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Business models for a changing world
Lessons to be learned – and a lot of questions!

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At the outset

- **Change:** There are clear indications that scientific, technical, environmental and societal changes have been accelerating during the last decades – and will continue to do so in future.
- **Complexity:** The world is increasingly interconnected, offering new opportunities but also adding to the complexity of challenges we are facing.
- **New ways of interacting:** Coping with accelerated change rates, increasing interdependencies and exploding data is a challenge.

➔ We need new business models for a changing world!

Three questions will guide my reflexions

- Where do we stand?
- What are new trends?
- What lessons to be implemented?

- Where do we stand?

We are facing a systemic challenge

- **Financial crisis at the outset:** The new innovation debate has been triggered by the financial crisis. Innovation shall pave the way for economic growth.
- **Systemic challenge:** However, we are confronted with more than an economic crisis. Social and environmental objectives are at stake as well.

➔ **Capitalism without growth:** Is economic growth approaching it's limits in developed countries? And if so: Will we still be able to integrate major parts of our populations into our societies via jobs without growth?

Innovation crisis in Europe

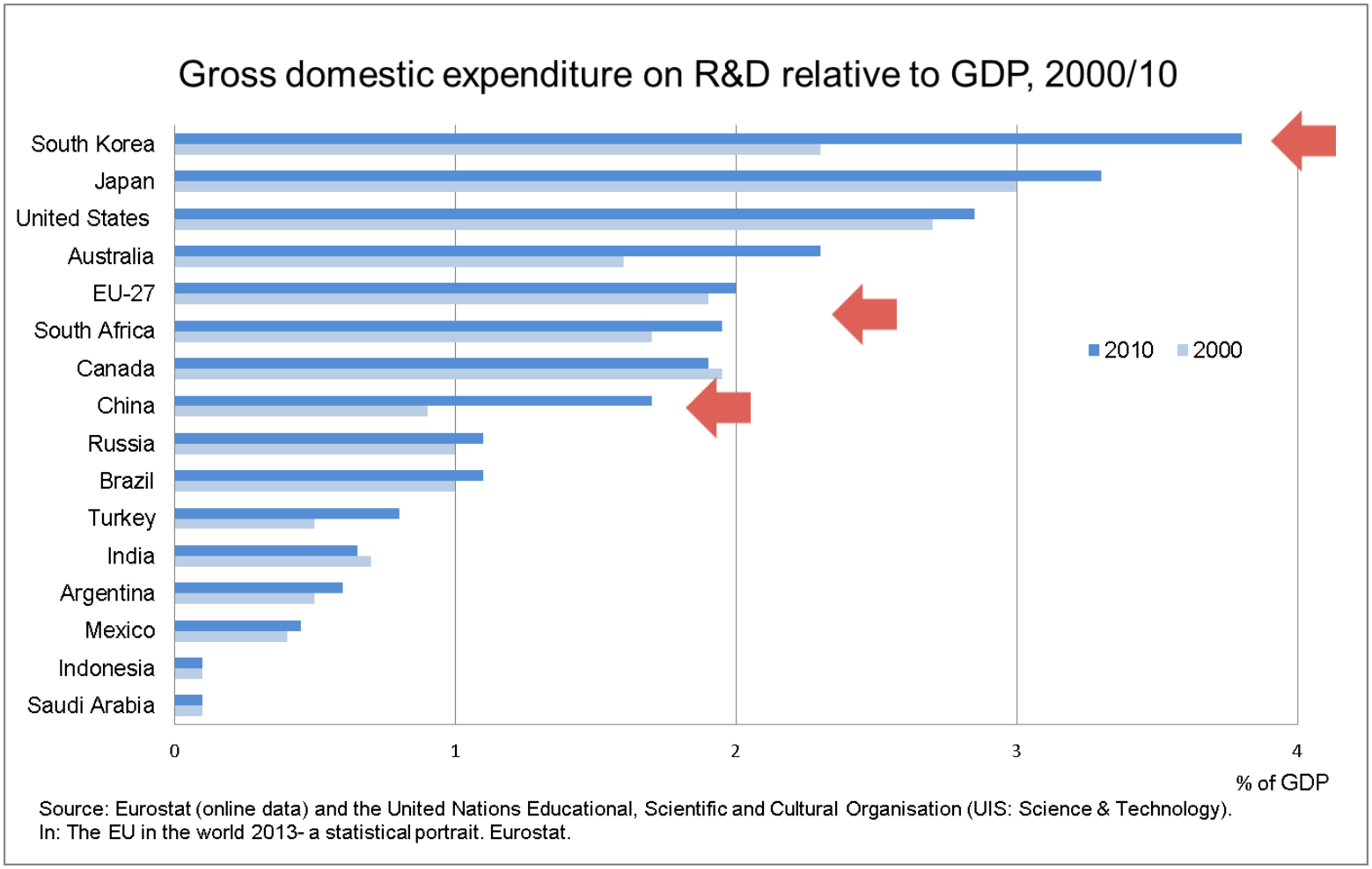
- The R&D intensity in the EU is stagnant, while it grows in Asia and the US maintain their higher level.
- Europe still publishes most scientific material world-wide and has a growing research community. Thus, Europe could be attractive for non-European research investments. However, Europe contributes less to high impact publications than the US.
- Less than 25% of the global research funds are spent in the EU. At the same time we are facing growing R&D-investments in emerging countries.

Lack of risk capital in Europe and the US

- **Financial crisis:** Due to the financial crisis, the financial value chains collapsed to a degree that they cannot take risks anymore. The risk capital market is shrinking – in Europe as well as in the US.
- **Tax systems:** Tax systems of various countries lead to large amounts of money remaining trapped in emerging markets (40 billion of US $).

➔ **Mobilizing money:** There is enough cash worldwide. However, the money is kept on corporate balance sheets. It has to be mobilized.

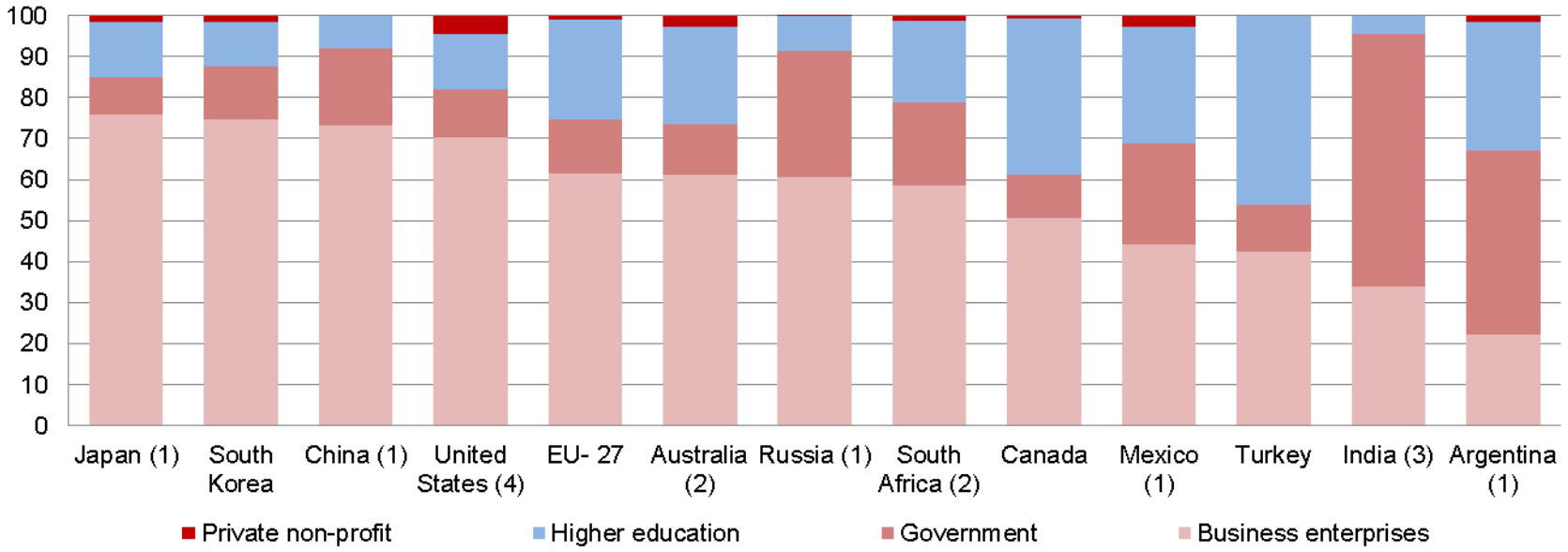
Investments in R&D relative to GDP



Source: Eurostat (online data) and the United Nations Educational, Scientific and Cultural Organisation (UIS: Science & Technology).
In: The EU in the world 2013- a statistical portrait. Eurostat.

Investments in R&D by sectors

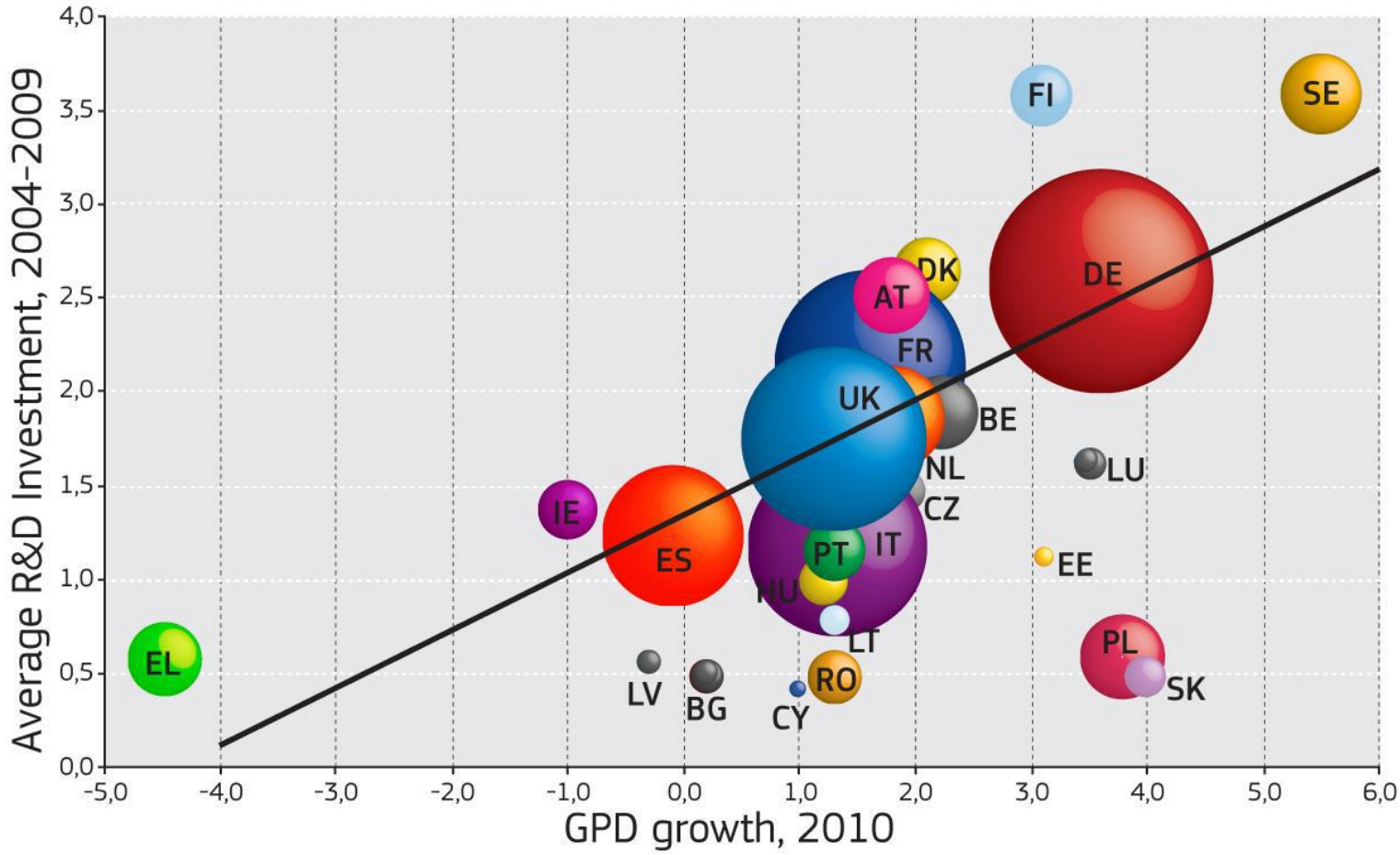
Gross domestic expenditure on R&D by sectors (%), 2010



(1) 2009
(2) 2008
(3) 2007; data for the business enterprises sector includes the data for the private non-profit sector.
(4) Excluding most or all capital expenditure; government includes central or federal government only.

Source: Eurostat (online data)and the United Nations Educatinal, Scientific and Cultural Organisation (UIS: Science & Technology). In: The EU in the World 2013 - a statistical portrait, Eurostat.

R&D investments and economic growth



Europe's response: Horizon 2020

- **Innovation:** Europe is integrating research, development and innovation. «Innovation Union» and «Horizon 2020» are the main instruments at EU-level.
- **Grand Challenges:** Addressing «Grand Challenges» shall drive integrated research, from basic science and technology all the way to innovation.
- **Excellence:** Funding shall focus on excellence and funding schemes shall become more trust based.
- **Demand:** In addition to supporting the supply side, the demand for research and innovation shall be strengthened as well.

Summary: Where do we stand?

- **We are facing systemic challenges.**
  - Financial crisis at the outset
  - We are confronted with systemic challenges
  - There are innovation deficits in Europe
  - There is a lack of risk capital
- **Europe's response:**
  - Integrated approach to R,D&I
  - Focusing on Grand Challenges
  - Fostering excellence

- What are new trends?

The world is vastly interconnected

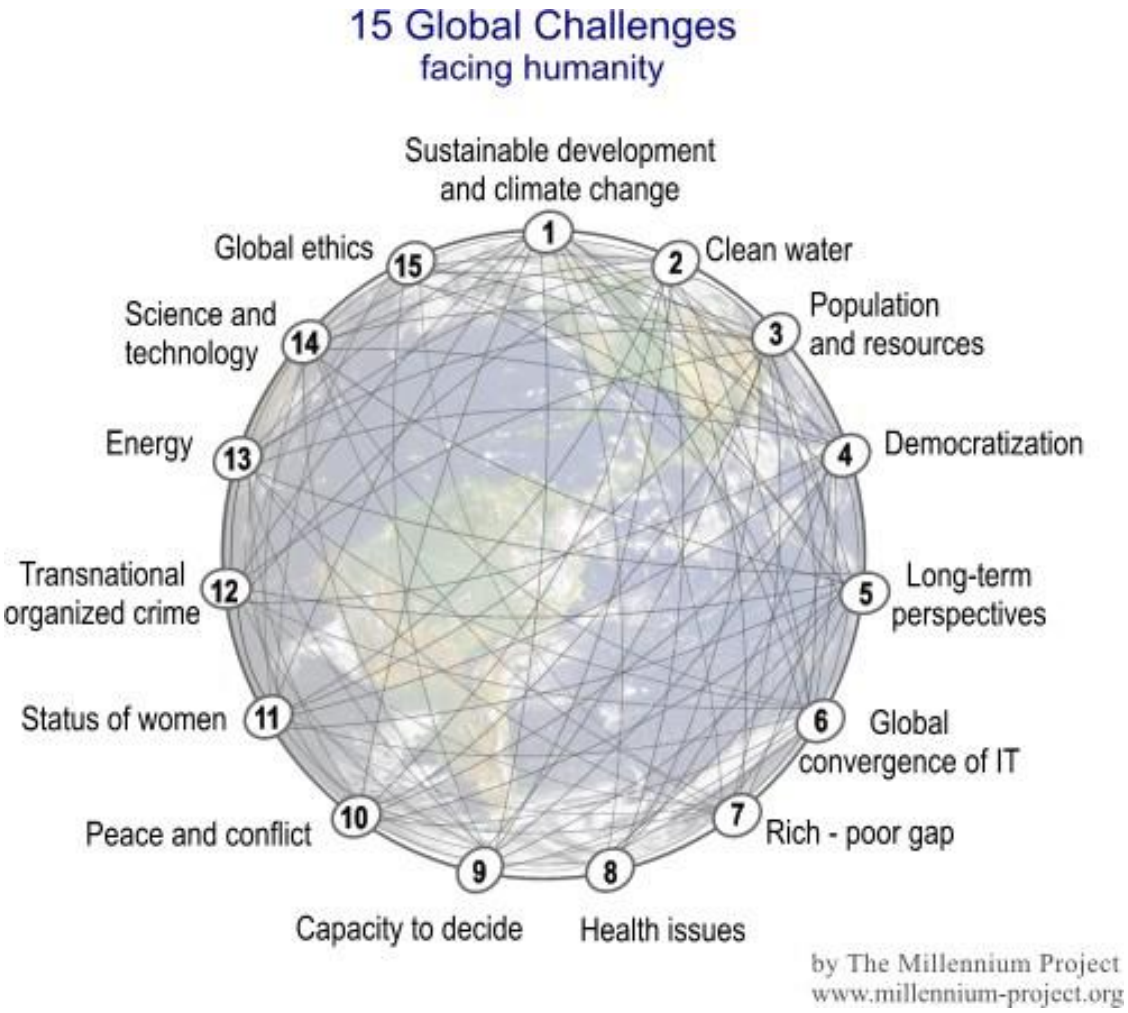
Flights

Facebook

Global trends for 2030 (NIC, USA)

- **Individual empowerment** supported by greater educational attainment, widespread use of ICT, new manufacturing technologies and healthcare advances.
- **Diffusion of power** with a shift of power from the few hegemons to networks and coalitions of states and non-state actors in a multipolar world.
- **Demographic patterns changing** due to aging societies, migration and urbanization.
- **Increasing food, water and energy demand** owing to an increase in global population.

Global challenges facing humanity



Are we facing a third industrial revolution?

- **Atoms and bits:** Desktop, digital factories and the www meet. Together they may path the way to a third industrial revolution: New means of production alter the manufacturing process.
  - 3D-printers and -scanners, laser & robots work together.
  - Online sharing creates global innovation communities.
  - Thus, there are less economies of scale and variety becomes possible without additional costs.
- **Marx revisited:** It's not the ownership anymore, but the access to the means of production that counts. Web-based platforms serve as intermediate.

New business models in the corporate sector

- New businesses expand globally from day one. De-centralized management of the best people available worldwide becomes possible.
- Global supply chains are open for everyone. Thus, transaction costs are reduced by new technologies and by the web – instead of by proximity.
- Outperformers are more aggressively pursuing business model innovation than underperformers!

➔ **Corporate sector:** In the corporate sector global networks are increasingly replacing local companies.

Research is global

- 2005/09 almost 70% of research partnerships of researchers in Switzerland were international.

	1981-1985	1995-1999	2005-2009
Anteil der internationalen Zusammenarbeit	**52,1%**	**74,6%**	**69,3%**
Technische und Ingenieurwissenschaften, Informatik	62,3%	74,1%	70,9%
Physik, Chemie und Erdwissenschaften	77,8%	89,0%	86,8%
Landwirtschaft, Biologie und Umweltwissenschaften	41,4%	52,4%	62,8%
Life Sciences	47,7%	59,7%	60,4%
Klinische Medizin	24,9%	48,1%	52,4%
Sozial- und Verhaltenswissenschaften	47,8%	68,9%	62,6%
Geisteswissenschaften und Kunst	52,8%	57,7%	71,6%

Quelle: Thomson Reuters (SCI/SSCI/A&HCI), Bearbeitung SBF

Science 2.0 as a new paradigm

- **Big data:** We are facing an explosive growth of data, authors and publication platforms.
  - Every two days as much information is produces as in history until now (IBM).
  - 11% of the world scientific output is open source.
  - Systems of collective intelligence are emerging from global collaboration of individuals and groups.
- **Science 2.0:** We are at the beginning of a change in modus operandi of science and research. This implies the need to rethink institutional facts of scientific life.

➔ The future will be data driven.

Summary: What are new trends?

- **The world is vastly interconnected.**
  - We share global trends
  - We share global challenges
- **Are we facing a third industrial revolution?**
  - Technology brings «atoms» and «bits» together
  - New business models in the corporate sector
  - Research is global
  - The future will be data driven

- What lessons to be implemented?

Lessons to be implemented (1)

- **Interaction of science and society:** The accelerating change asks for massively strengthening the interaction of science and society.
- **Paradigm shift:** After decades of protecting data and of patenting discoveries we come to the conclusion that open source and sharing of knowledge may pave the way for the future.
- **Global governance** is needed to address challenges as climate change, energy, water and food security. Focussing research on such challenges asks for a close cooperation with international organisations responsible for these issues.

Lessons to be implemented (2)

- **Funding R&D:** Assuring the public funding and increasing private investments in R&D will be decisive.
  - In Europe the public sector is key!
  - SME need support to attract investments from abroad.
- **Hybrid organizations:** Refining the management of the public sector beyond NPM will be important. Such «Transinstitutions» shall work:
  - Value based and value oriented
  - Objective oriented and evidence based
  - Flexible and transparent
  - Participatory and e-supported

Lessons to be implemented (3)

- **Interfaces:** Knowing and accepting the different logic and culture of science, the corporate as well as the public sector is a precondition for working successfully at the interface of these sectors.
- **Societal discussion:** The hypothesis, that we may have reached limits to economic growth in industrialized countries has to be taken as starting point for new strategies to assure societal integration and social security.

Summary: Lessons to be implemented

- «Open», «sharing» and «global» will be the driving factors for new business models in science, the corporate sector as well as in politics. We have to work in all three sectors to have a sustainable impact.
- «It is increasingly clear that the world has the resources to address its challenges. It is also increasingly clear that the current decision making structures are not making good decisions fast enough and on the scale necessary to really address the global challenges.»
  2012 State of the Future Report, The Millennium Project