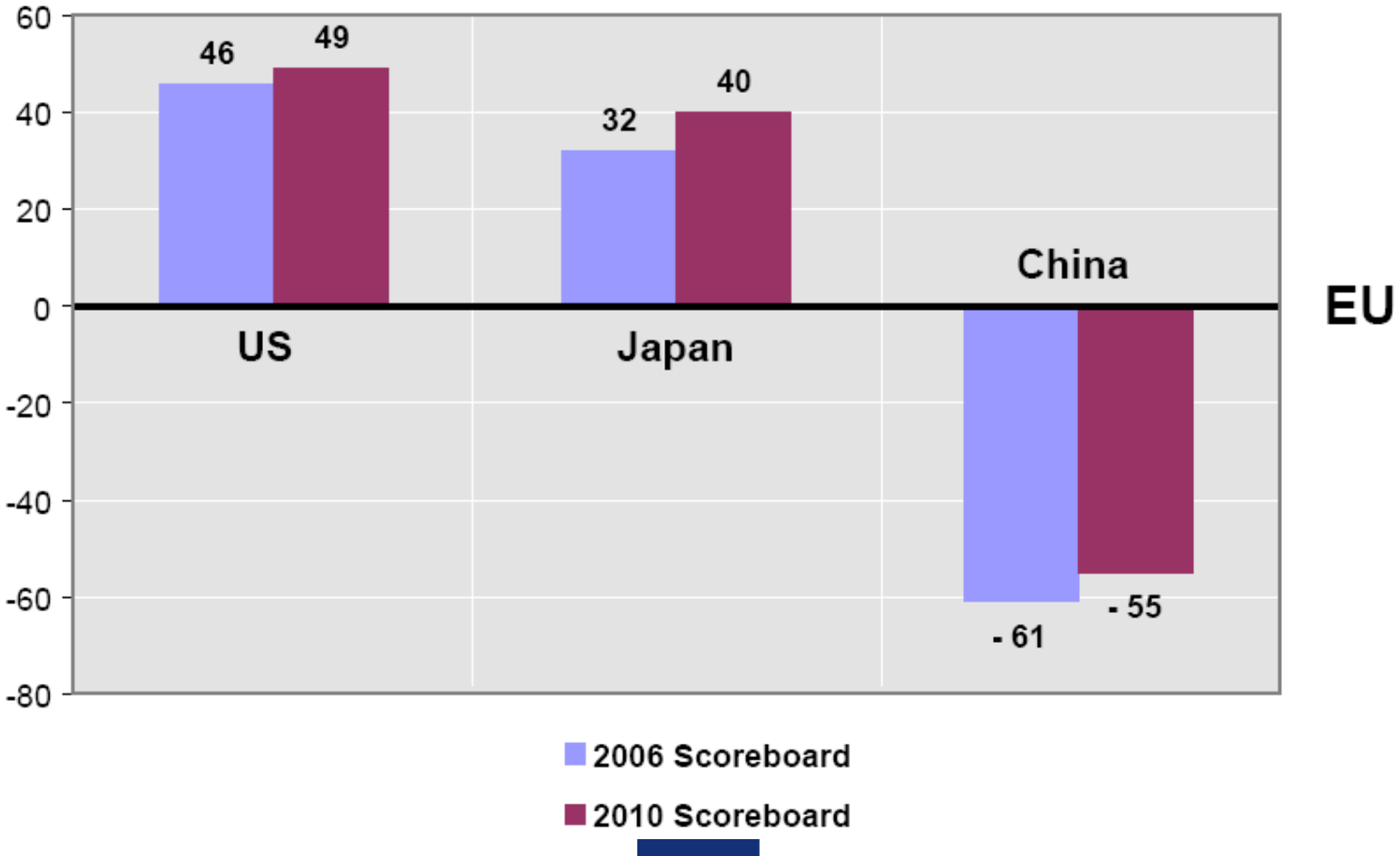
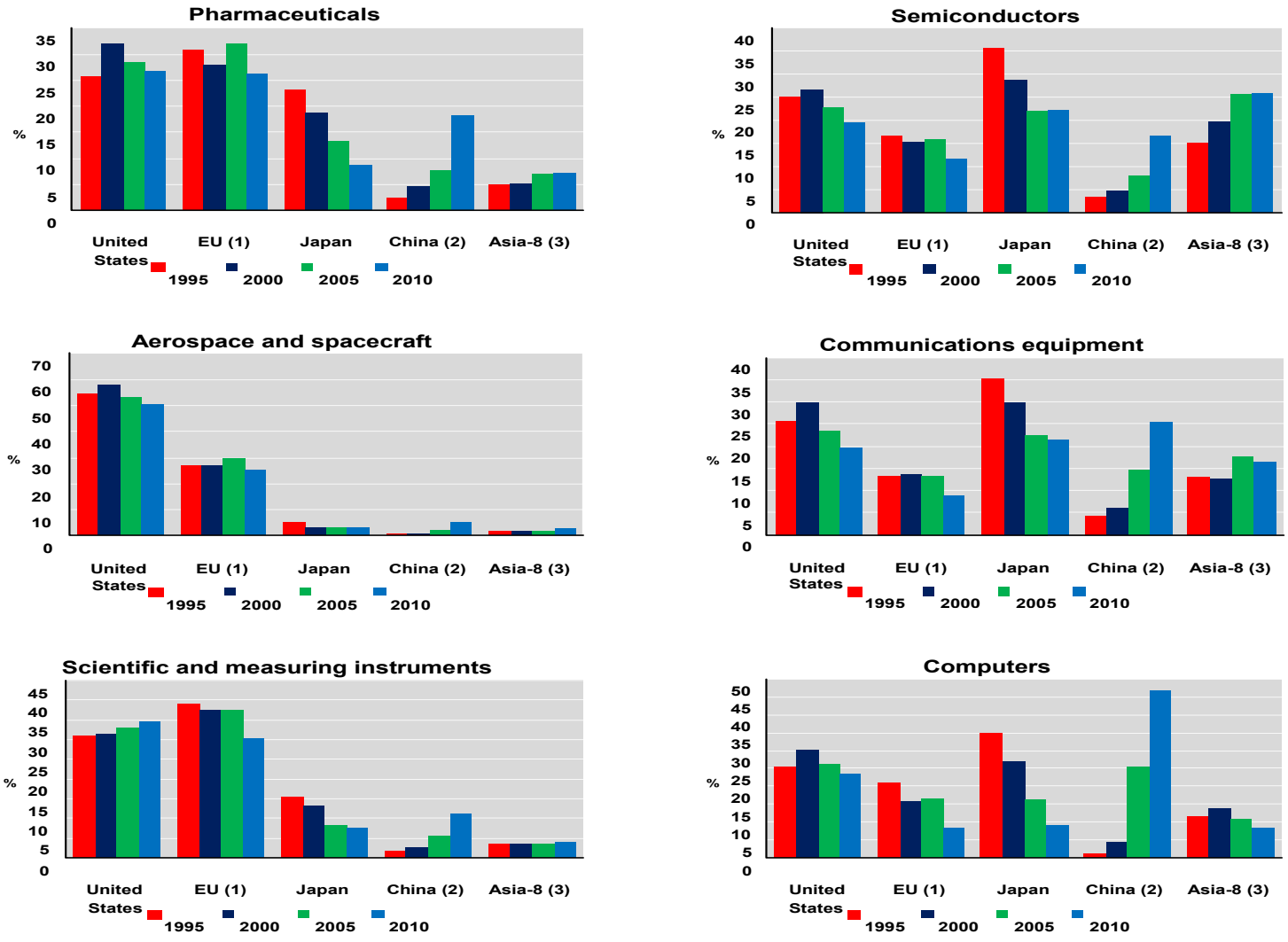
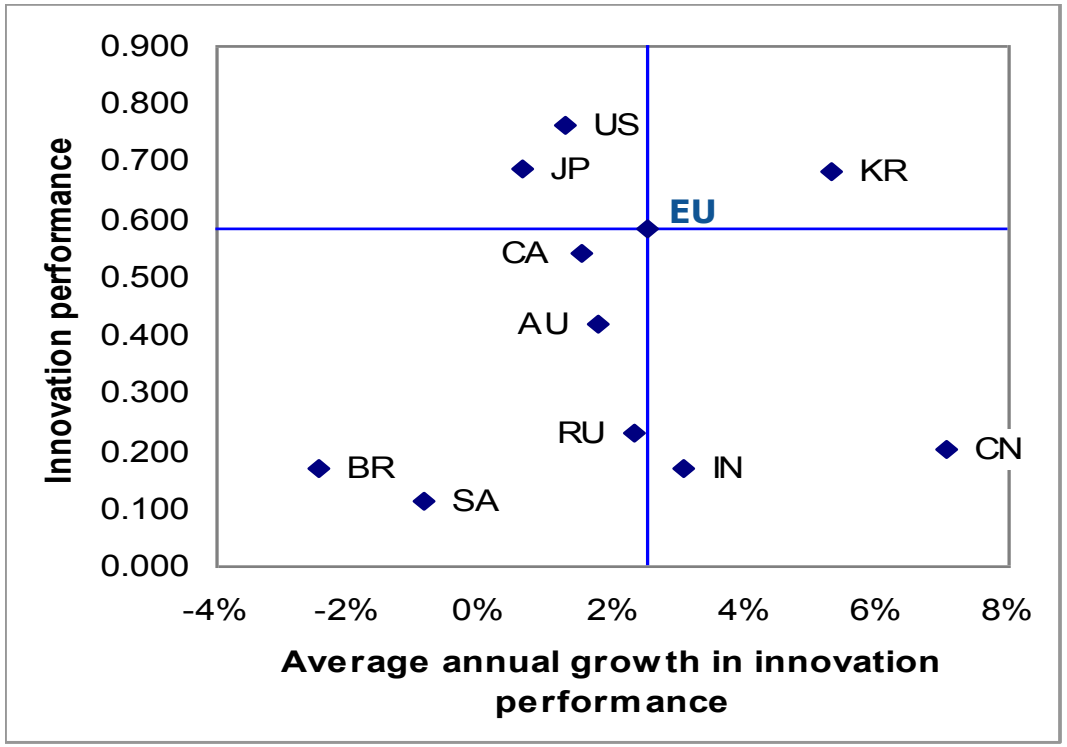


Figure 9: Value Added for selected manufacturing industries - global shares (%)

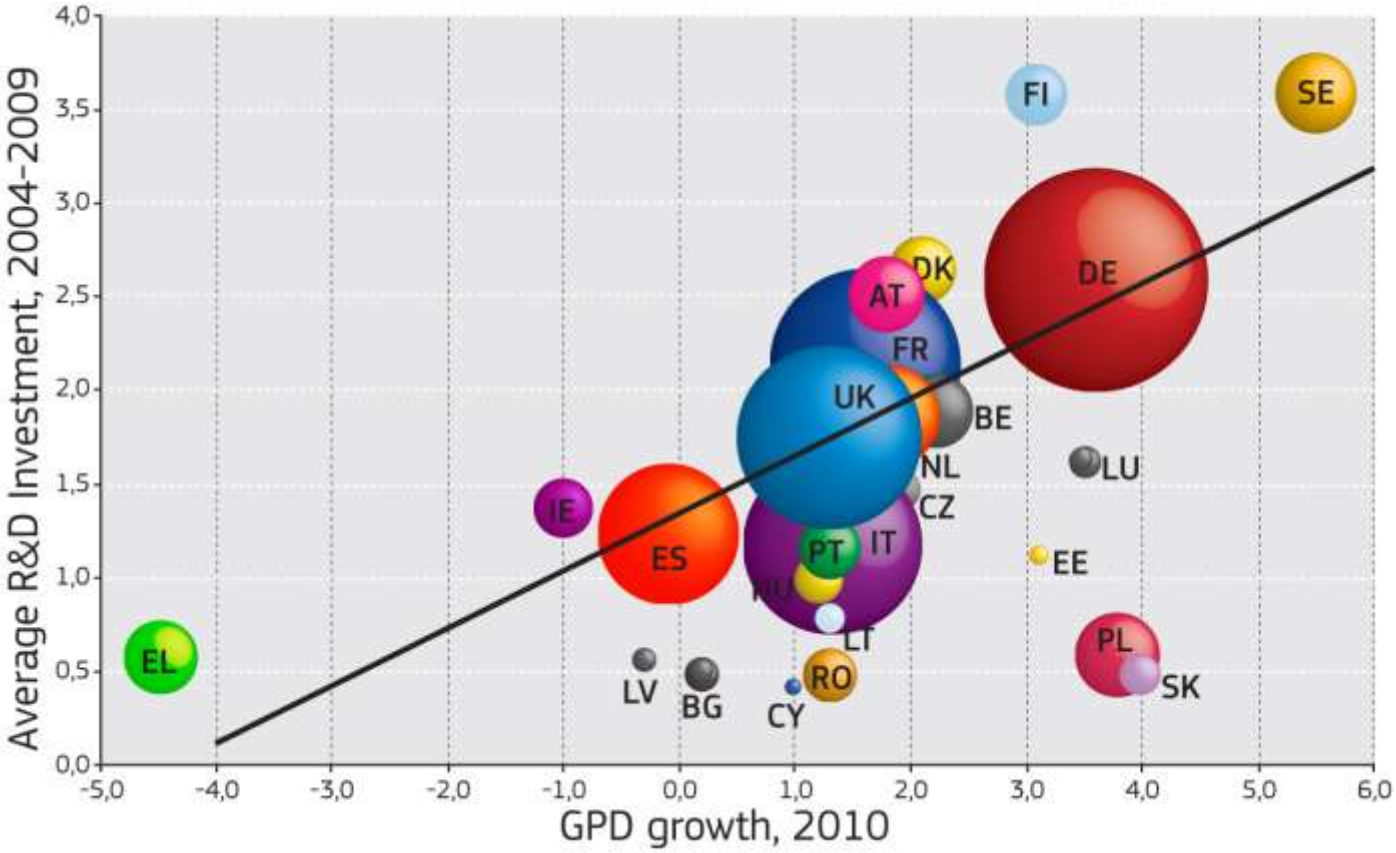


Source: DG Research and Innovation

Innovation performance and growth in innovation performance of the EU and its main competitors



Investment in R&D is part of the solution to exit from the economic crises



The developed and developing world sees the way out of the economic crisis through deployment of new technologies and innovations, in all sphere of society!

The overall scientific world, from Humanities to Basic science, is therefore called upon to develop new ideas, propose and test new innovations, which together with Industry and the financial market, will create the condition of a new societal transition, breaking new frontiers and contributing to the wellbeing of our citizens.

The call to the scientists could not be taller. Once again Science is at the forefront to meet public expectation. No other system is providing such a high expectation in Society.

EU 2020 growth strategy response

Growth based on knowledge and innovation

- **Innovation, Education, Digital society**

Green growth: a competitive and sustainable economy

- **Clean and efficient energy, combating climate change, competitiveness**

An inclusive high employment society

- **Employment, skills, fighting poverty**

INNOVATION	EDUCATION	DIGITAL SOCIETY
Key facts • R&D spending is below 2%, compared to 2.6% in the US and 3.4% in Japan; our smaller share of high-tech firms explains half of the gap with the US • Google spends more on information and com--munication technologies R&D than the EU FP7 does	**Key facts** • Less than 1 person in 3 aged 25-34 has a university degree, compared to 40% in the US and over 50% in Japan • 1 in 7 young people drop out of school, and 1 in 4 have poor reading skills	**Key facts** • The world market in information and com--munication technologies is worth € 660 billion and employs 1/3 of research workforce: EU firms make up only 23% of this • 56% of households have a broadband connection, but many users have doubts about safety and financial transactions on the internet
Possible EU flagship: ***EU Innovation Plan***	Possible EU flagship: ***Youth on the Move***	Possible EU flagship: ***EU Digital Agenda***

COMBATING CLIMATE CHANGE	ENERGY	COMPETITIVENESS
Key facts • Achieving our goals means reducing emissions by twice as quickly in the next decade than in the last decade • Jobs in the eco-industry have increased by 7% every year since 2000; meeting our renewable target would mean 2.8 million jobs in the sector	**Key facts** • Meeting our goals will result in € 60 billion less in oil and gas imports by 2020 • Further progress with the internal market for energy can add 0.6% to 0.8% GDP	**Key facts** • The market for green technologies is forecast to triple by 2030 / Improving resource efficiency by 20% would increase EU growth by around 1 per cent • Using the single market to the full / improved market access and regulatory convergence can boost growth and jobs
Possible EU flagship: ***Low-Carbon Strategy***	Possible EU flagship: ***Energy Action Plan***	Possible EU flagship: ***Industrial Policy for the Globalisation Era***

JOBS	SKILLS	FIGHTING POVERTY
Key facts • Despite progress, only 2/3 of our working age population is employed (66%), compared to over 70% in the US and Japan • Only 46% of our older workers (55-64) are employed compared to over 62% in the US and Japan	**Key facts** • About 80 million people have low or basic skills, but lifelong learning benefits mostly the more educated • By 2020, 16 million more jobs will require high qualifications, while the demand for low skills will drop by 12 million jobs	**Key facts** • 80 million people were at risk of poverty in the EU prior to the crisis; 19 million are children; unemployed are particularly exposed • 8% of people in work don't earn enough to make it above the poverty threshold
Possible EU flagship: ***A New Jobs Agenda***	Possible EU flagship: ***New Skills for New Jobs***	Possible EU flagship: ***European Action against Poverty***

What is Horizon 2020

- **Commission proposal for a 80 billion euro research and innovation funding programme (2014-2020) a 46% increase compared to FP7**
- **A core part of Europe 2020, Innovation Union & European Research Area**
  - Europe needs cutting edge research and innovation
  - Essential to ensure competitiveness, growth and jobs
  - Vital to tackle pressing societal challenges
  - 3% of GDP invested in R&D: headline target of Europe 2020

Horizon 2020 structure

EU REGULATION (2014-2020)		
I	*Excellent science*	*24598*
II	*Industrial leadership*	*17938*
III	*Societal challenges*	*31748*
European Institute of Innovation and Technology (EIT)		*1360* + 1440
Non-nuclear direct actions of the Joint Research Centre		*1962*
	TOTAL EU REGULATION	**77606**
EURATOM REGULATION (2014-2018)		
I.	*Indirect actions*	*1009*
II.	*Direct actions of the Joint Research Centre*	*656*
	TOTAL EURATOM REGULATION	**1665**
	TOTALE HORIZON 2020	**79271***

**729 million€ in MFF proposals for EURATOM 2019-2020*
NB features in 2011 constant prices

Three priorities:

1. Excellent science
2. Industrial leadership
3. Societal challenges

Proposed funding (million euro, 2014-2020)

European Research Council Frontier research by the best individual teams	*13 268*
Future and Emerging Technologies Collaborative research to open new fields of innovation	*3 100*
Marie Curie actions Opportunities for training and career development	*5 572*
Research infrastructures *(including e-infrastructure)* Ensuring access to world-class facilities	*2 478*

The European Research Council

European Research Council

ERC Grant schemes

Starting Grants
starters (2-7 years after PhD)
consolidators (7-12 years after Phd) up to € 2.0 Mio for 5 years

Advanced Grants
track-record of significant research achievements in the last 10 years
up to € 3.5 Mio for 5 years

Synergy Grants
2 – 4 Principal Investigators
up to € 15.0 Mio for 6 years

Proof-of-Concept
bridging gap between research - earliest stage of marketable innovation
up to €150,000 for ERC grant holders

European Commission

After 5 years of existence…
A success story

- more than 2.600 funded proposals
- in more than 480 different host institutions in 26 countries; total 4 Bio€
- “excellence attracts excellence”: 50% of PIs in 50 institutions
- highly competitive: average success rate 12 %
- EU value added: pan-European competition among researchers for the first time ever
- strengthening peer-review-based evaluation systems
- strong structuring effects: reshaping the European landscape of basic/frontier research
- making Europe more attractive in the global competition for scientific talent

European Research Council

Attractive features for researchers from outside Europe

Flexibility:

- Additional “start-up” funding for scientists moving to Europe (EUR 500 000 for Starting and EUR 1 Million for Advanced grantees)
- Grantee can keep affiliation with home institute outside Europe (“significant part” of work time in Europe)
- Team members can be based outside Europe
- Grantee can move within Europe with the grant

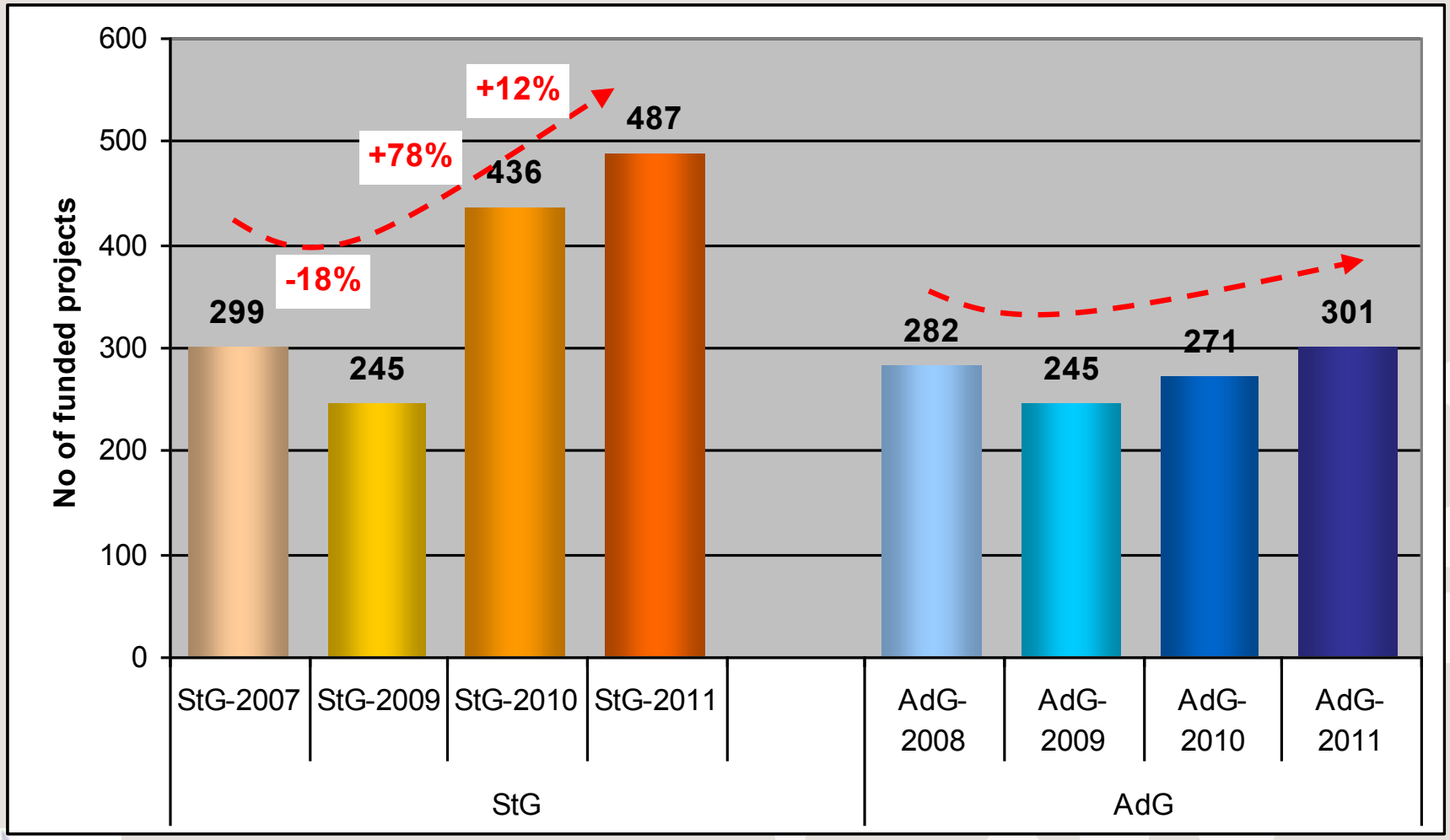
Negotiation:

- Several European countries/host institutions assist applicants and reward grantees with top-up funds or long-term professorships

European Commission

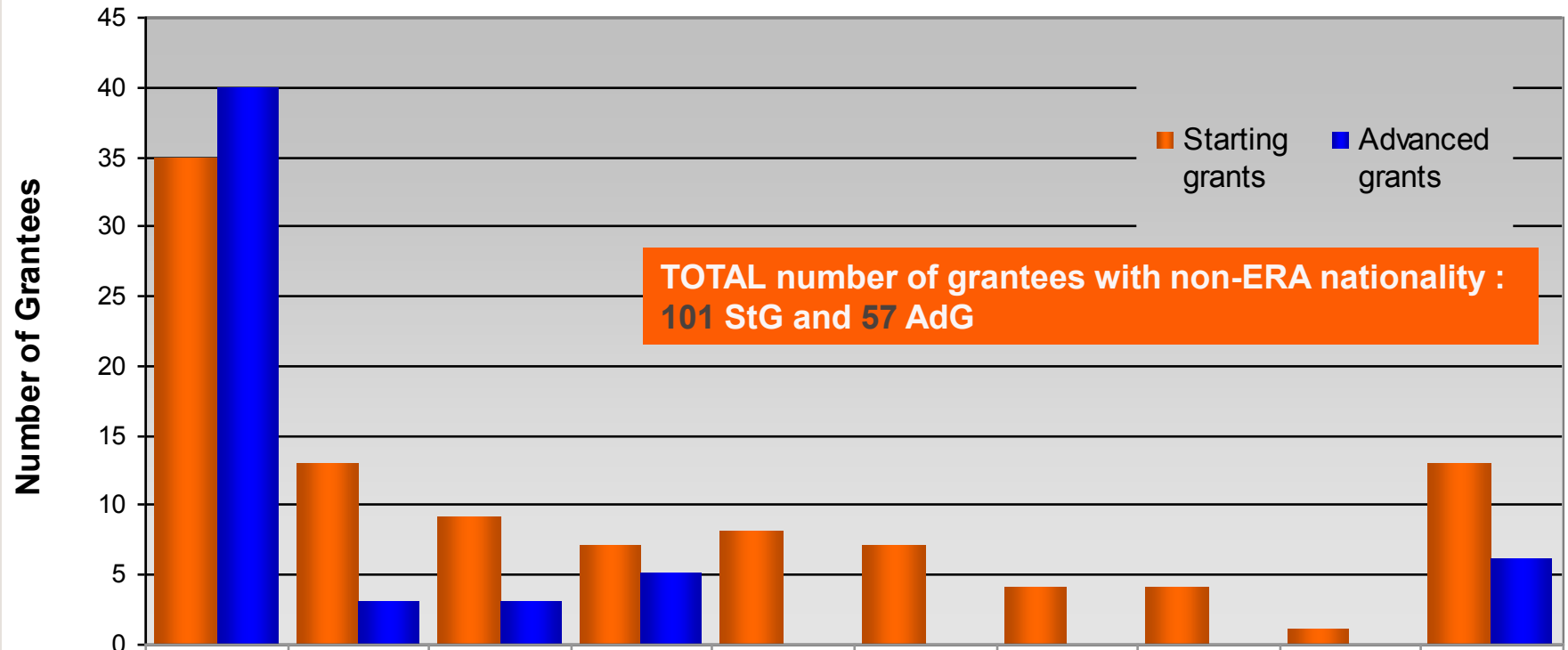
Funded projects

ERC Starting & Advanced grant calls 2007 – 2011



ERC grantees with a non-ERA nationality

ERC Starting and Advanced Calls 2007 - 2011



	USA	Australia	Russia	Canada	Japan	India	Argentina	China	Brazil	Others
Starting grants	35	13	9	7	8	7	4	4	1	13
Advanced grants	40	3	3	5	0	0	0	0	0	6

*) nationality as last declared by the principal investigator

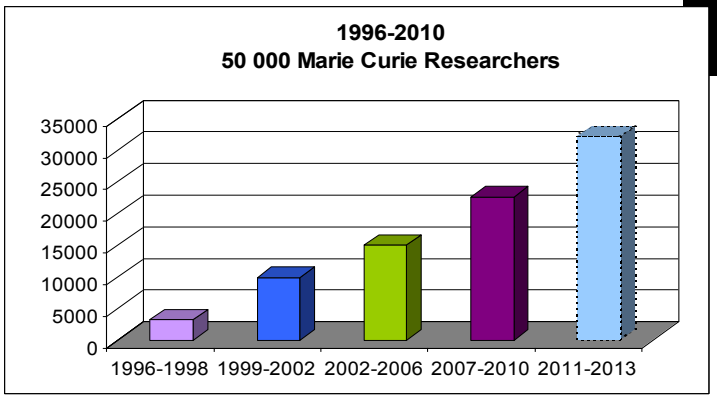
Researcher's mobility

Marie Curie Actions

- EU fellowships programmes since 1990
- Marie Curie label since 1996
- Training, mobility and career development
- Implemented through the People Programme (2007-2013)

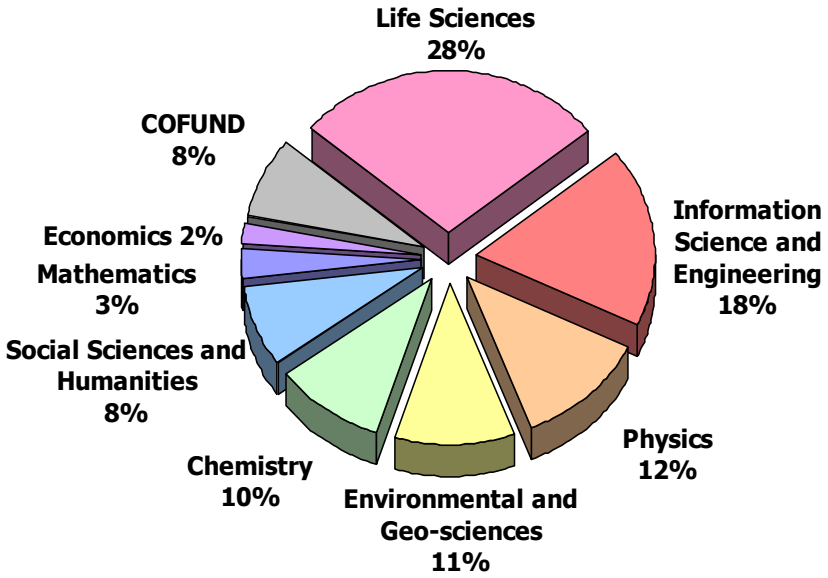
Pierre and Marie Curie honeymoon, 1895

FP7 Achievements



2007-2011:

- **EU contribution spent: ~ €2,5 billion**
- **Funded research projects : > 6 500**
- **Supported PhD: >10 000**
- **Women participation rate: 38% (close to 40% target)**

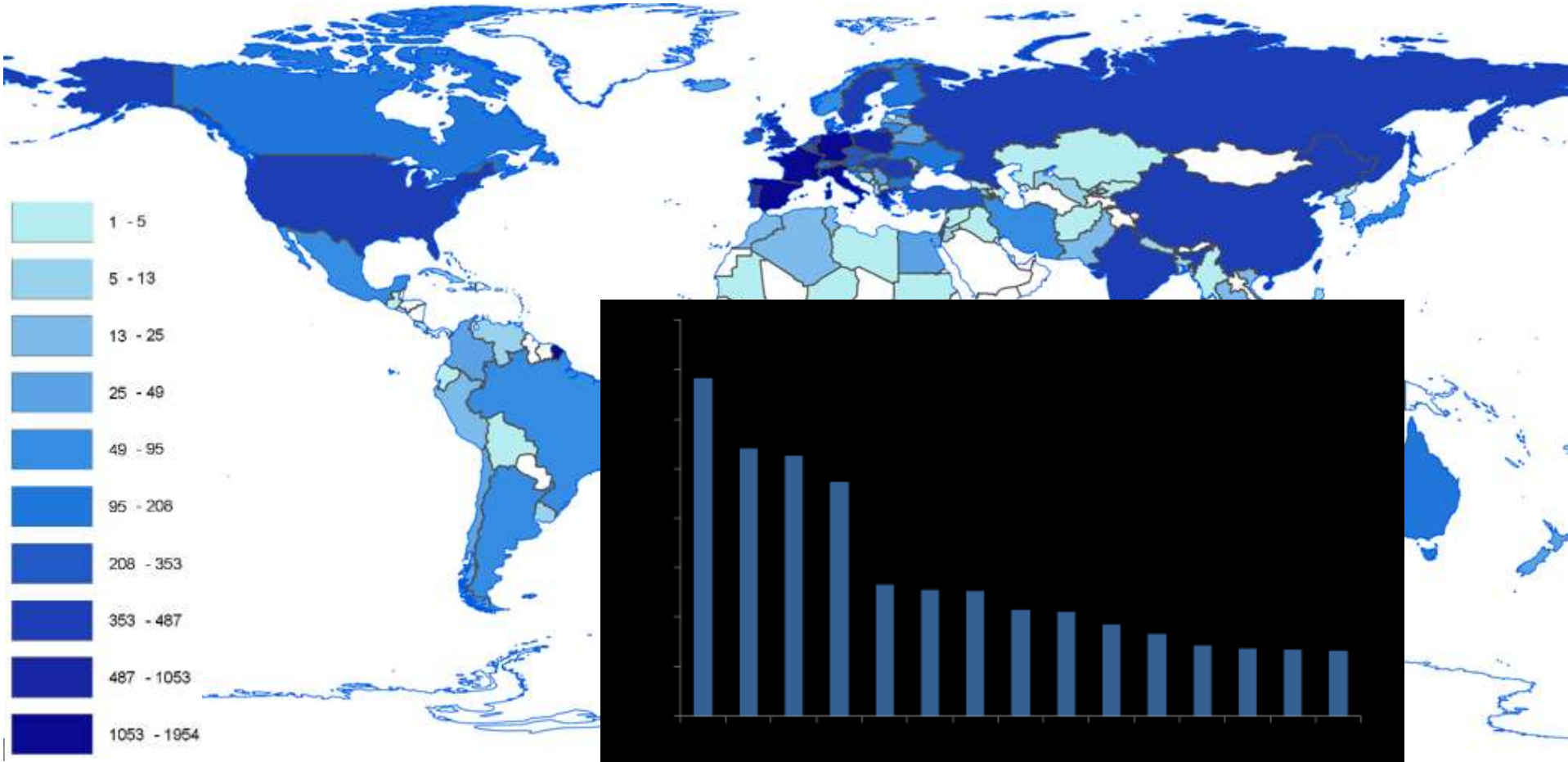


Budget distribution by scientific panel in FP7 (bottom up approach)

Education and Culture

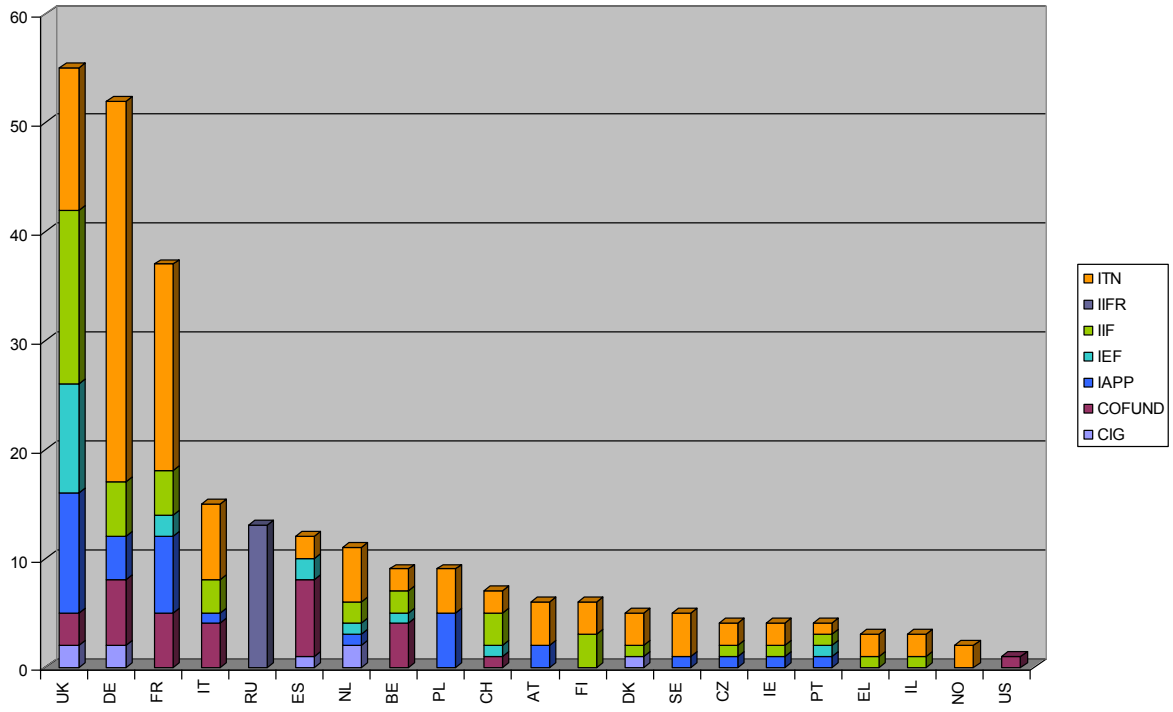
FP7 Achievements

FP7 Marie Curie researchers coming from all over the world (around 130 nationalities)



Number of Russian researchers funded in Marie Curie Actions (2007-2012)

Russian fellows benefitting from a MC grant, grouped by country of destination



H2020
Expected Impact

2014-2020

- ~ 65.000 researchers to be supported, including 25.000 doctoral candidates
- ~ 200.000 scientific publications in high impact peer-reviewed journals
- ~ 1.500 patent applications
- ~ 100 spin-offs created
- ~ 350-400 new regional / national / international programmes to be created targeting international and intersectoral training, and career development of research and innovation staff

Research Infrastructures

Research Infrastructures in H2020

Developing the European RIs for 2020 and beyond

- Developing **new world-class RIs**
- **Integrating** and **opening national RIs** of **pan-European interest**
- Development, deployment and operation of ICT based **e-Infrastructures**

Fostering the **innovation** potential of RIs & their **human capital**

Reinforcing European RI **policy** and **international cooperation**

ESFRI Roadmap 2010

Social Sc. & Hum. (5)	Biological and Medical Sciences (13)		Environmental Sciences (9)		Energy (7)	Material and Analytical Facilities (6)	Physics and Astronomy (10)		e-Infra-structures (1)
SHARE	BBMRI	ELIXIR	ICOS	EURO-ARGO	ECCSEL	EUROFEL	ELI	TIARA*	PRACE
European Social Survey	ECRIN	INFRA FRONTIER	LIFEWATCH	IAGOS	Windscanner	EMFL	SPIRAL2	CTA	
CESSDA	INSTRUCT	EATRIS	EMS	EPOS	EU-SOLARIS	European XFEL	E-ELT	SKA	
CLARIN	EU-OPENSCREEN	EMBRC	SIAEOS	EISCAT_3D	JHR	ESRF Upgrade	KM3NeT	FAIR	
DARIAH	Euro BioImaging	ERINHA BSL4 Lab		COPAL	IFMIF	NEUTRON ESS	SLHC-PP*	ILC-HIGRADE*	
	ISBE	MIRRI			HiPER	ILL20/20 Upgrade			
	ANAEE				MYRRHA				

Distributed research infrastructures

Single sited research infrastructures

Research and Innovation

Developing new world-class RIs

- **Objective:** To ensure the implementation, long-term sustainability and operation and operation of the ESFRI and other world-class RIs
- **EU funding will support:**
  - the **preparatory phase** of future RIs (e.g. detailed construction plans, legal arrangements, multiannual planning, etc.)
  - the **implementation phase** (e.g. R&D and engineering work, development of regional partner facilities, etc.)
  - the **operation phase** (e.g. access, data handling, outreach, training and international cooperation activities)
  - **design studies** for new RIs through a bottom-up approach

Reinforcing European RI policy and international cooperation

- Reinforcing **European policy** for RIs
  - Partnerships between relevant policymakers and funding bodies
  - Surveys, monitoring and assessments of RIs at Union level
  - Policy studies and communication tasks
- Facilitating strategic **international cooperation**
  - Cooperation for global RIs
  - Cooperation of European RIs with their non-European counterparts:
  - Ensuring their global interoperability and reach
  - Pursuing international agreements on the reciprocal use, openness or co-financing of RIs

Structural Funds

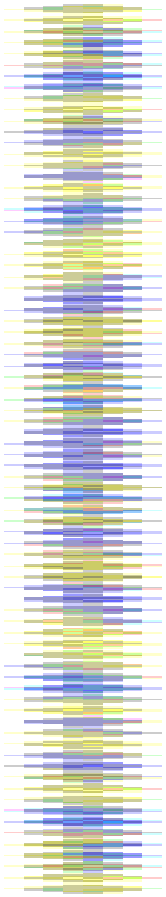
- Developing **synergies between the Structural funds and Horizon 2020** is a priority of the European Commission
- More specific reference to research infrastructures "of European interest" is made in the European Commission proposal for the European Regional Development Fund
- Also, Horizon 2020 foresees support to activities dedicated to developing cooperation between research infrastructures and other Union policies, such as Cohesion, through relevant studies and communication tasks

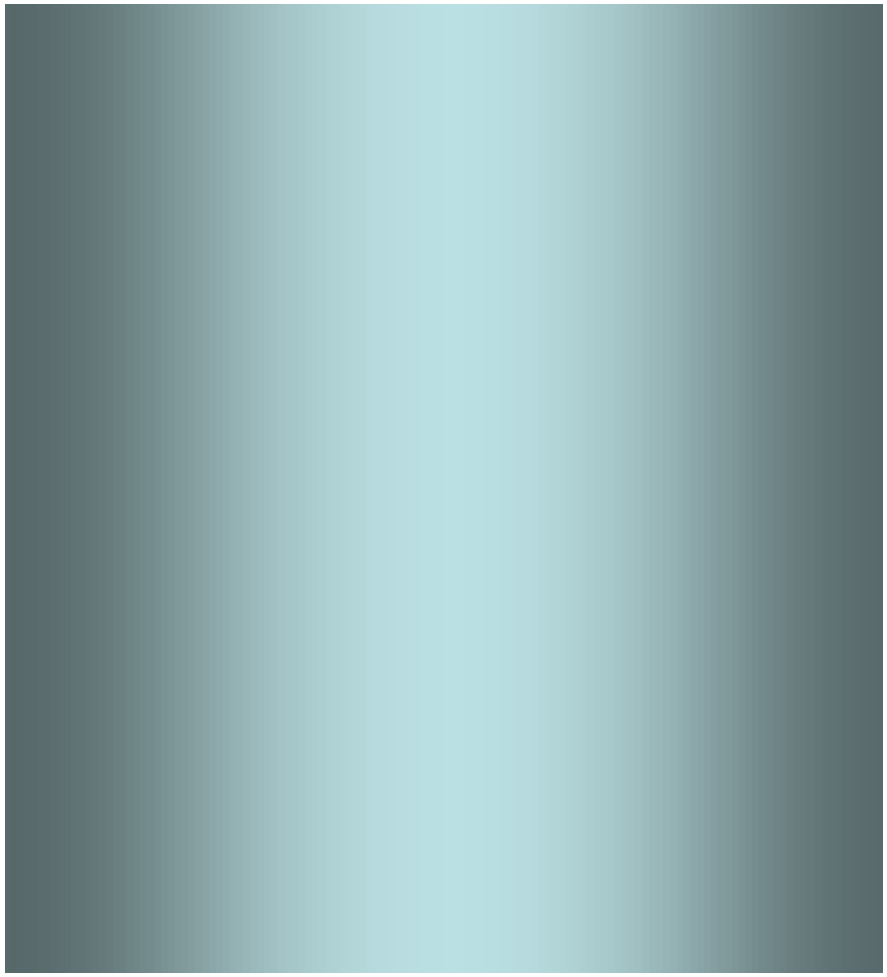
II – Industrial leadership

Proposed funding (million euro, 2014-20)

Leadership in enabling and industrial technologies *(*ICT, nanotechnologies, materials, biotechnology, manufacturing, space)	*13 781*
Access to risk finance Leveraging private finance and venture capital for research and innovation	*3 538*
Innovation in SMEs Fostering all forms of innovation in all types of SMEs	*619 complemented by 6 829 (expected 15% of societal challenges + LEIT) and 'Access to risk finance' with strong SME focus*

Programmes supporting Nano development (FP7 2007-2011)



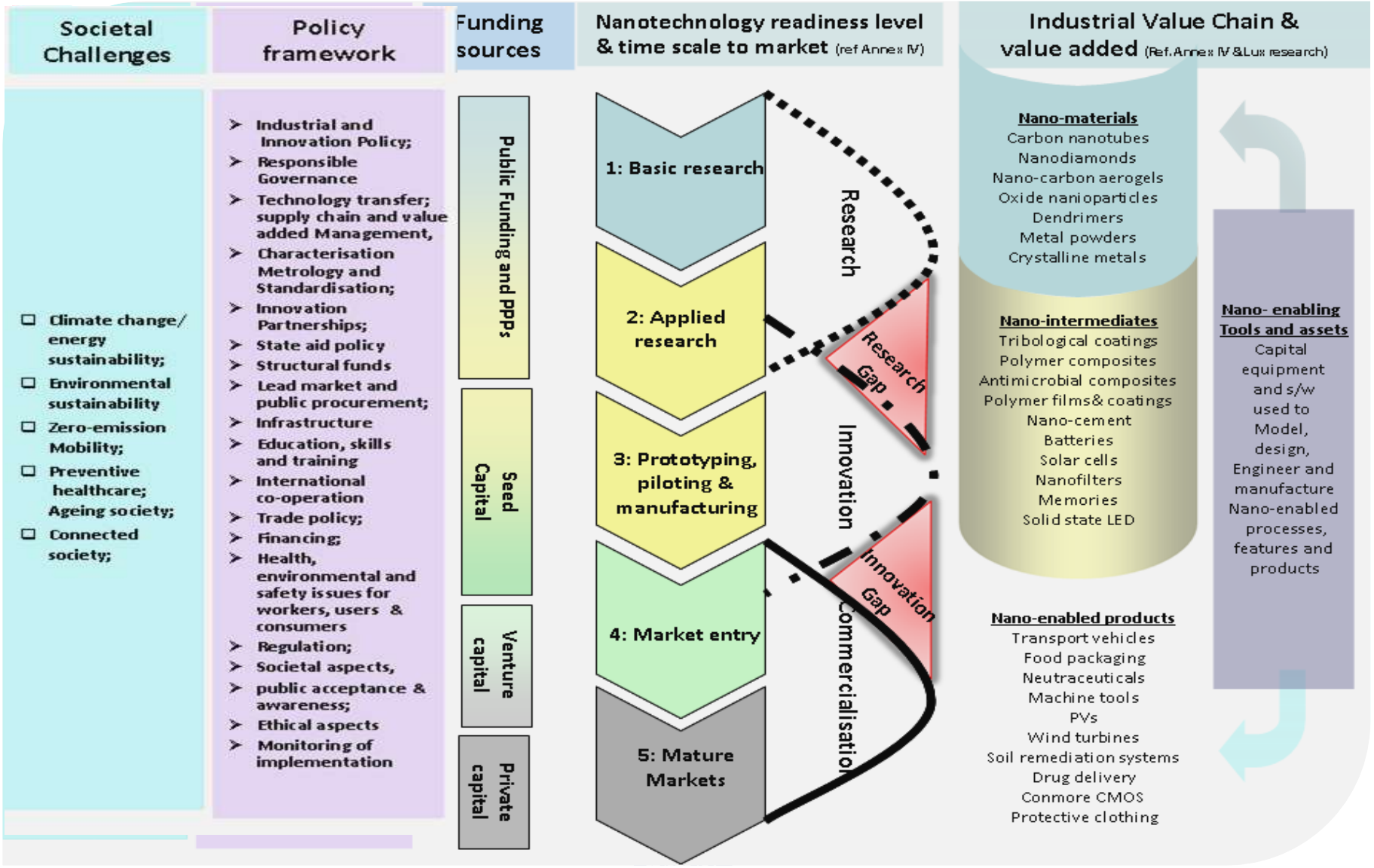


source EC: **Co**mmon **R**esearch **Da**ta Warehouse (CORDA)

Integrated system for Innovation-Regulation-Governance

European Commission

Translating Science to Business



Traceability and metrology in Industry

Translating Science to Business

To bring nanotechnology through to successful business:

- relevant metrology tools
- suitably skilled human resources able to implement appropriately such tools

European Consultation on Traceability, Standards and Dissemination of Metrology in Industrial Nanotechnology (December 2010)

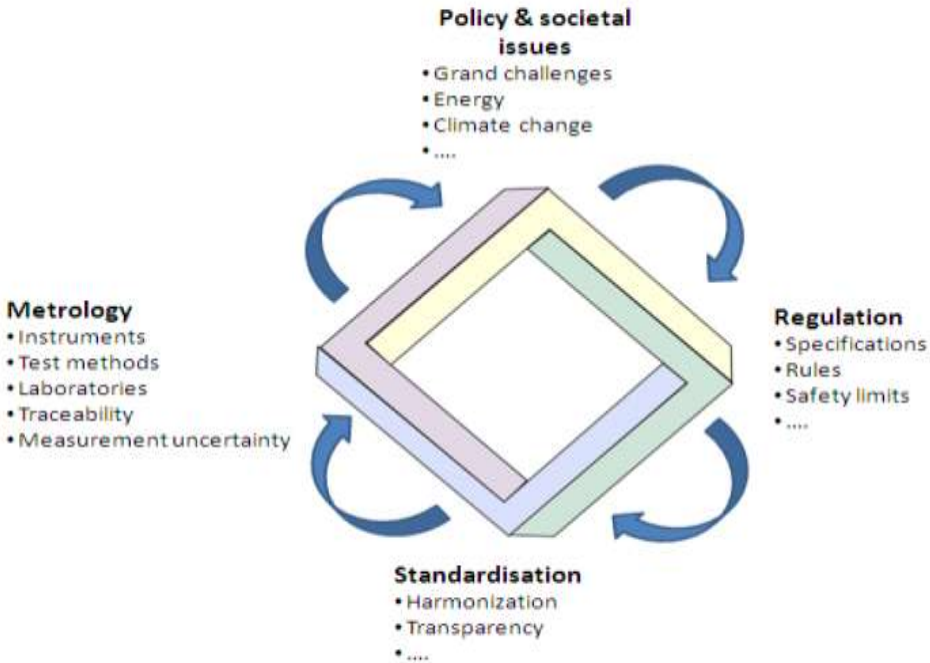


Figure 1.2 Innovation infrastructural 'rectangle': policy, regulation, standardisation and metrology [Pendrill 2010]

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NANOTECHNOLOGY-H2020 –Five building blocks

Next generation nanomaterials, -devices and -systems: Development and integration of knowledge at the cross-roads of different scientific disciplines, aiming at fundamentally new products enabling sustainable solutions in a wide range of sectors.

Safe development and application: Advancing scientific knowledge of their potential impact on health or on the environment for pro-active, science-based governance of nanotechnologies, and providing validated scientific tools and platforms for hazard, exposure and risk assessment and management along the entire life cycle of nanomaterials and nanosystems.

Societal dimension: Addressing the human and physical infrastructure needs of nanotechnology deployment and focussing on governance of nanotechnology for societal benefit.

Synthesis and manufacturing: Focusing on new flexible, scalable and repeatable unit operations, smart integration of new and existing processes, as well as up-scaling to achieve mass production of products and multi-purpose plants that ensures the efficient transfer of knowledge into industrial innovation.

Capacity enhancing techniques: Focusing on the underpinning technologies, supporting the development and market introduction of complex nanomaterials and nanosystems, including characterising and manipulating matter at the nano-scale, modelling, computational design and advanced engineering at the atomic level.

Energy

Focus on the implementation plans and road maps of the European Strategic Energy Technology Plan (SET-Plan)

Aim to accelerate market take up of most promising technologies in:

- Smart Cities and Communities
- Renewable Energy
- Carbon Capture and Storage (CCS);
- Smart Grids and Energy storages

III – Societal Challenges

Proposed funding (million euro, 2014-2020)

Health, demographic change and wellbeing	*8 033*
Food security, sustainable agriculture, marine and maritime research & the bioeconomy	*4 152*
*Secure, clean and efficient energy**	*5 782*
Smart, green and integrated transport	*6 802*
Climate action, resource efficiency and raw materials	*3 160*
Inclusive, innovative and secure societies	*3 819*

**Additional €1 788m for nuclear safety and security from the Euratom Treaty activities (2014-2018). Does not include ITER.*

Partnership – the Innovative Medicines Initiative

- IMI projects - research and innovation
- Proof of concept for new public private collaborations in pharmaceuticals
- Open collaboration to define and address common challenges
- IMI works: tangible deliverables after less than 2 years – at pace that no other funding scheme allows
- IMI bridging the gap between science, health and growth

IMI slides kindly provided by M. Chlebus, EFPIA

International Cooperation in health: How does it work?

- Identify and define shared strategic goals
- Agree to approach jointly and share tasks (and costs)
- Let each agency use its own funding mechanisms/timing
- Agree to share data / standards

Alignment – Flexibility - Commitment

K.O. Mouse & Cancer

International K.O. Mouse Consortium

- NIH, EU Commission, Genome Canada
- Total investment: $100 million, EU: €13 million
- >60% of the work done
- www.knockoutmouse.org

International Cancer Genomics Consortium

- NIH, EU Commission, and 12 other countries
- >$300 million invested, EU €21 million
- www.icgc.org

International Cancer Genome Consortium

Euratom Programme 2014-2018

Budget: *TOTAL: € 1665 million, including Fission €336m; Fusion € 673m; JRC € 656m.*

Programme for 5 years, in line with the Euratom Treaty (art.7)

What is new?

- Stronger focus on nuclear safety and nuclear training
- A single Euratom programme bringing together three separate decisions
- The same rules for participation as in the Horizon 2020 - simplified access
- Programme contributes to the implementation of priorities of the 'Horizon 2020'
- Fusion research programme will be restructured

Funding for ITER outside MFF in a separate supplementary programme: *€ 2573 million for 2014-2018*

Simplification of Administrative project management

"It's too bureaucratic!"


European Commission
niac
ARTEMIS
cip
SEVENTH FRAMEWORK PROGRAMME
AAL
AMBIENT ASSISTED LIVING
eurostars™
CLEANSKY
EU Financial Regulation
SINGLE SET OF RULES
for Horizon 2020
imi
Innovative Medicines Initiative
eit
European Institute of Innovation & Technology
FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING
. . . ETC

International Cooperation: the case of Russia

After all, science is essentially international, and it is only through lack of the historical sense that national qualities have been attributed to it.

Marie Curie

International cooperation

- **International cooperation is crucial** to address many Horizon 2020 objectives.
- **Principle of general openness**: the programme will remain to be the most open funding programme in the world.
- Horizon 2020 shall be open to the **association** of: acceding countries, candidate countries and potential candidates and selected third countries that fulfil the relevant criteria (capacity, track record, close economic and geographical links to the Union, etc.).
- Targeted actions to be implemented taking a **strategic approach to international cooperation** (dedicated measures in the 'Inclusive, innovative and secure societies' challenge).

EU-Russia S&T cooperation: Context

"EU"-Russia S&T cooperation:

- 27 EU Member States – Russia

- European Union / Euratom– Russia

EU-Russia Summit May 2003:

Commitment to creation of four common EU-Russia spaces: External Security; Trade & Economic; Freedom, Security & Justice; Research, Education & Culture

=> Road-map for the *Common EU-Russia Space in Research, Education & Culture*

EU-Russia Summit November 2009: EU-Russia Partnership for Modernisation

EU-Russia Cooperation in Research & Innovation

- ***3 international agreements with Russia covering science and technology*** *(S&T) issues:*
  - **S&T Cooperation Agreement between the EU and Russia since 1999**
  - **2 Euratom-Russia Agreements in nuclear safety and nuclear fusion (an agreement on the peaceful uses of nuclear energy is currently being negotiated)**
- ***Trilateral dialogue on space*** *– EU - European Space Agency (ESA) - Russian Space Agency (Roscosmos) - also covers research issues.*
- ***EU - Russia Partnership for Modernisation***
  (R&I cooperation forms an integral part of it)
- *Creation of* ***Common Space of Research and Education*** *(including cultural aspects) as agreed in the May 2003 St. Petersburg Summit*

Joint EU-RU Thematic Research Working Groups

- *Nanotechnologies & New Materials*
- *Health*
- *Food, Agriculture, Biotechnologies*
- *Non-nuclear Energy*
- *Aeronautics*
- *Space*
- *Nuclear Energy Fission Research*
- *Information & Communications Technologies*
- *Environment*
- *e-Infrastructures*
- *[…]*

Policy & scientific dialogue

"Bottom-up": *EU & Russian* ***scientists*** *themselves (!):*

- *scientific advisory councils and committees*
- *expert advice to governments*
- *joint evaluation committees*
- *peer reviews*
- *joint projects & publications*
- *scientific conferences*
- *research visits*

EU-Russia Cooperation in Research & Innovation: FP results

In FP6 & FP7 Russia has been the most successful third country non-associated partner (both in terms of the total number of participations and in terms of the total amount of EU financial contribution received)

More coordinated calls with Russia than any other partner

- **eight to date: Health, FAFB, NMP (2 calls), ICT, Energy, Aeronautics and Nuclear Energy**
- **both sides committing ca € 31 million for the projects supported**
- **new coordinated calls in ICT and aeronautics, for the 2013 work programme, are under development**

In FP7, 475 Russian research organisations involved in 302 FP7 projects, receiving an EU contribution of €59 million

Highest levels of successful participation in: the Marie Curie actions, research infrastructures, transport, space, ICT and FAFB

EU-RU S&T cooperation…

*…also extends to **related areas** such as…*

Higher Education:

- *Russia's participation in the "Bologna process"*
- *Erasmus Mundus programme*
- *Tempus programme*

Space (research):

European Commission - European Space Agency - Roscosmos

…EU-RU S&T cooperation

…and also includes Russia's active participation in major European research infrastructures and facilities such as…

***CERN** - European Organization for Nuclear Research*

***XFEL** - European X-ray Free Electron Laser*

***FAIR** - Facility for Antiproton & Ion Research*

***GLORIAD** - Global Ring Network for Advanced Applications Development*

***GÉANT** - European computer network for research & education*

EU-RU S&T cooperation: Main conclusions I

- *S&T cooperation covers practically **all scientific areas** & includes a very broad spectrum of **different activities**.*
- *S&T cooperation is a very **dynamic**, **multi-dimensional** & **fast developing** area of cooperation of & by itself.*
- *S&T cooperation is an **integral component** and an **important part** in the overall EU-Russia relationship.*

Arguably, the S&T relationship of the European Union with Russia is as broad & deep as (if not broader & deeper than) the EU's S&T relationship with any other non-EU member state, and one of the most dynamically developing areas of the EU-Russian relationship overall.

Some (not all!) “lessons learnt”

Need to listen to all partners & stakeholders (scientists & researchers, policy-makers) in east & west.

Realise that learning from experience and applying in practice the lessons & recommendations from past projects takes time.

Learn to understand, and navigate, one’s own flexibilities & rigidities and those of one’s partners.

Suggested areas of future attention

*Reaching out to **Russia's** as yet **"untapped potential"***

*Know your market: Understanding & using the **synergies** & **complementarities** of **different European Community schemes** (e.g. Framework Programmes, Erasmus Mundus, Tempus, EUREKA, CIP, etc.)*

***Synergies** & **coordination** between instruments of **EU Member States**, the **European Community**, and **Russia** ("variable geometries") - linking bilateral & multilateral schemes*

The EU-Russia R&D on-going cooperation and its potential for growth is shaping a new landscape with far reaching implications and results, mutually beneficial for our societies and citizens.

This is the result of dedication from both Russia's and EU's scientists and engineers who have work hard to work together since the early 90s, to form groups, to become friends and colleagues.

This fascinating evolution among both sides of a wider Europe is very encouraging for today, for tomorrow and for the future generations.

This cooperation, open to the whole world, is rooted on creativity and entrepreneurship. We now have instruments to make it happen!

Cooperation in science between Russia and the EU is therefore ready for more: a must do for all scientists in Tomsk and elsewhere in this vast country!