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# Research Infrastructures for innovation and development

## Financing Research & Development to serve economy

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*Presented by H. CRUTZEN*





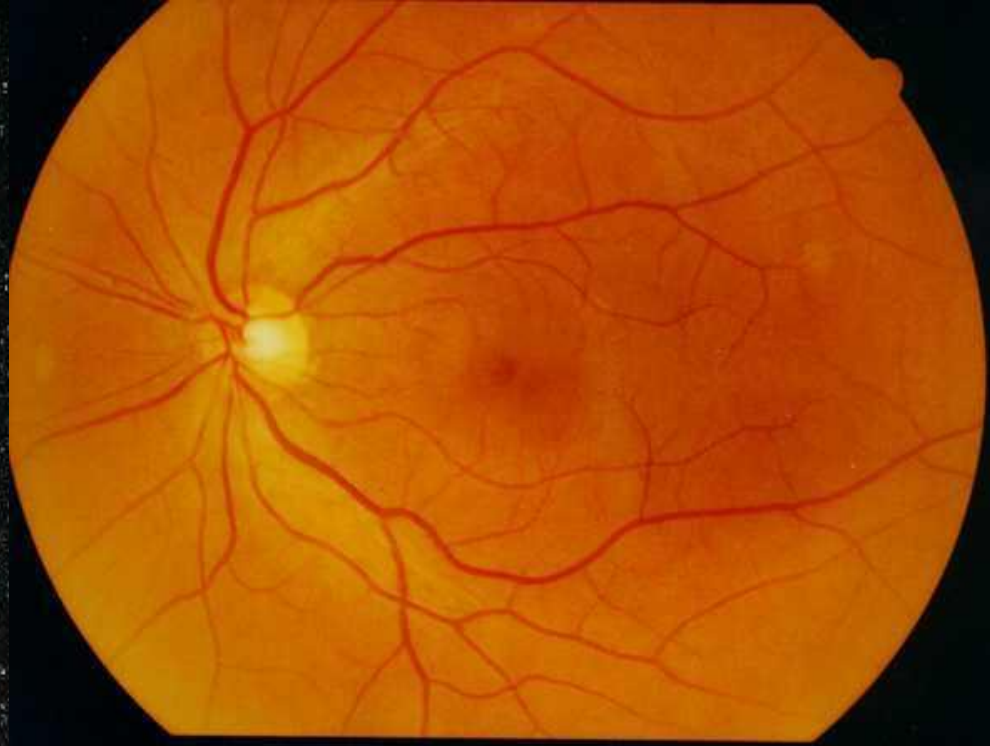
# World-class research infrastructures

Key element of the Lund & Donostia declarations (July 09 – Jan 10)

- Essential for Europe's researchers to stay at the forefront of research development
- Key component of Europe's competitiveness in "frontier" research

## *Key Challenges:*

- *Overcoming fragmentation in Europe*
- *Coping with increasing costs / complexity*
- *Improving efficiency of (and access to) research services, incl. e-infrastructures*



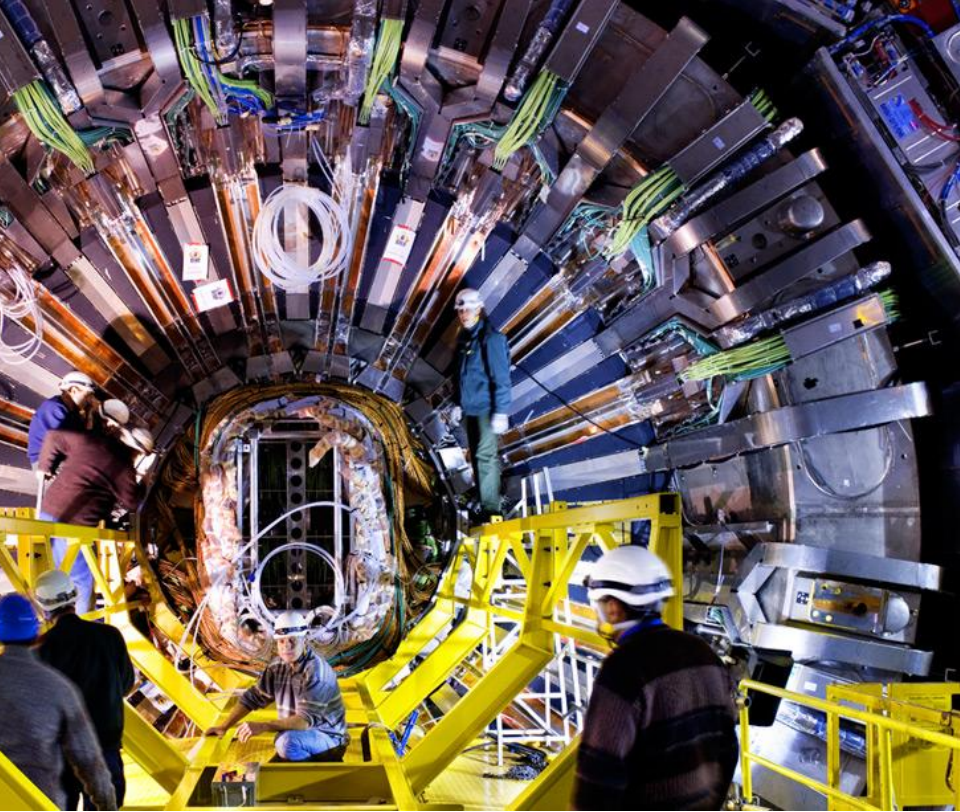
Research Infrastructures are facilities where **basic research** as well as **applied research** are interacting to generate innovations for our daily life



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# First approach to measure industrial impacts at European level ...

*(data from ERID Watch - 2008)*

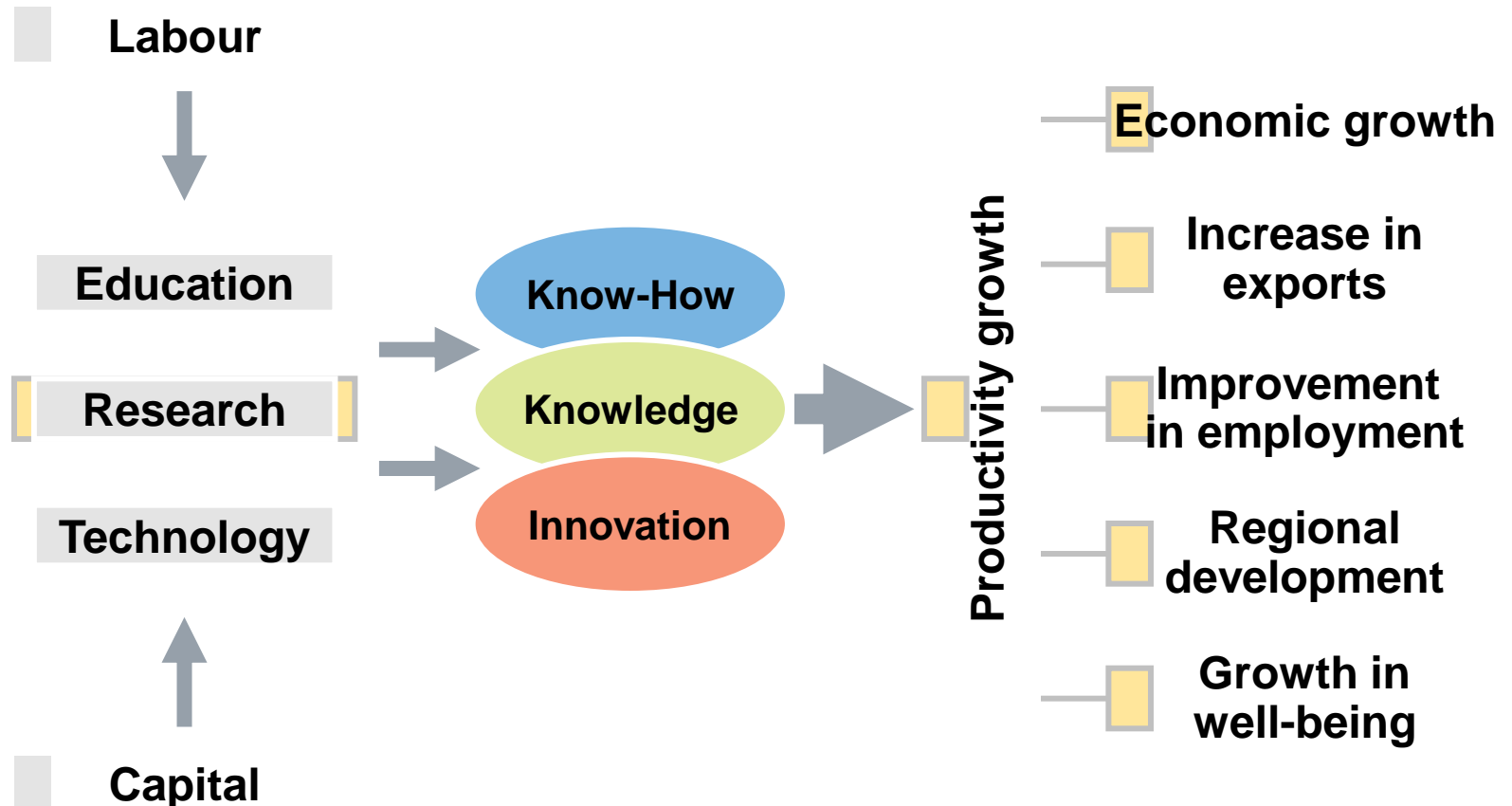
- ✓ Rather big market ~8-9 B€ per year
- ✓ Increase of 5.5% over the last 10 years
  - o new products (e.g. Medical drugs)
  - o Leading edge technologies
  - o Secondary industrial products (e.g. DNA sensors)
- ✓ Marketing image & global markets for technologically-based companies



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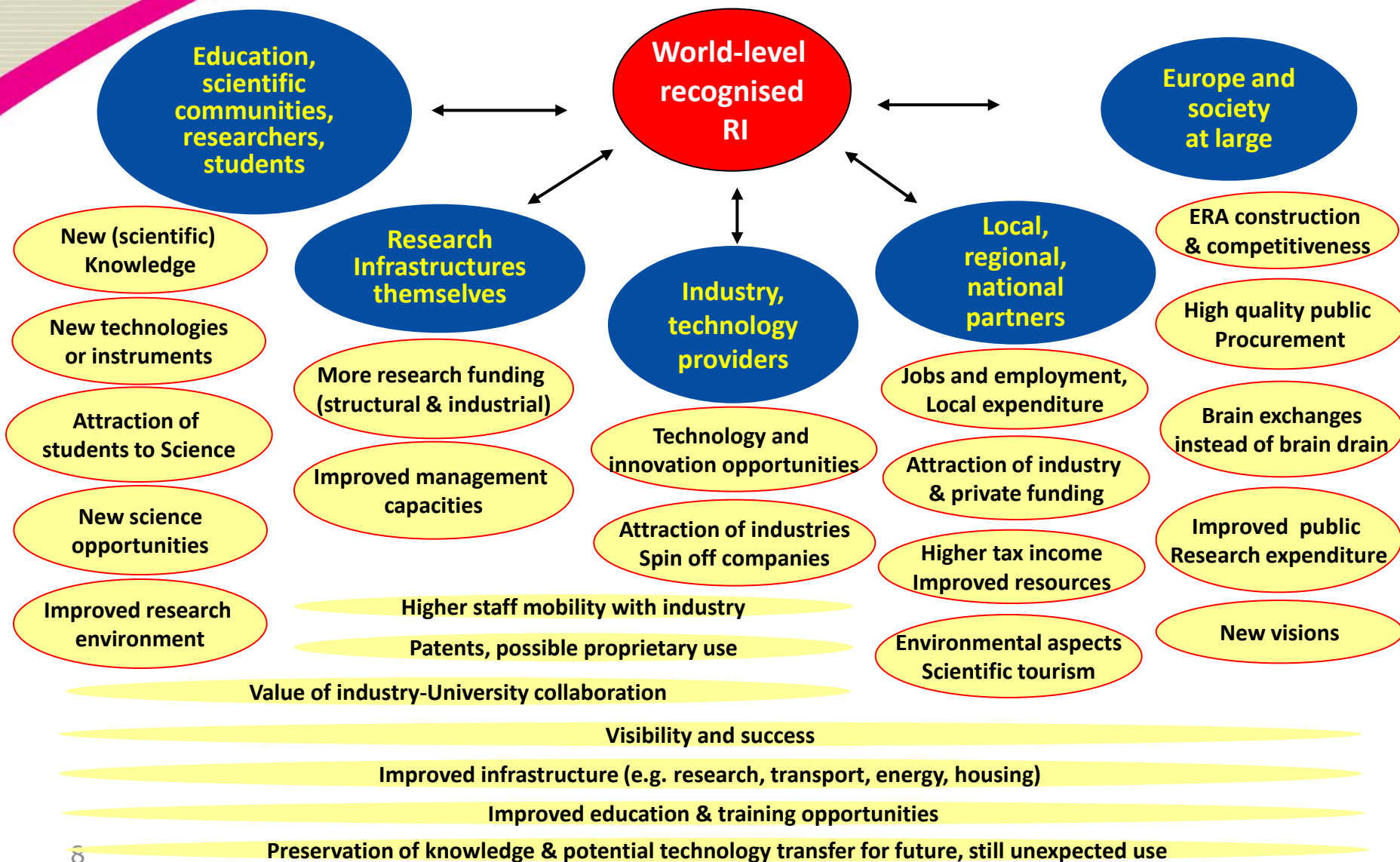
# Sources of economic growth



**According to this growth model, economic growth is rooted in education, research and technology.**



# Rough analysis of Returns and Stakeholders







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## In brief...

Impacts can be generated ...

- **almost immediately**, at **medium term**, and at **longer term**, i.e. creation of spin-offs, knowledge and data for further (still unexpected) use
- At **societal** (e.g. use of internet), at **health & environment level** (e.g. helping to understand climate change issues, at **economical level** (e.g. gains in scale and scope, increased industrial competitiveness, new technologies / products)

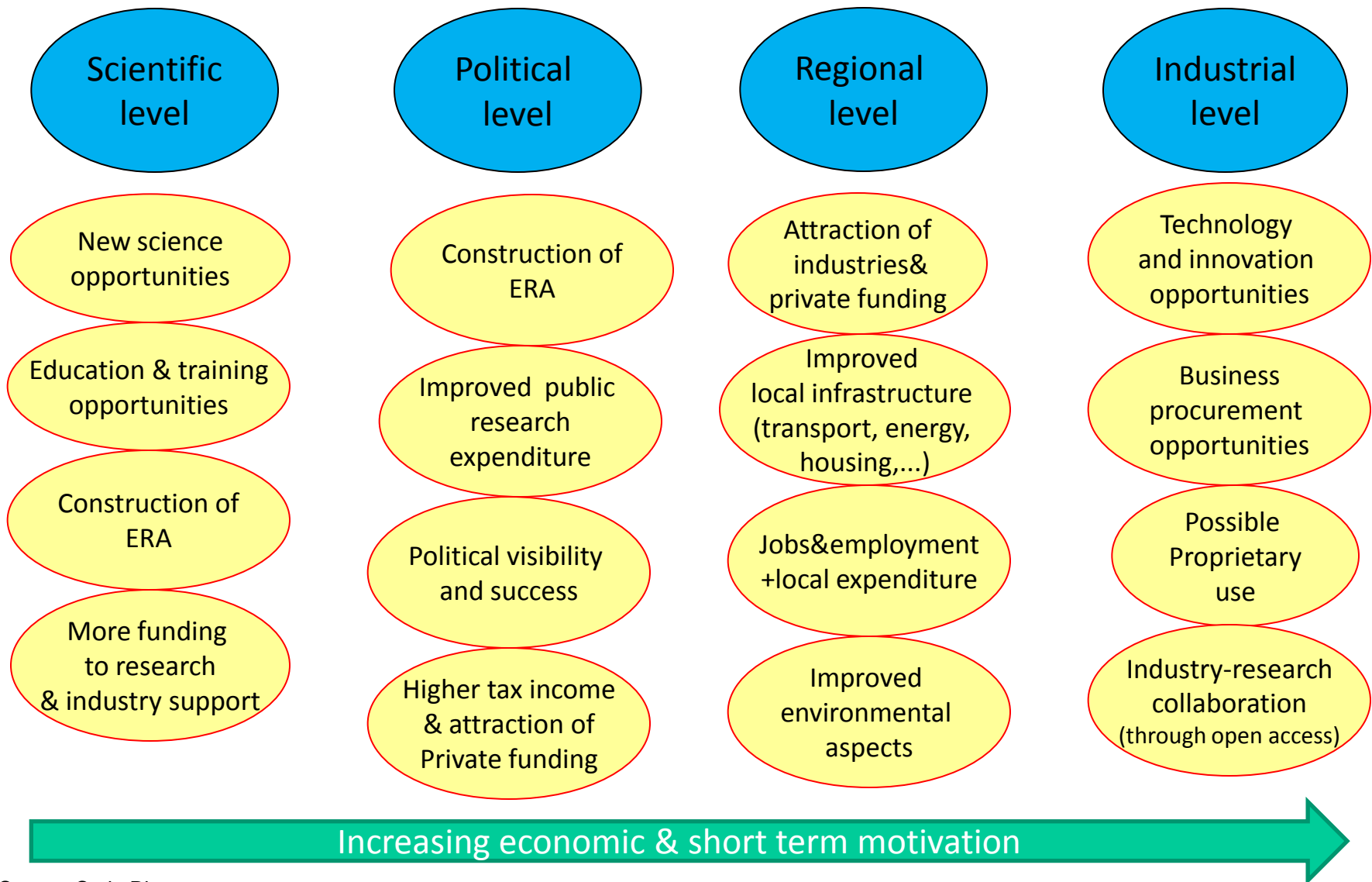




## Direct / indirect effects of individual RIs

- By themselves, RIs generate shorter-term **direct impacts**, i.e. as demanders of new technology or through gains in scale and scope
- RIs generate also many medium to longer-term **indirect impacts**:
  - The results of the research work they allow,
  - The training of people,
  - The organizational changes they stimulate,
  - The opportunities they give for regions, etc.

# Who aims at what?



**However, returns may vary according to local, regional or national environments...**







## Success factors identified...

- Established User / supplier relationships:  
*pre-existence of networks / business models is of high importance for impact generation*
- Relevant expertise:  
*mix of knowledge on socio-economic and relevant scientific/technical domains is key*
- Ex-ante analysis of impacts:  
*based on possible retrospective analysis or modelling (only possible if data collected and retained)*



# Barriers to generation of impacts ...

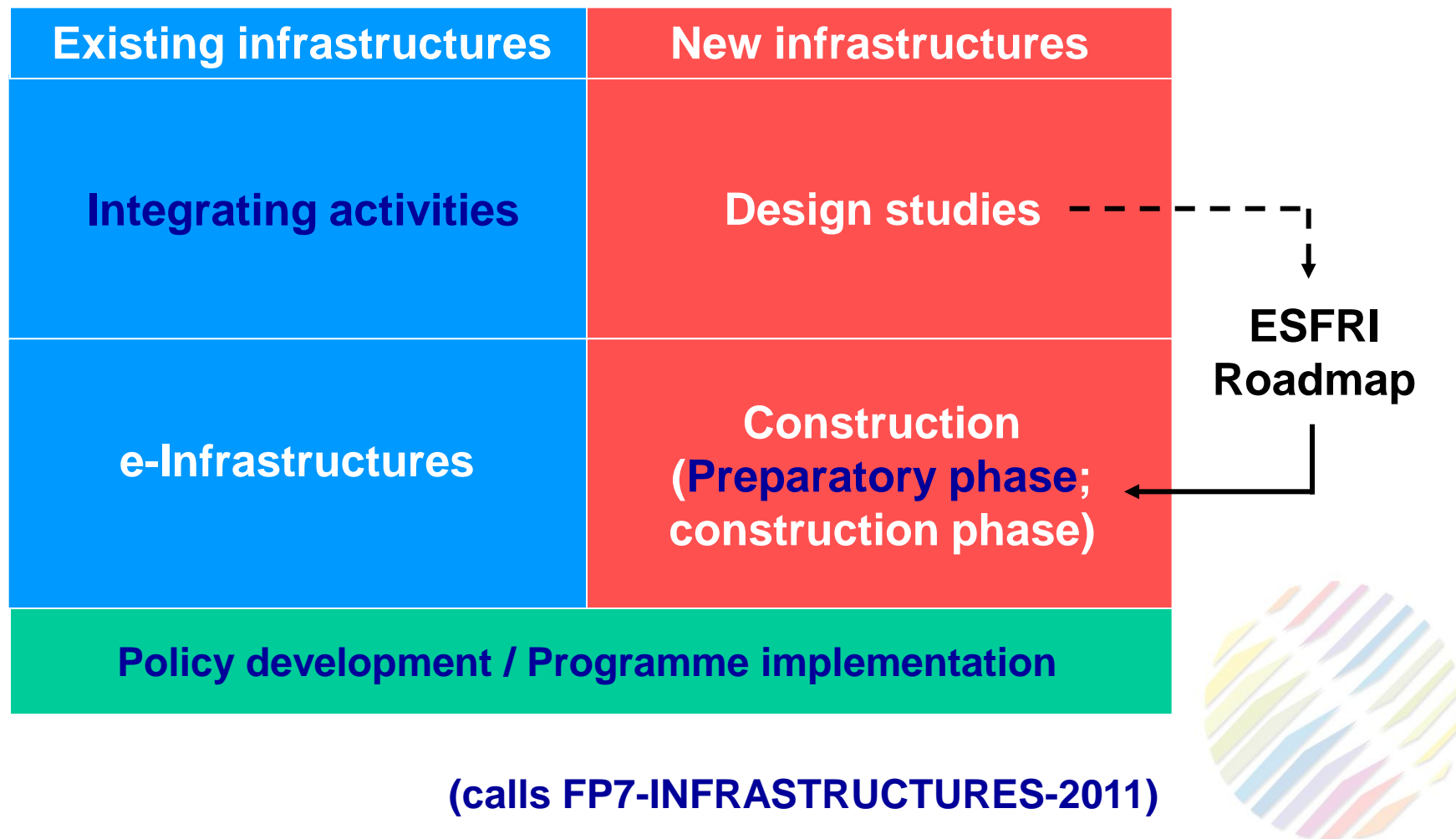
- Non adequate planning of work or lack of business model towards users and/or suppliers
- Non-availability or lack of a critical mass of data
- Lack of maturity of the Discipline or its information use
- Non-Availability of Relevant expertise and/or Personnel
- ... *also imperfect or Partial methodologies, meaning that although impacts are there, nobody is really aware ...*



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# Support given by FP7 Research Infrastructures action





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## **Main FP activity: *Integrating RIs at EU level***

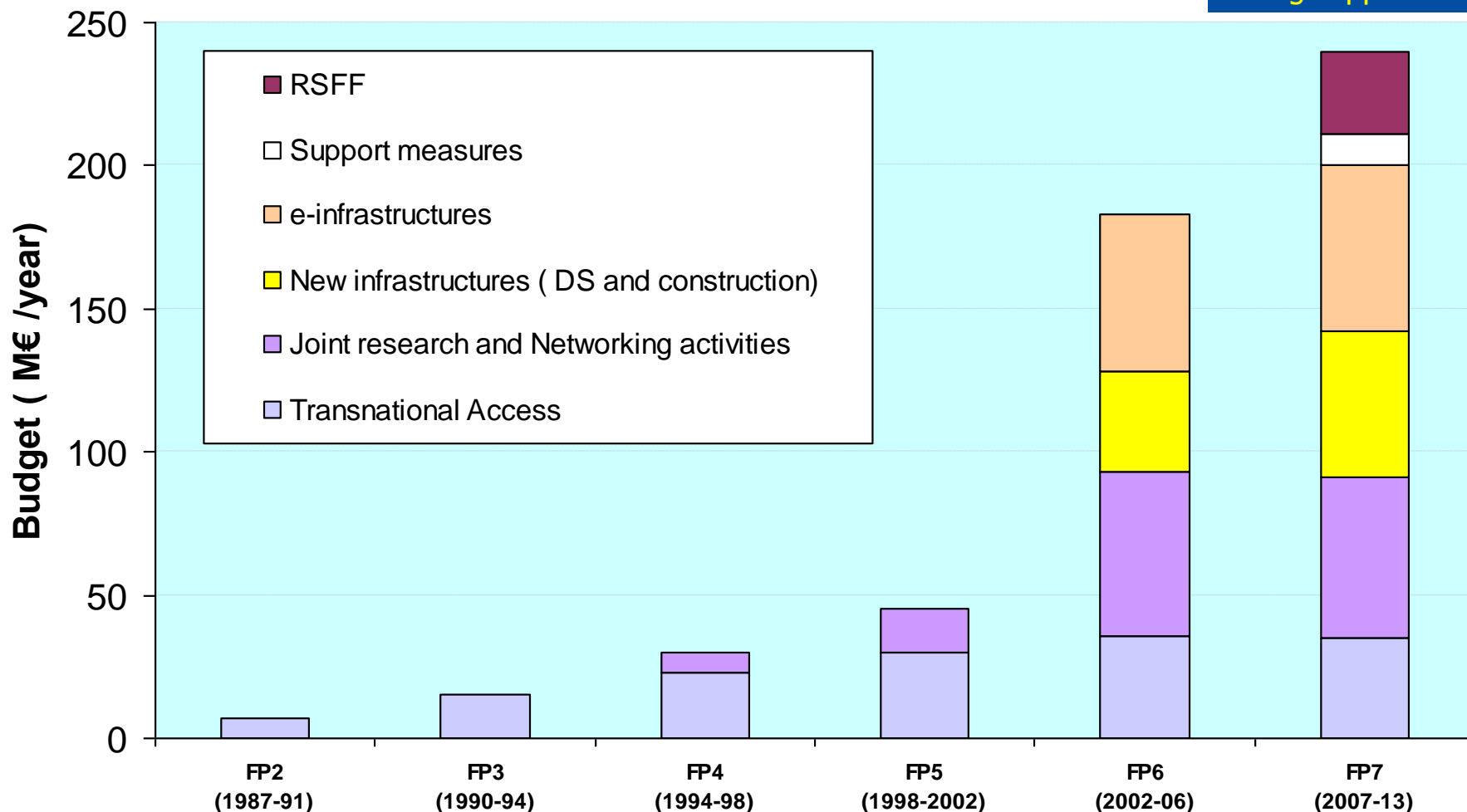
- **Collaboration of existing research infrastructures**
  - ➔ **Normally all major RI's in Europe in one field**
- **Three types of obligatory activities**
  - ➔ ***Networking Activities***
  - ➔ ***Trans-national Access + Service Activities***
  - ➔ ***Joint Research Activities***

**2,5% of EU needs**  
About 550 RIs  
supported under FP  
until now



# A steady evolution since 20 years...

About 550 RIs  
being supported





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# The Virtuous Cycle

Increase of  
quality of research

Increase of new  
financial resources



Increased attraction  
of human resources  
and ideas:  
invent to discover!

More innovation and quality procurements:  
economic and social returns

**CHALLENGE: To aim at a self-sustaining cycle!**



# Vision?

## The knowledge society...

- A fully integrated, consistent, efficient eco-system of Research Infrastructures, serving researchers and society in all S&T fields
- Research Infrastructures as knowledge industry for the knowledge society and source of attraction for world scientists
- Based on widely used and efficient e-infrastructures





## Which are the key factors affecting the vision?

- Capacity (or not) to develop a *favorable environment* for EU research (not just national)
- Capacity (or not) to strengthen relations with *education* and with *industry*
- Capacity (or not) to *work together* to face increasingly complex problems / costly solutions
- Capacity (or not) to face *research internationalization*
- Stimulating Working environment
- Socially-friendly hosting environment
- Favorable financial / eco environment
- Politically « working together »





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# The need to assess a RI

## A possible evaluation matrix to be looked at...

		inputs		Overall RI environment
		Excellence	Management	
outputs	Science	Frontier research	Research services	
	Europe	EU S&T challenges	Governance	
	Economy	Grand Challenges	Balanced budget	
				Research-innovation bridge



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## Need to characterize the overall environment!

- Overall positive environment needed to generate impacts, although inputs are present...
  - Stimulating Working environment (W)
  - Socially-friendly hosting environment (S)
  - Favorable Financial / eco environment (F)
  - Politically « working together » (P)

As if a theoretical equation was:

**Impacts: function (E, M, T, W, S, F, P...)**



*Questions ?*