

# **NEW DIGITAL TECHNOLOGIES:**

**SOCIOECONOMIC EFFECTS AND POTENTIAL FOR INNOVATION**



# Humanity is at a turning point

The future will be very different from the present

We are entering the most disruptive era in human history, driven by exponential technological change. It entails:

- Extraordinary opportunities
- Huge challenges

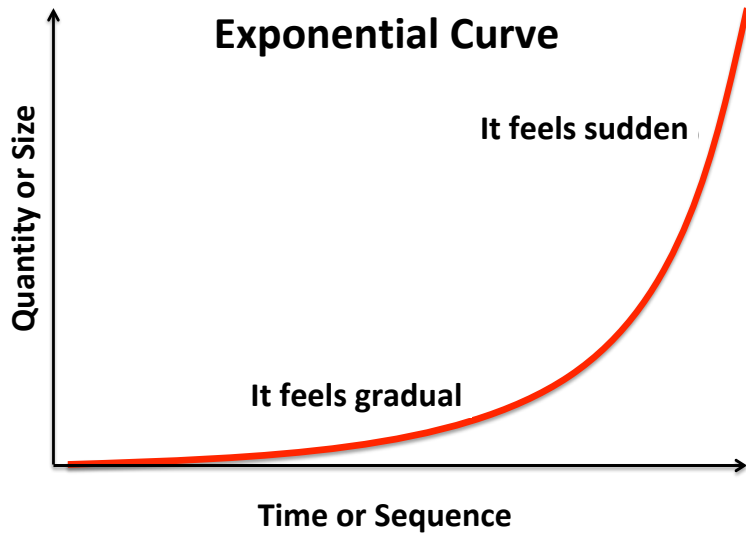
- the very competitive forces of capitalism compel accelerated technological change
- So far, technological progress has generally played a positive role,

BUT...

- Unlike other periods of great transformation, today the effects are global, immediate, deep and increasingly irreversible

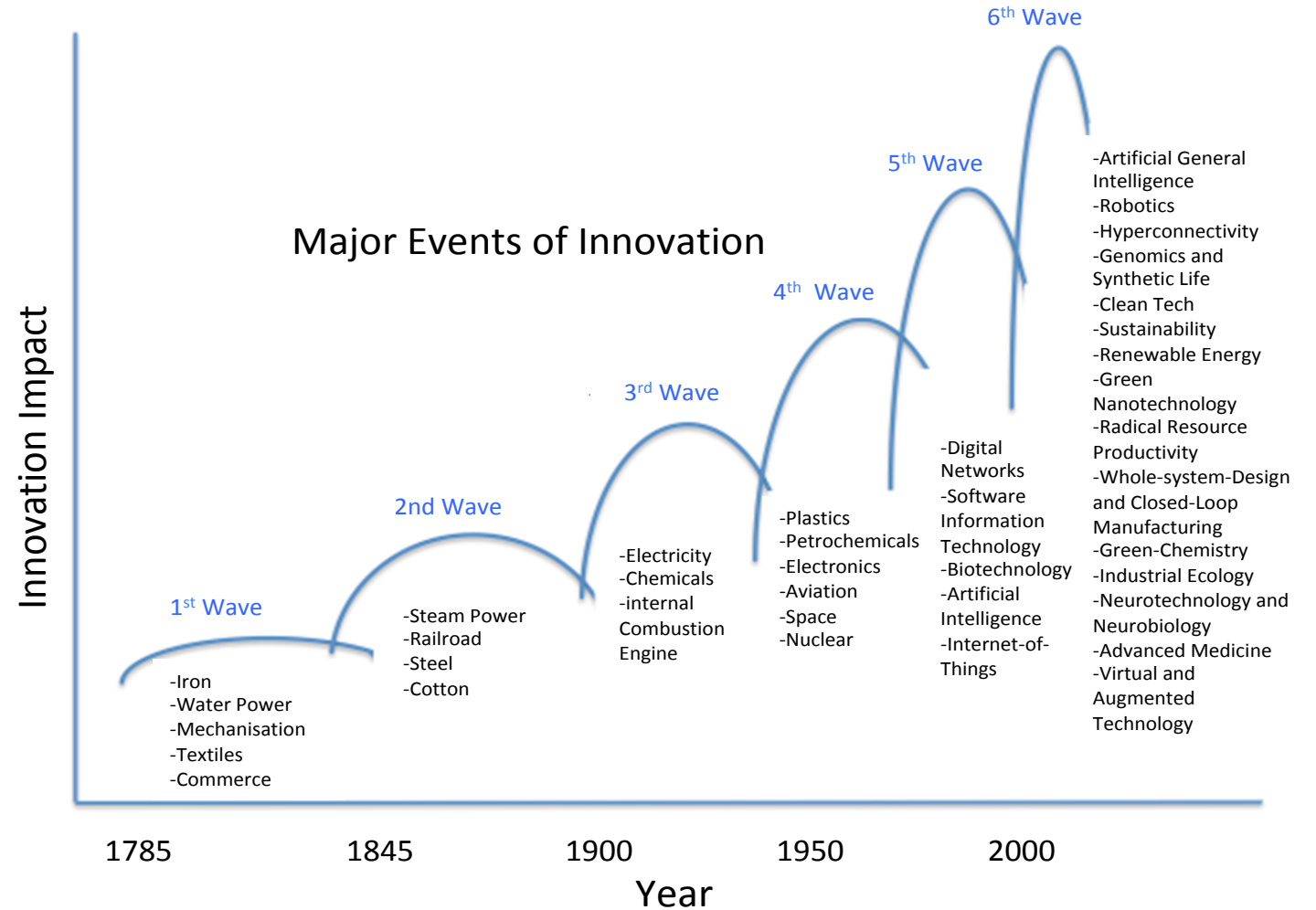
***For the first time in history, thinking and skilful machines are surpassing our physical abilities, and also our cognitive ones***

# Accelerating Technological Change and Eras of Technological Progress



The fulfilment of the Sustainable Development Goals (SDG) of Agenda 2030 will reside within a world of exponential technological change

## WAVES OF TECHNOLOGICAL PROGRESS



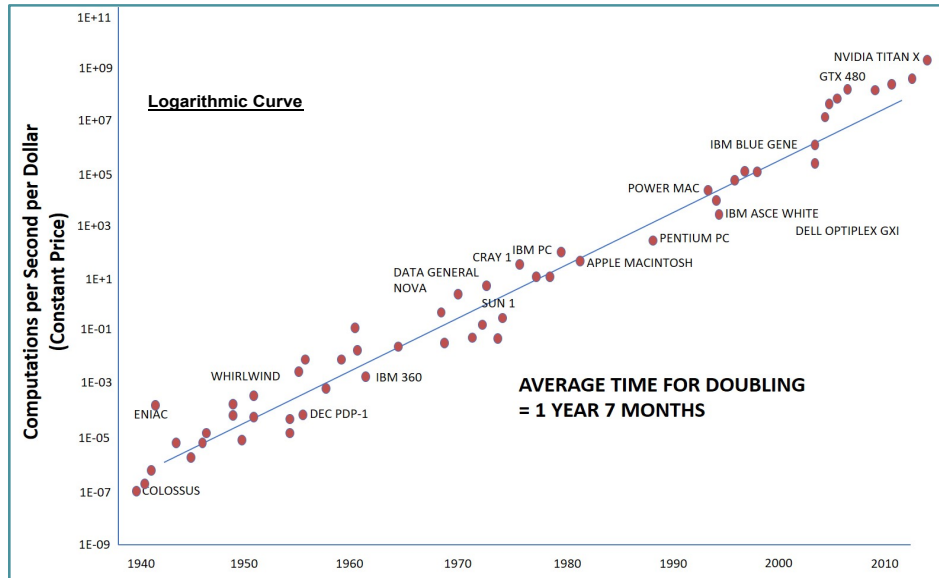
Growing synergy among emerging technologies has created a vastly expanding arborescence of scientific research, knowledge and emerging technologies



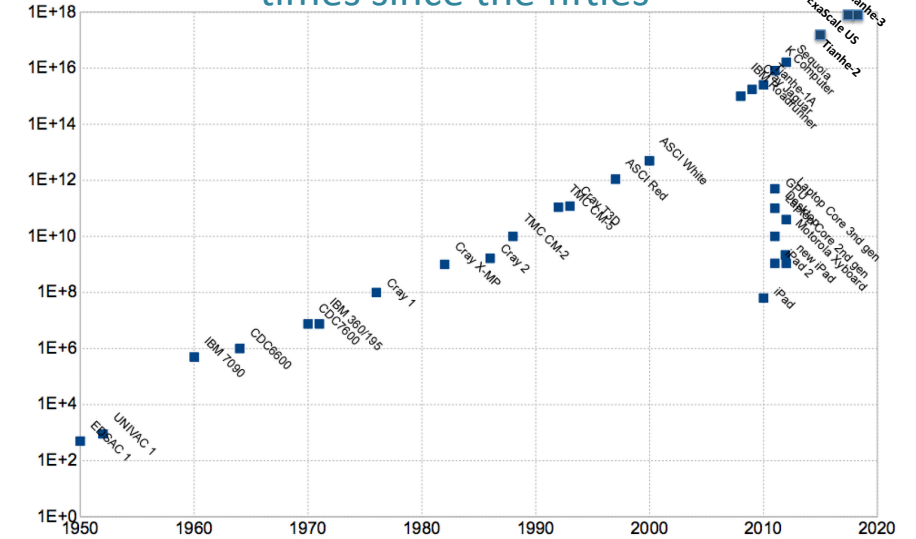
# Accelerating technological change will continue past the next decade

Computing power and cost:

Computational Speed: Calculations / Second / Dollar

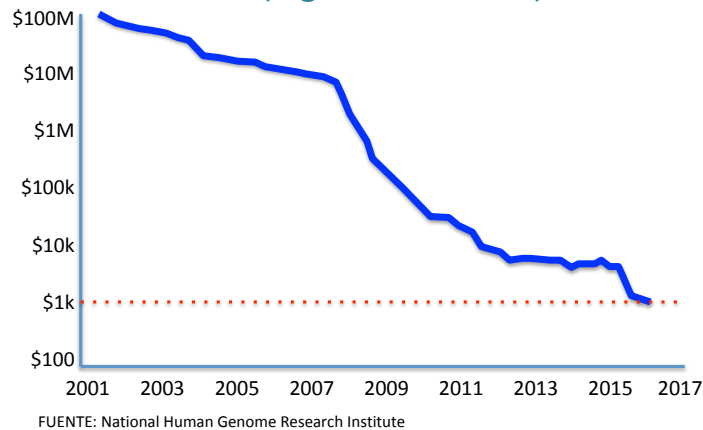


Computer Power has Increased one trillion times since the fifties

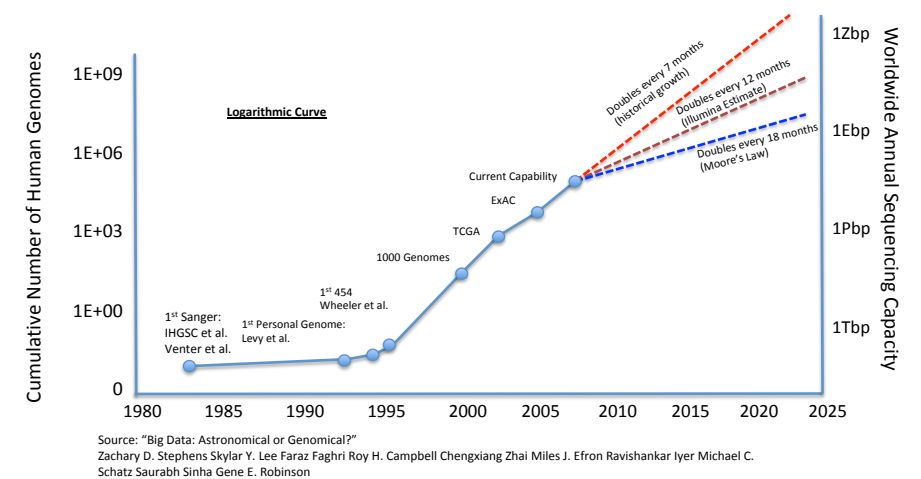


Genome sequencing and cost:

Cost of Human Genome Sequencing (US \$)  
(logarithmic curve)



DNA Sequencing Capability has grown exponentially



Source: "Big Data: Astronomical or Genomical?"  
Zachary D. Stephens Skylar Y. Lee Faraz Faghri Roy H. Campbell Chengxiang Zhai Miles J. Efron Ravishankar Iyer Michael C. Schatz Saurabh Sinha Gene E. Robinson

***This could represent a colossal advantage for humanity, but the irrational, abusive, belligerent or negligent application of these technologies could also lead to social tragedies and even global catastrophes***

***These challenges are probably more urgent to address, and the consequences of not doing so more imminent and devastating, than predictions of climate change***

# What to Expect?

## On the bright side

We could find solutions to

- meeting all SDGs
- unleashing creative and collaborative forces of all humanity
- freeing people from repetitive, undignified and dangerous jobs
- overcoming scarcity

## On the challenging side

It could also lead to

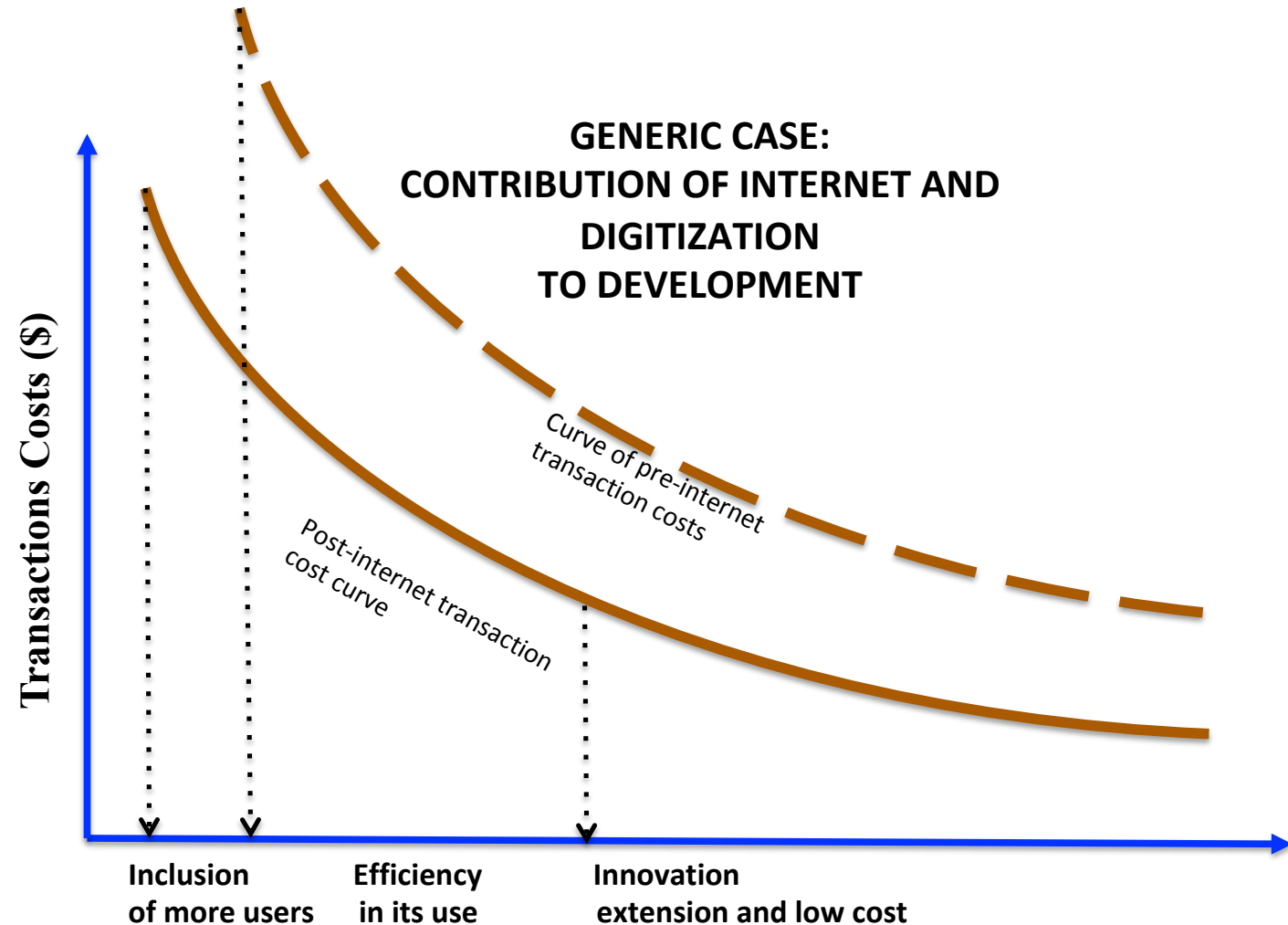
- mass-unemployment
- greater inequality
- structural deflation
- loss of privacy and freedom
- collapse of governance systems

***It all depends on what we do today***



# Digitalisation, AI and other exponential technologies can contribute to:

- drastically boost productivity and growth
- reduce marginal costs of producing additional units of anything
- achieve renewable energy capacity
- lower prices for consumers
- increase returns
- more administrative efficiency
- transparency
- planning and evaluation capacity
- optimise consumption and welfare



SOURCE: WORLD BANK: "Digital Dividends", 2016, p. 45

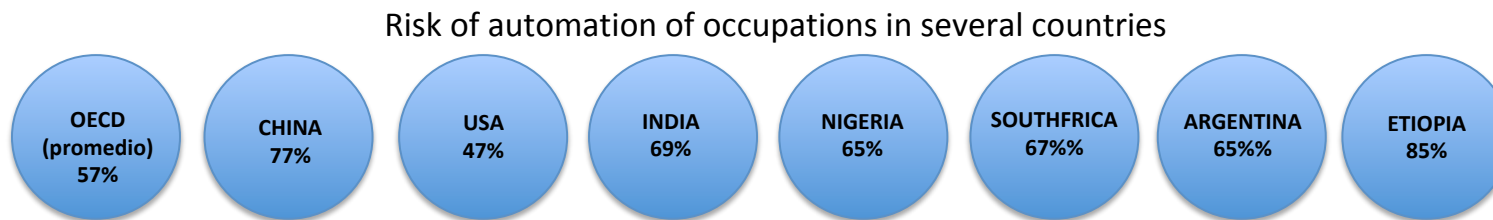
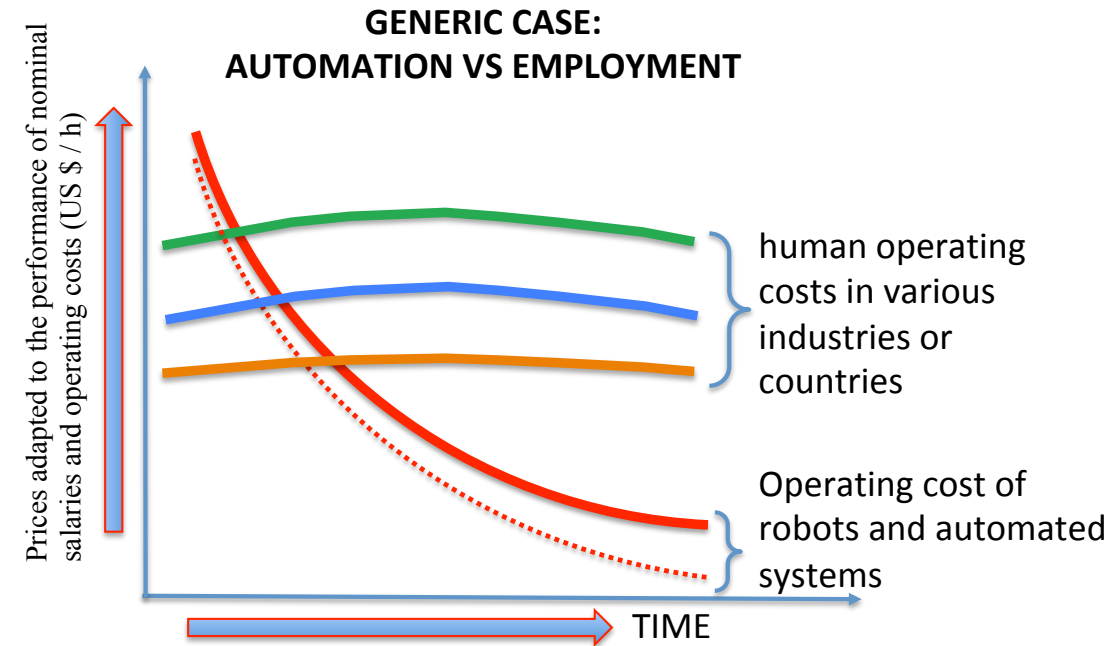
# On the challenging side

Exponential technological change could lead to:

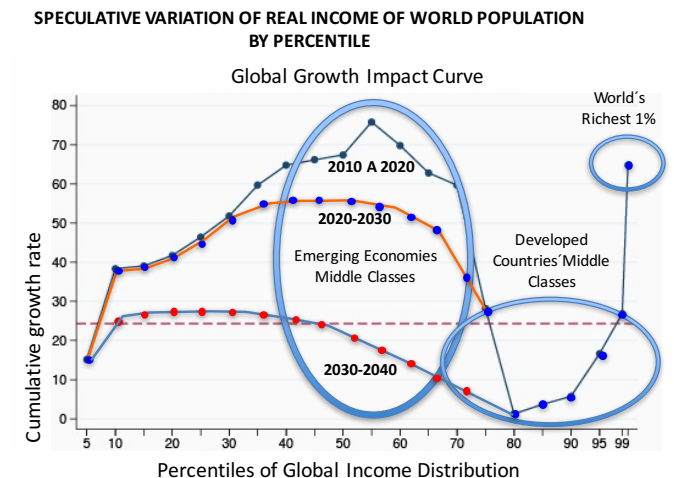
- rapid automation
- intelligent robotic evolution
- 3D and 4D printing
- change in international trade flows
- loss of comparative advantages based on cheap labour and resources

could lead to

- migration of industry in the form of fully automated activities
- technological unemployment
- greater inequality
- sudden deindustrialization of developing economies



SOURCE: WORLD BANK (DEVELOPMENT REPORT, 2016)





# **Ignorance is not bliss**

- **Government and business leaders have little awareness of the speed and implications of the tsunami that is coming and**
- **how it will affect, for good and for bad, economies and companies**

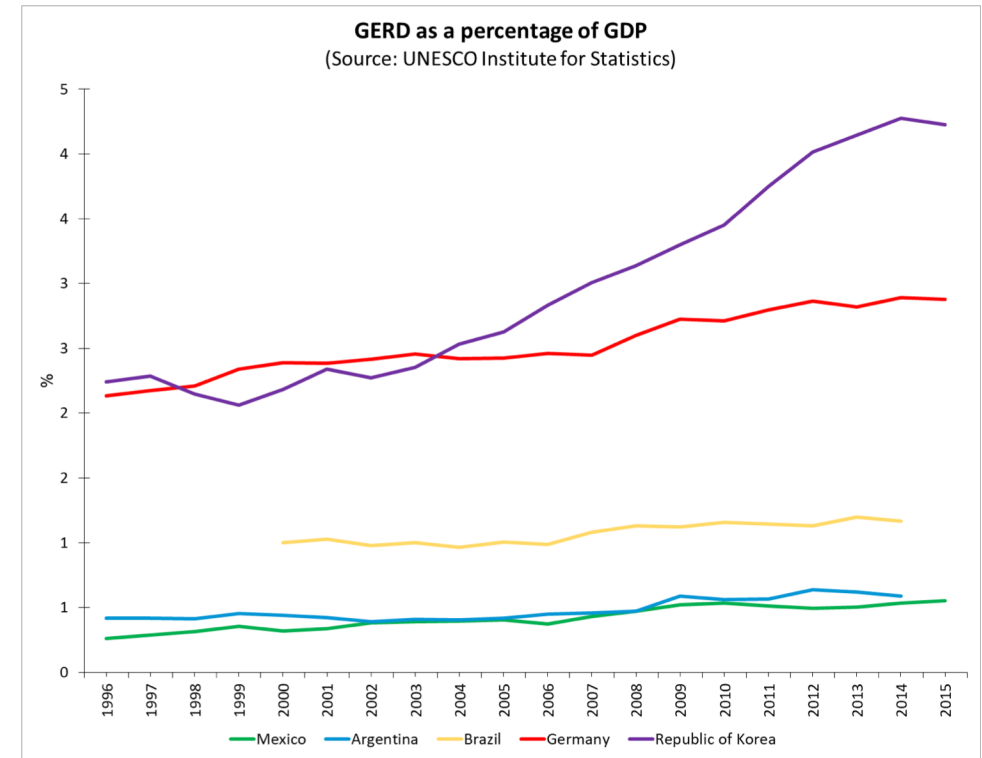
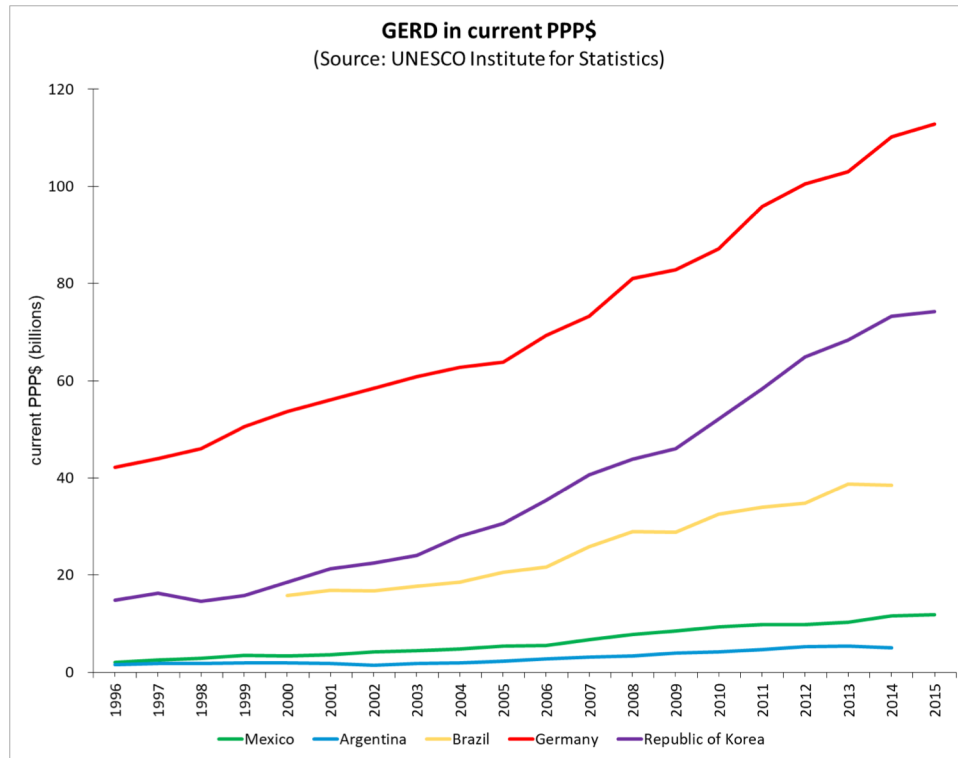
**There is a gap between**

- **people's perception of their socioeconomic problems and**
- **the powerful and rapidly growing solutions and challenges that new technologies can bring**



# State of Affairs:

Latin American countries have poor technology absorption and innovation capabilities



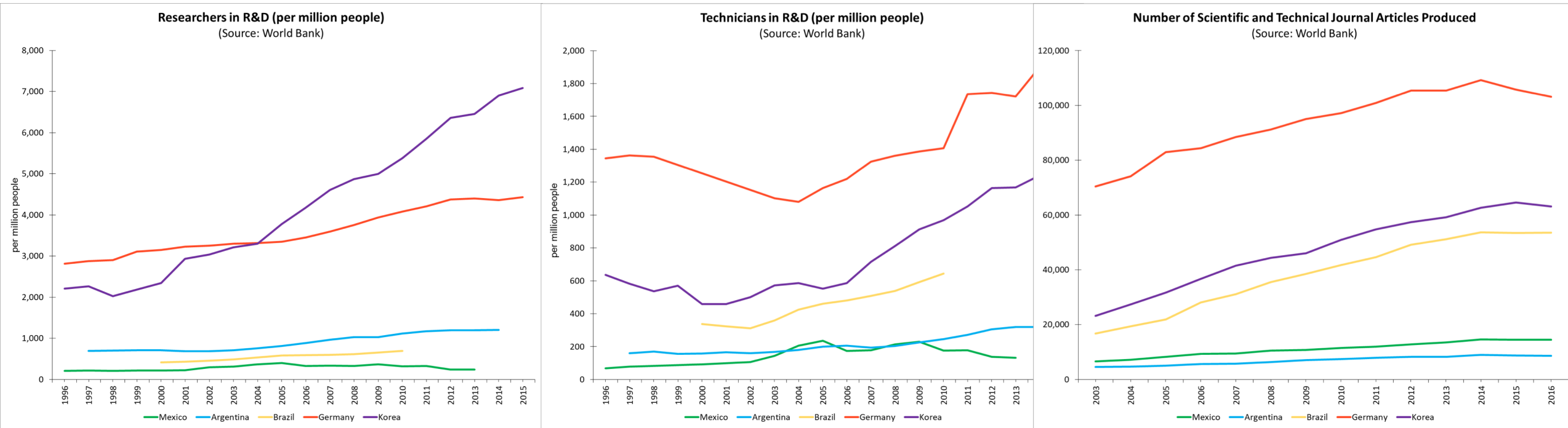
Private innovation and technology absorption is mainly inhibited because of:

- lack of financing, access to capital and financial conditions
- insufficient information, climate of distrust, high risks and low returns

- poor planning and organizational skills
- insufficient public incentives and infrastructure
- use of the Internet, digital platforms, artificial intelligence systems and protection against cyber attacks is very low

# State of Affairs:

technically able population and S&T reading is very low in LAC



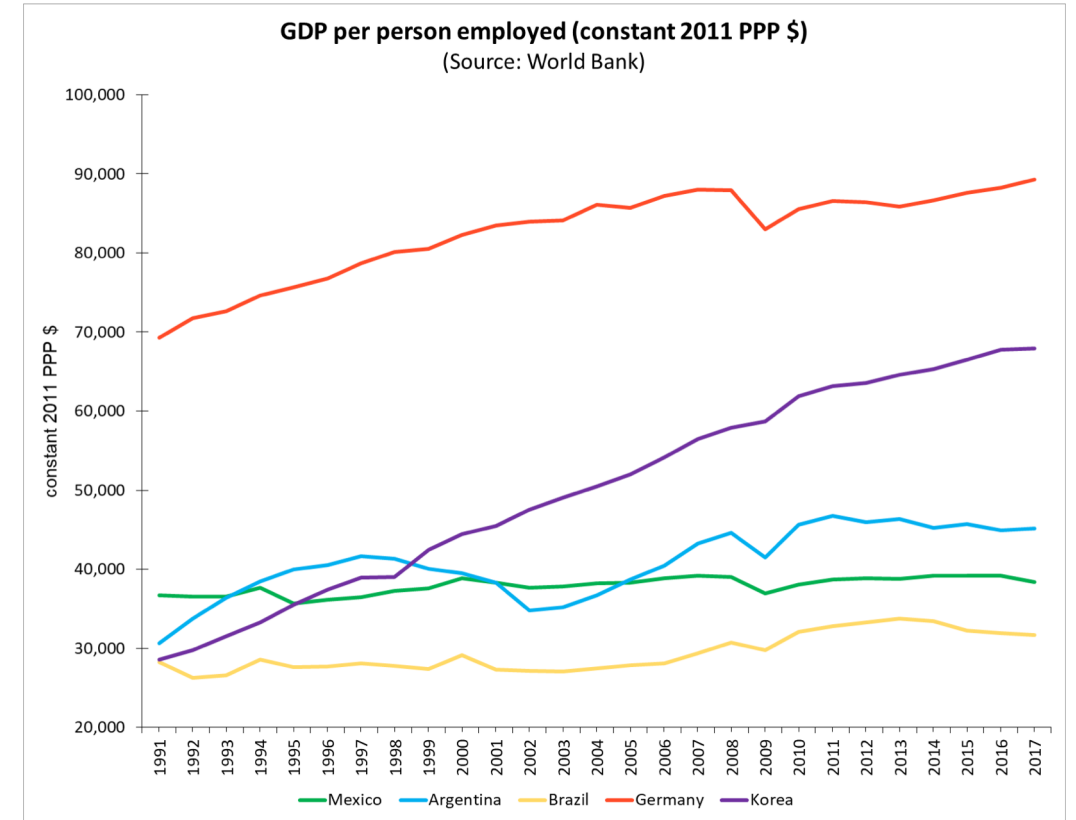
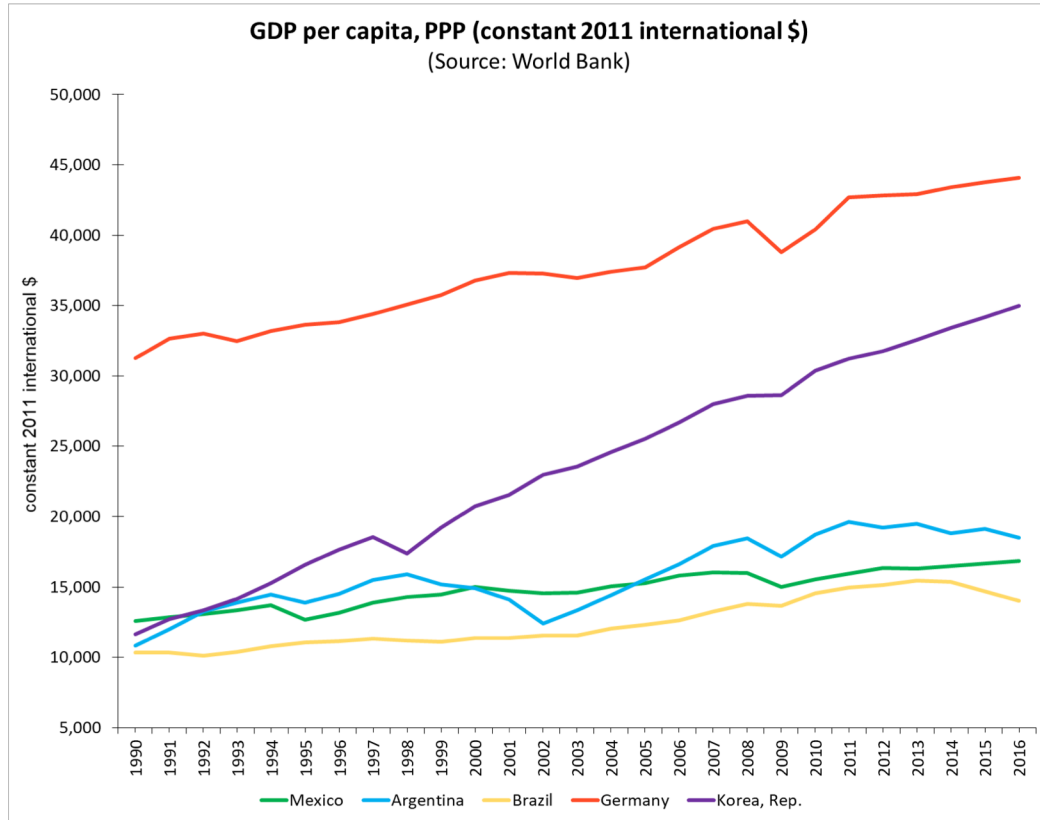
All countries need to seriously invest in

- boosting their technological capabilities and
- intensify their education and training programmes

to take full advantage of the opportunities created by accelerated technological change and to overcome its challenges

# State of Affairs:

Technological and innovation capabilities are key to fast and sustainable growth



There is a positive correlation between innovation, productivity and growth of public and private companies:

ECLAC: “...the lack of a structural change strategy towards more technology-intensive activities underlies the slow and unstable economic growth and is a limit to the advance of the digital economy”

However, R&D strategy and spending must be **long term** and **directed correctly** because not all innovations lead to economy-wide growth

# State of Affairs:

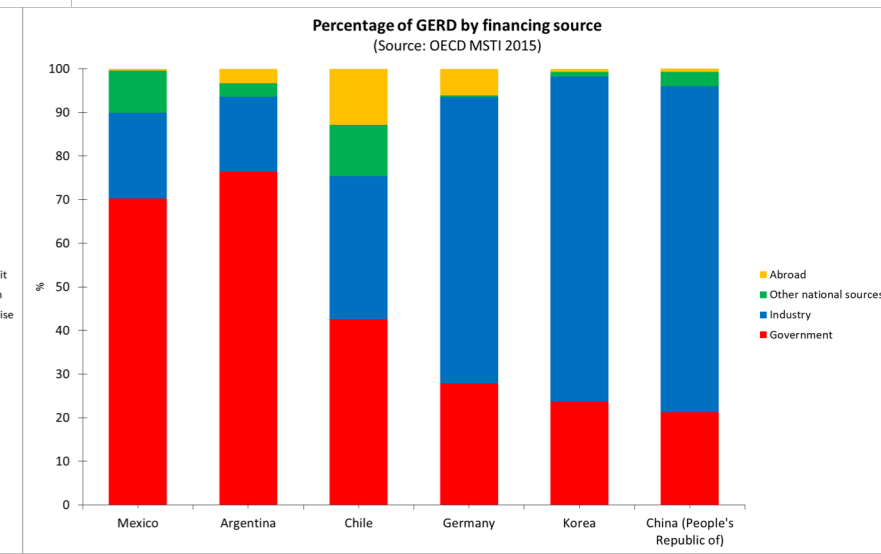
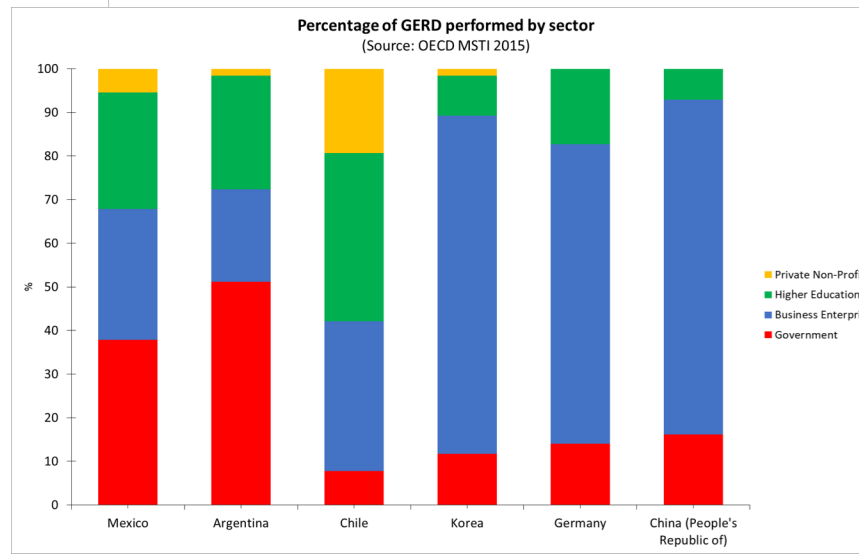
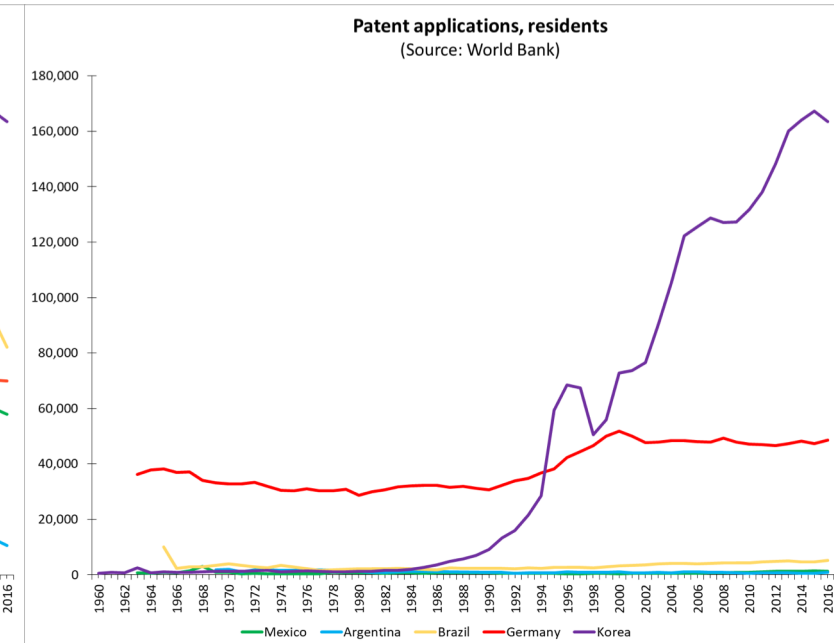
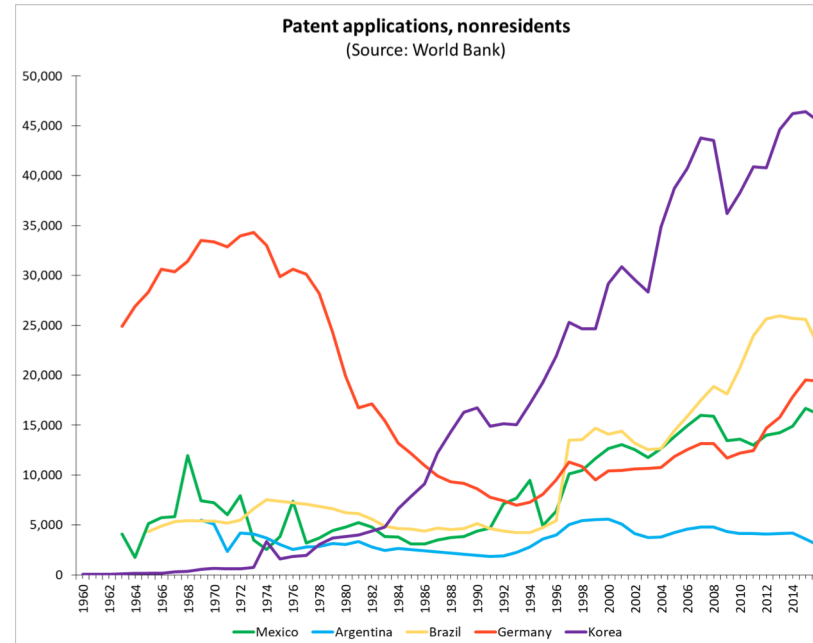
S&T knowledge and patent generation is very low in LAC:  
technology will come from abroad

But must be careful with blunt measures because:

- not all investments are equal, and
- there is strong evidence to show that the relationship between R&D and innovation, and in turn innovation and growth **is not linear**

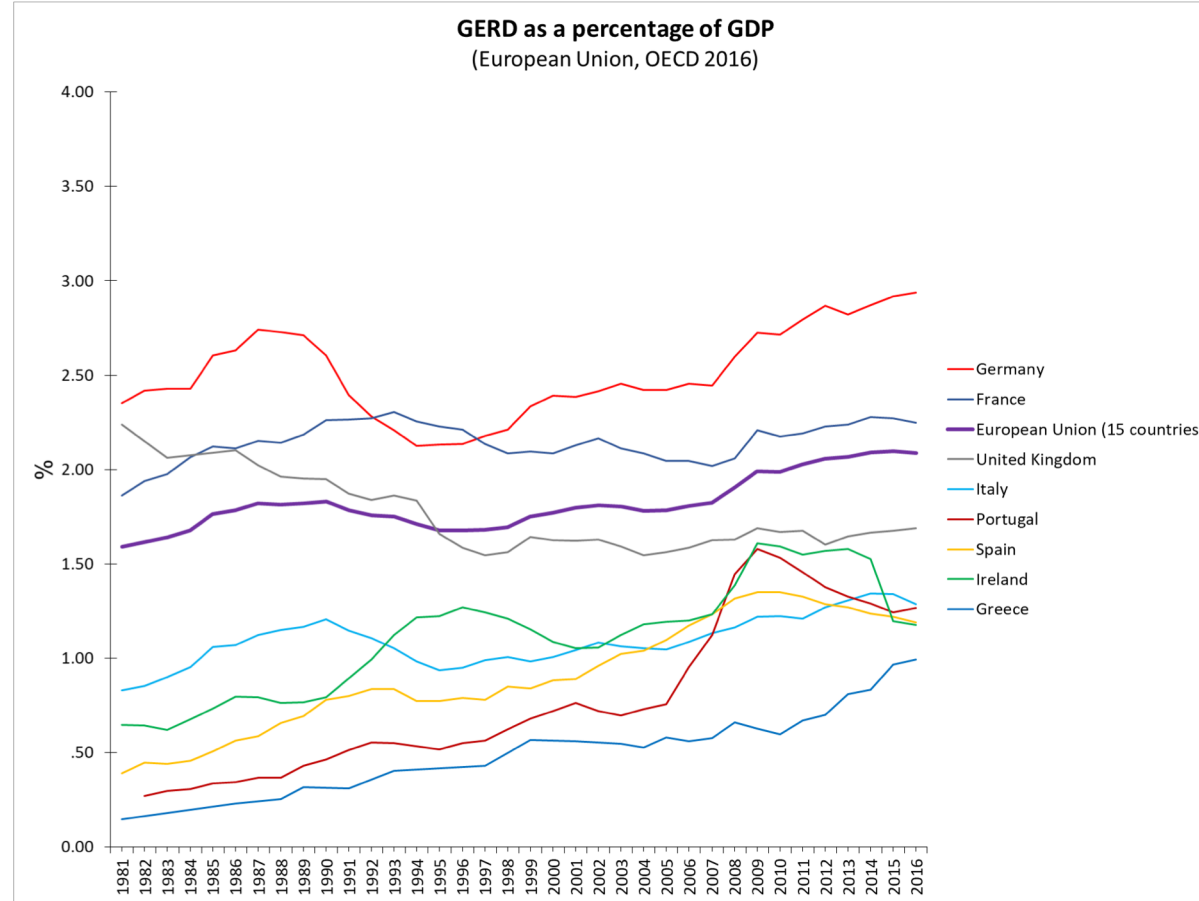
Complementary institutions (low-tech) and right conditions are essential

- to allow innovation
  - circulation of knowledge throughout the economy
  - and at the company level
- Examples: Japan (2.5% of GDP) and Russia (4% of GDP) in 1970s:
- Japan grew faster because knowledge flowed horizontally



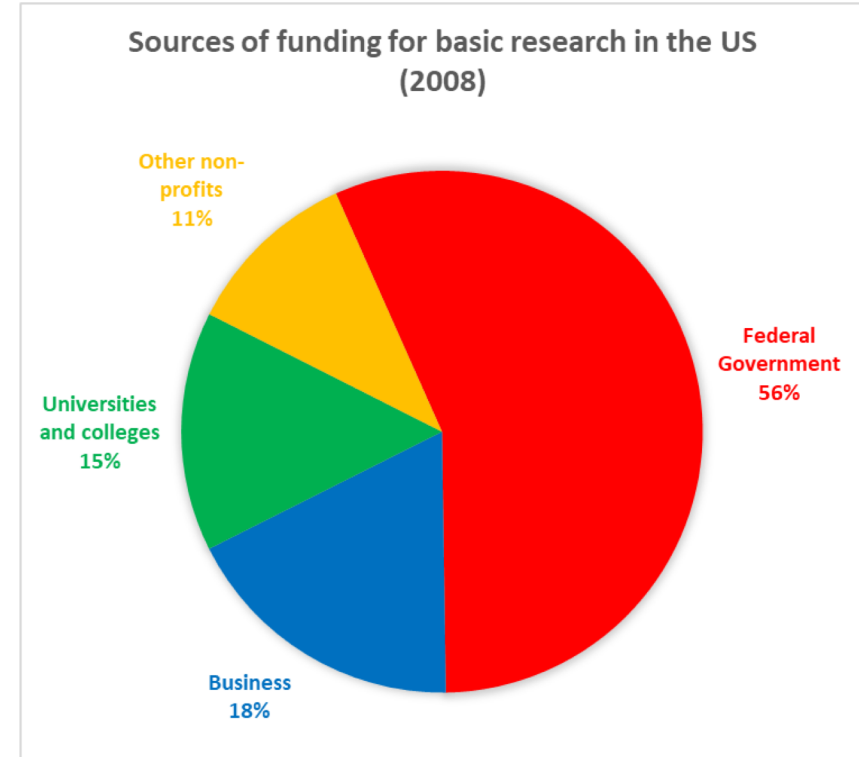
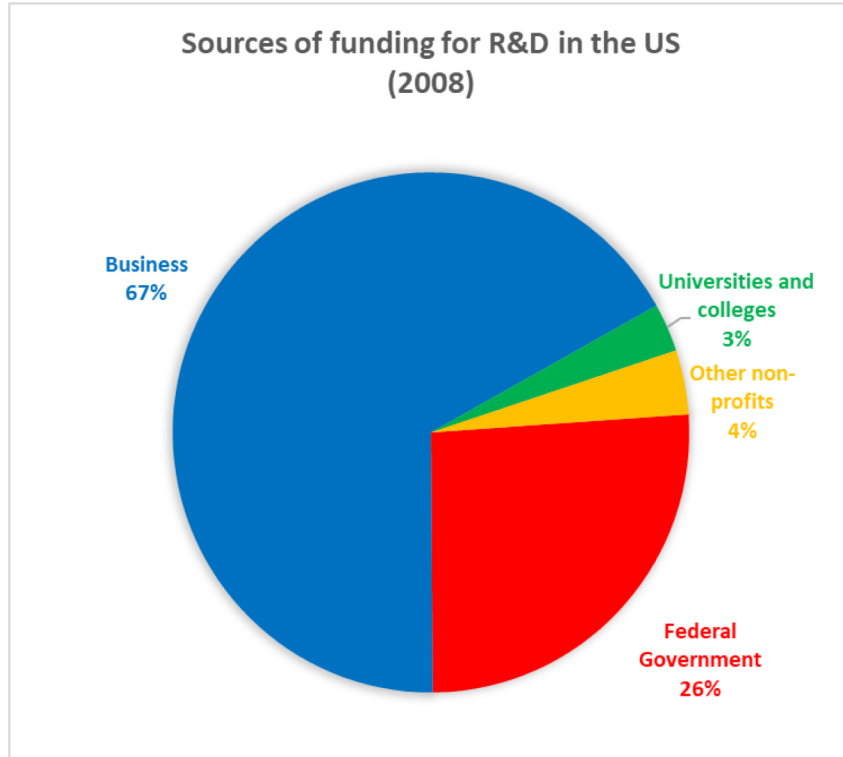
# A case in Europe

In Europe, countries that suffered the most from the Eurozone crisis were those spending the least on R&D:



# Big Question:

## How to socialize the benefits, and not just the risks of technological advance

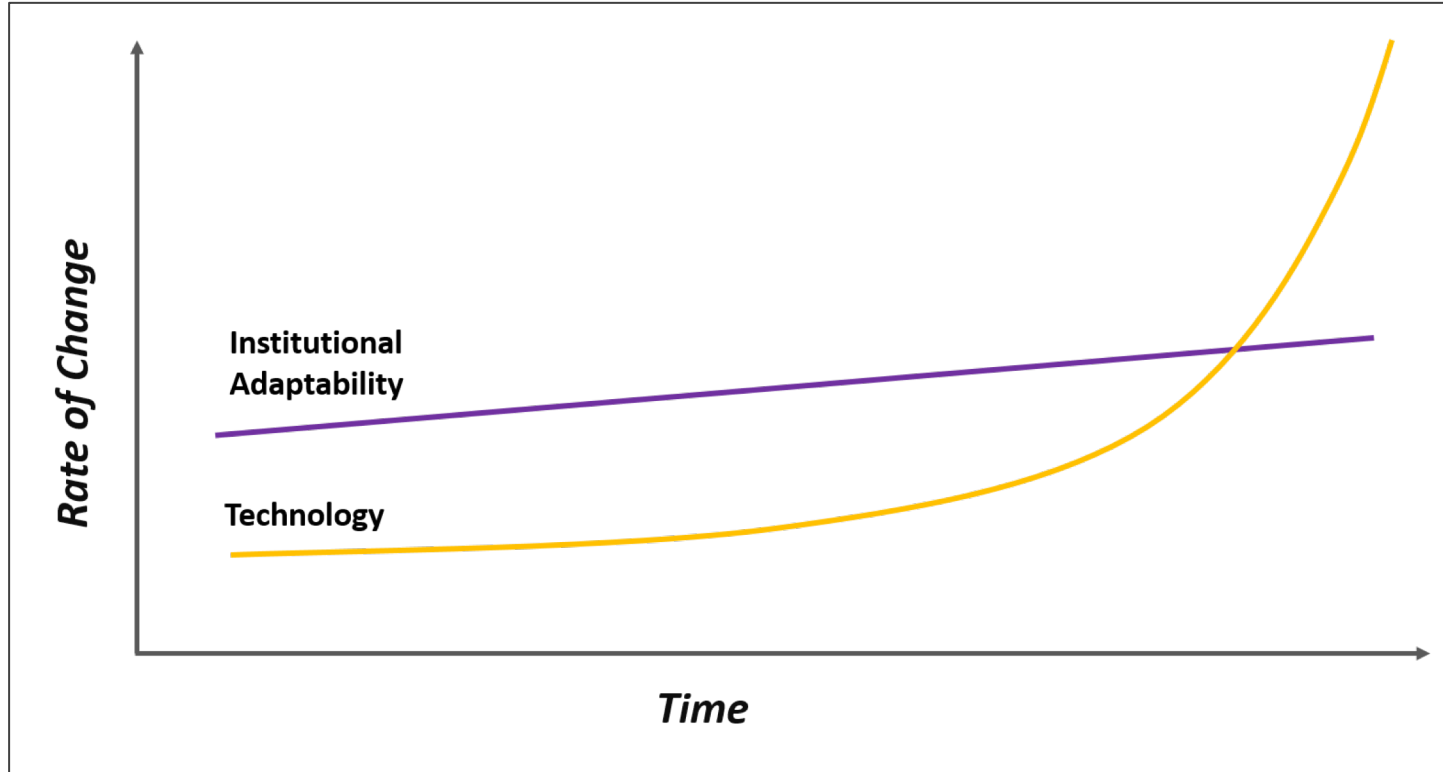


It is government, not the private sector that invests in high-risk but essential basic research that is uncertain but produces real innovation

# Challenges:

the problem of governance

It is difficult for institutions, and for society, to adapt effectively and in a timely manner



- Institutions move linearly
- Technological change does so exponentially

**Entrepreneurial and innovative State** (Mariana Mazzucato):  
strengthening governance system, adaptive regulations, rule of law and raising educational standards



# What to do?

1. Within a multilateral dialogue, all States must
  - urgently establish national and local open forums
  - with participation of civil society, academia, and the private sector
  - based on a bottom-up process and
  - a vigorous debate
2. Effectiveness will depend on
  - gathering
  - analysing and
  - disseminating
  - all relevant information and best practices from around the world on
  - how new technologies can have a positive impact toward achieving SDG
3. All countries need to
  - seriously invest in boosting their technological capabilities and infrastructure, for example:
    - 4G Internet affordable to all
    - strategic support for innovation
    - accessible spaces for testing engineering and digital solutions
  - Intensify education and training programmes to
  - take full advantage of the opportunities created by accelerated technological change and to
  - overcome its challenges

