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Analysis of Research and Innovation Dilemma

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Research/ Innovation

Research:

- A creative process
- Well-defined actors for training and working fields
- Linear and simple process
- Even in case of failure an useful result is obtained
- The destination field of the final product is always, in first approximation, in research scope

Innovation:

- A transformation process
- Actors with many and different competences and skills
- Not linear process with many driven forces
- A failure is total defeat
- The final scope is the society/market

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Innovation: introduction of new or significantly improved products (goods or services), processes, organizational methods, and marketing methods in internal business practices or in the open marketplace

R&D and other intangible investments such as investments in software, higher education, and worker training are key inputs driving innovation*

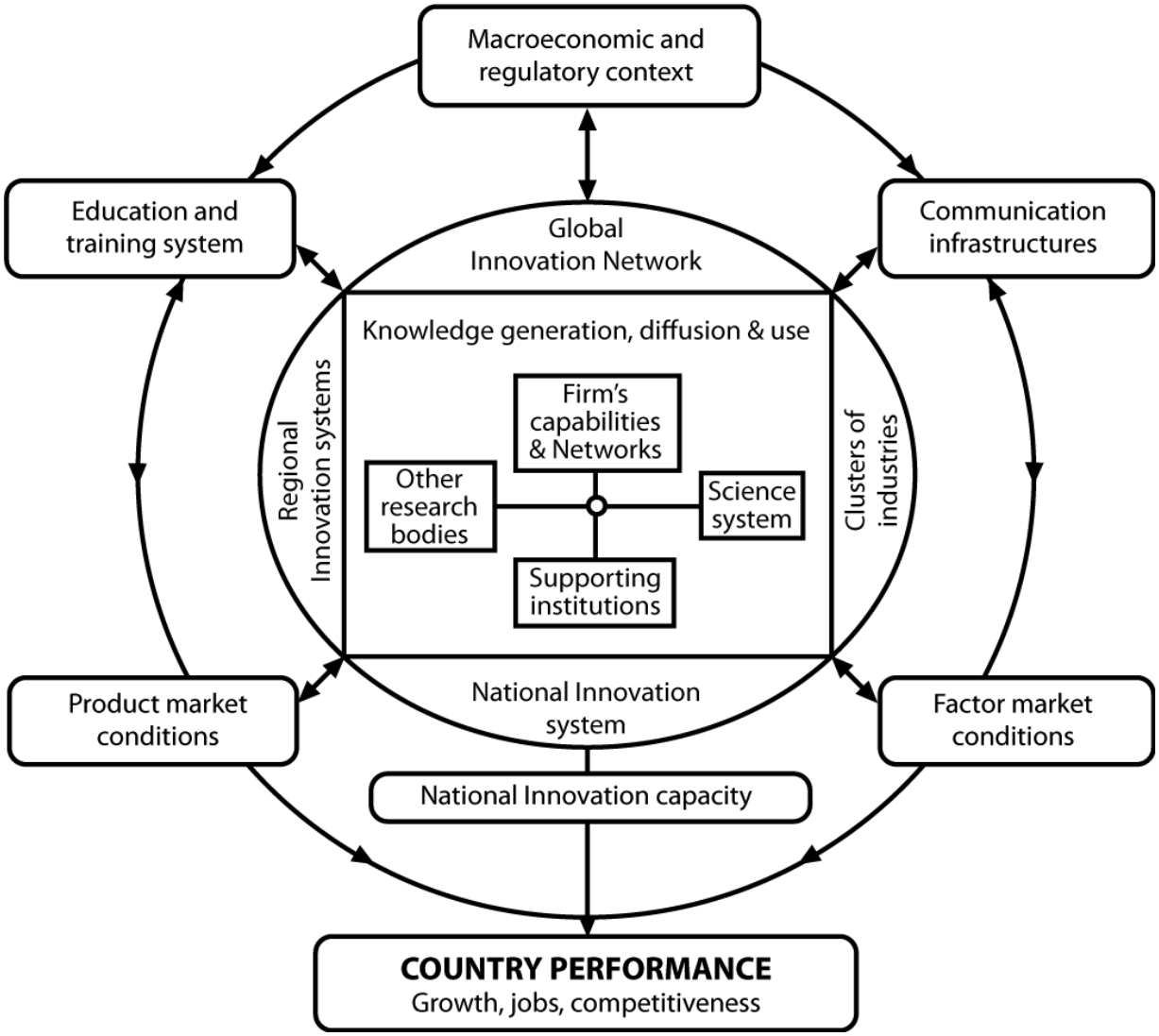
Technological paradigm as 'model' and 'pattern' of solution of selected technological problems, based on selected principles derived from natural sciences and on selected material technologies

*Technological trajectory: pattern of ''normal'' problem solving activity (i.e. of progress) on the ground of a technological paradigm***

***Dosi 1982*

**OECD Oslo 2005*

Innovation system



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Research

Galileo Galilei
(1564-1642)

Innovation

Joseph Schumpeter (1883-1950)

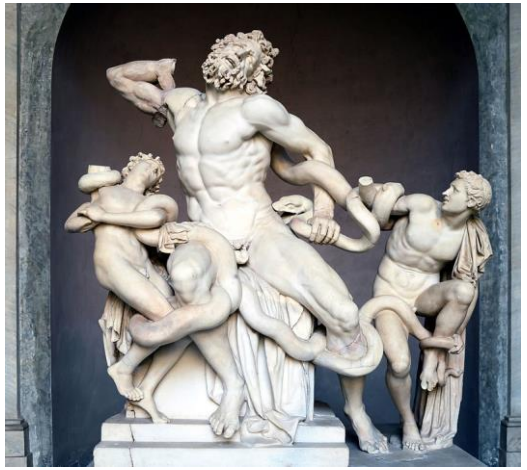
Kind of innovations:

i) Introduction of new products
ii) Introduction of new methods of production
iii) Opening of new markets
iv) Development of new sources of supply for raw materials or other inputs
v) Creation of new market structures in an industry

Greek Sculpture Innovation

700 A.C.

450 A.C.



150 A.C.

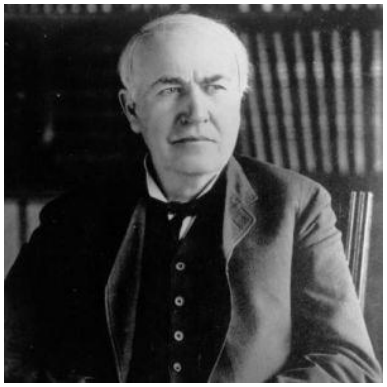
- Technique
- Materials
- Subjects
- Role of artist

Italian Renaissance

Evolution of Innovative processes

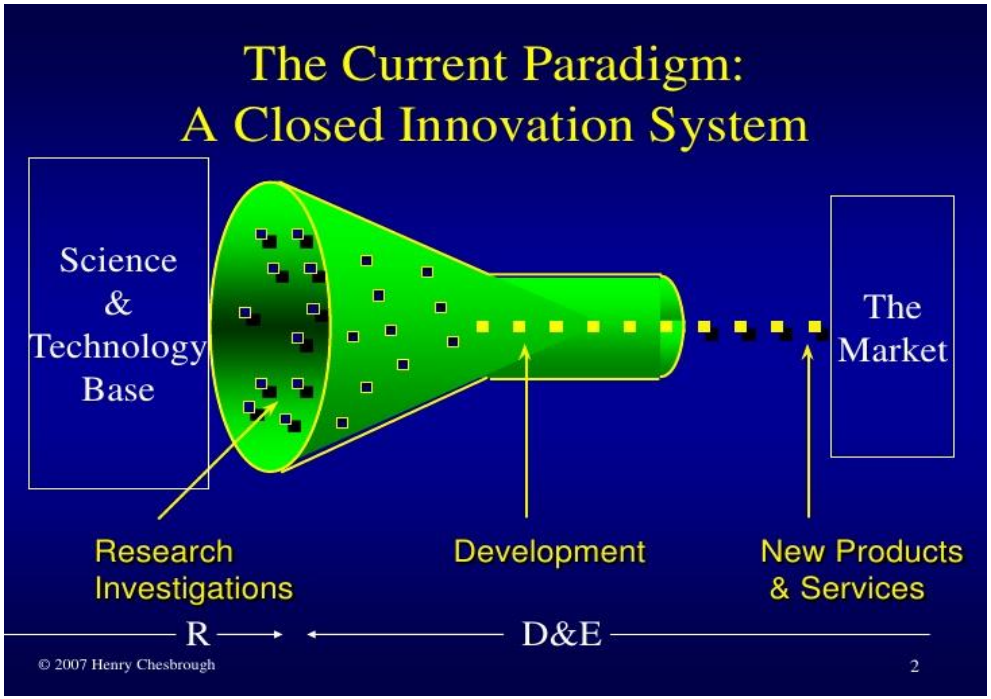
Interactions between participants

XIX XX XXI



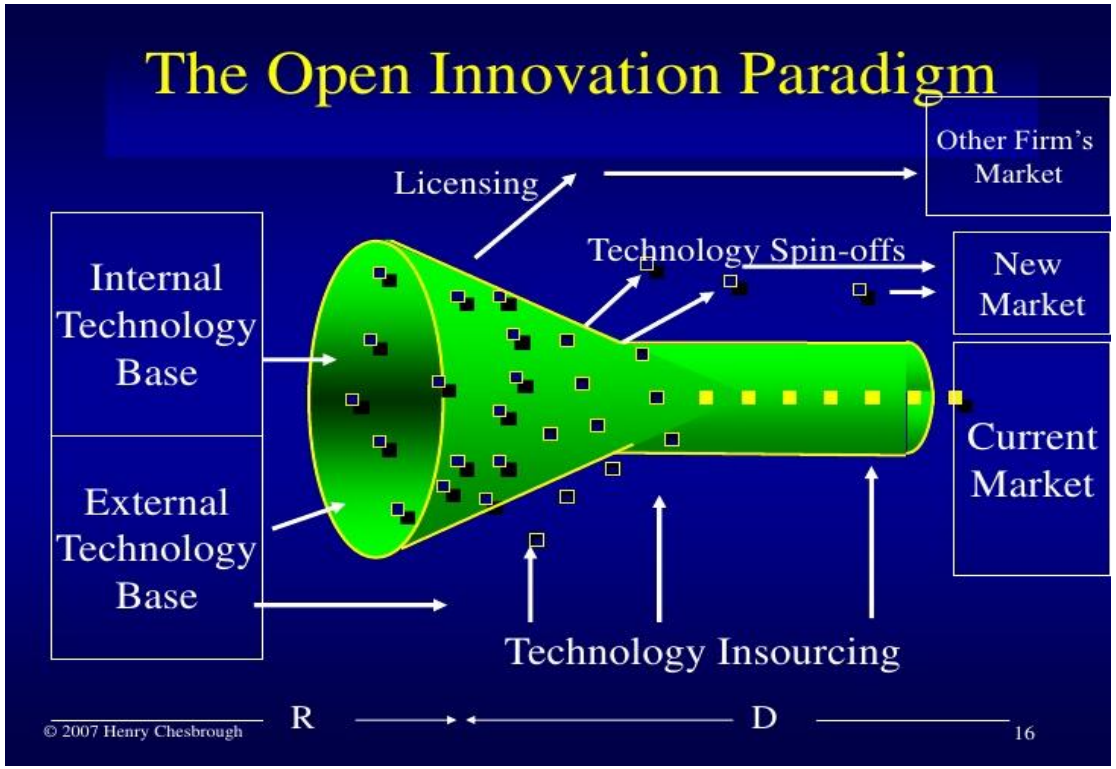
Thomas Edison 1847-1931
1092 patens
GE founder
Investor J.P Morgan

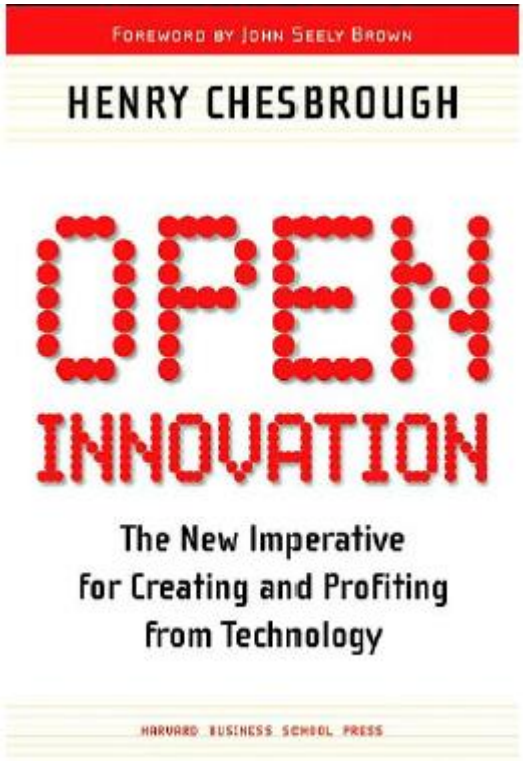
Guglielmo Marconi 1874-1937
1897 Company in UK
First case of “Brain escape“
1909 Nobel Prize



- Strong managerial control
- In house activity
- Big company
- High costs
- Impact only on reference market
- Long development time
- Limited role of University and Academia
- Followers/Imitators

e.g. Tracy Hall synthetic Diamond 1954





- Worker mobility
- Information propagation speed
- Small company role
- University research institution involvement
- New actors (spin off; mixed company)
- New investors
- Multiple target markets

Forerunners companies:

Procter & Gamble
IBM
SAS
Philips

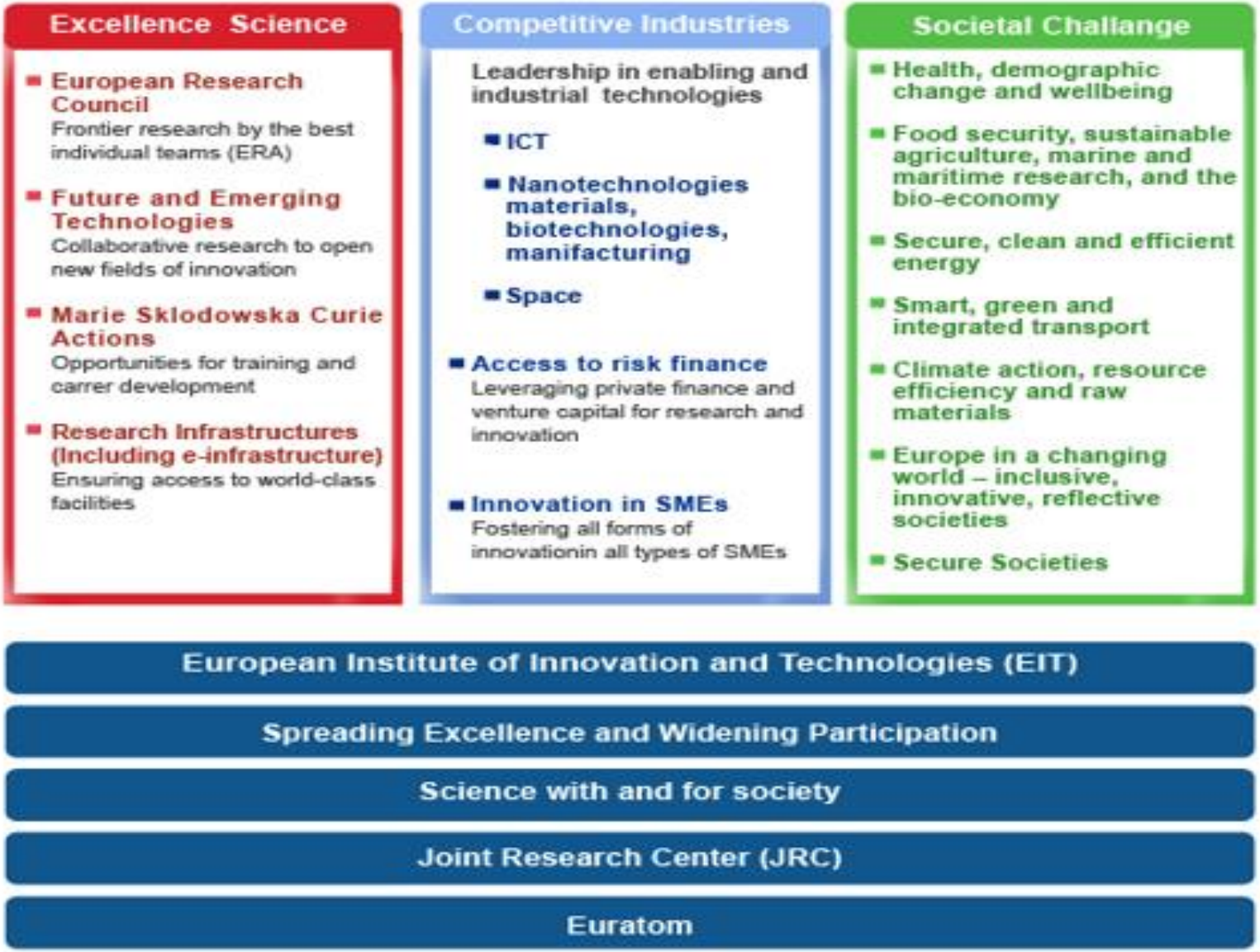
Paradigm shift in H2020

FP 5 Research oriented [Funds 15 B€]

FP 6-7 Research and Development [Funds 17.8; 50.5 B€]

H2020 Research and Innovation [Funds 80 B€]

From lab to market


Excellence Science
European Research Council
Frontier research by the best individual teams (ERA)
Future and Emerging Technologies
Collaborative research to open new fields of innovation
Marie Sklodowska Curie Actions
Opportunities for training and carrer development
Research Infrastructures (Including e-infrastructure)
Ensuring access to world-class facilities
Competitive Industries
Leadership in enabling and industrial technologies
ICT
Nanotechnologies materials, biotechnologies, manifacturing
Space
Access to risk finance
Leveraging private finance and venture capital for research and innovation
Innovation in SMEs
Fostering all forms of innovationin all types of SMEs
Societal Challange
Health, demographic change and wellbeing
Food security, sustainable agriculture, marine and maritime research, and the bio-economy
Secure, clean and efficient energy
Smart, green and integrated transport
Climate action, resource efficiency and raw materials
Europe in a changing world – inclusive, innovative, reflective societies
Secure Societies
European Institute of Innovation and Technologies (EIT)
Spreading Excellence and Widening Participation
Science with and for society
Joint Research Center (JRC)
Euratom

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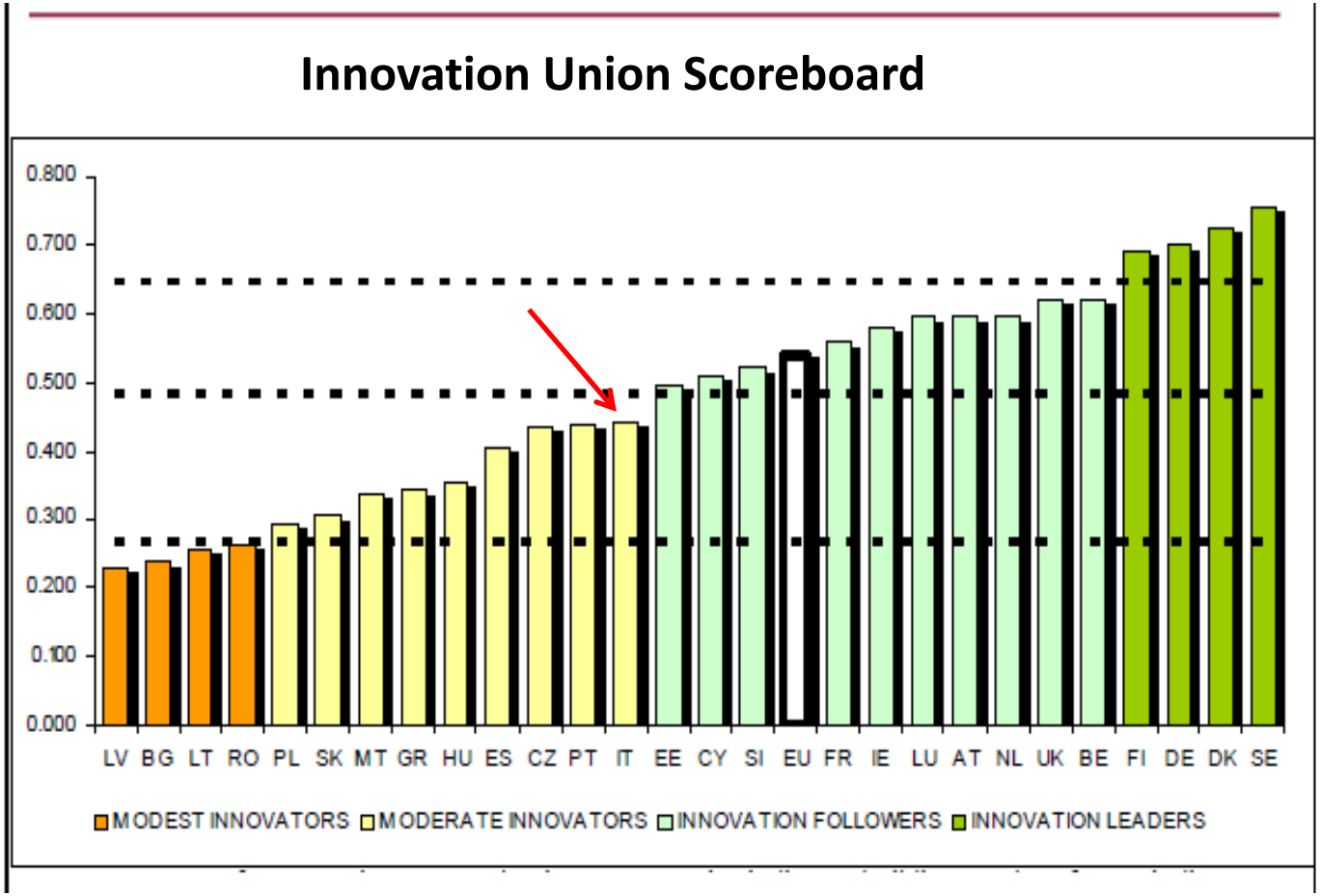
H2020 is a program for countries innovation oriented and with a strong connection between Research actors and Industry



Italy No country for…Innovators?

Italian Innovation parameters

- No a strong program of R&I at National level,
- Innovation index 35° in the world rank
- Public investments few and fragmented
- Any fiscal instrument to support private investment in R&I
- Small and medium enterprise are limited in their size evolution;
- Weak collaboration between Science and industries actors
- Private finance system (Capital ventures; crowdfunding) not completely developed
- High specialization of Italian company is a limit for Innovation investment

- Good Research indicators 8° in the world rank for number and quality of publication

Italian results in EC program

FP 6
Number of proposals second (after Germany)
Success rate 14.7% below European average value [19.2%]
Funds incoming 8.9%; -3.62% compared with contributions

FP7
Number of proposals third (After Germany and UK)
Success rate 12.3% below European average value [16%]
Funds incoming 8.43% -3.94% compared with contributions

H2020
Number of proposals third (After Germany and UK)
Success rate 8.56% below European average value [12%]

Nanomaterials Nanotechnology

After more than 20 years of full activity nanotechnology is still a promising field

The Nanotech Gamble: Bold Science, Big Money, Growing Risks

The Gap between research and Society impact is increasing

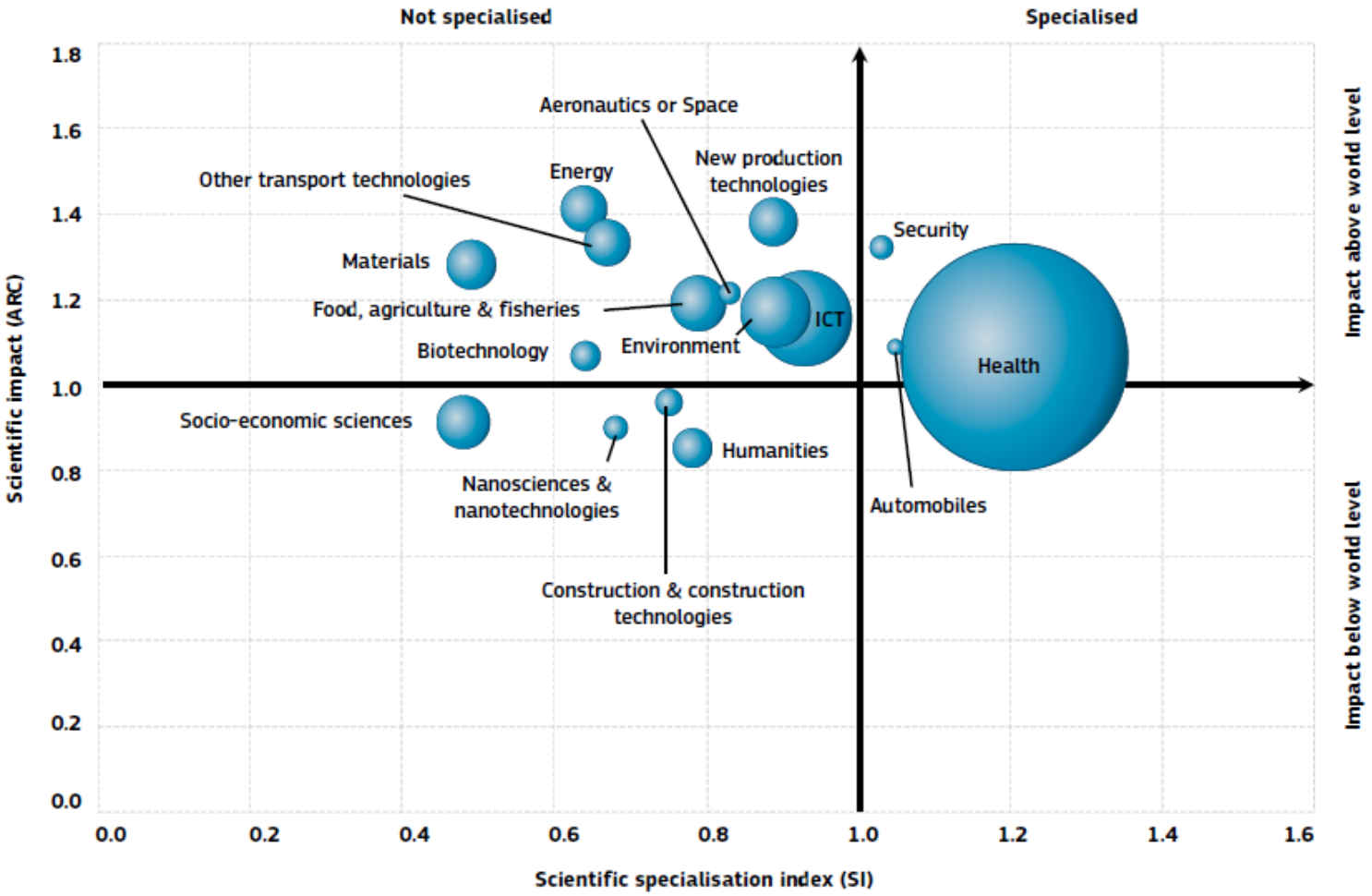
Needs of technological paradigm results

Face production cost issues

New applications/markets

Focus on healthy risks

Italy – Positional analysis of publications



Scopus

Conclusions

- Start point: a good research system able to produce relevant results
- Competences specialization and networking
- More innovation oriented; mixed team; open innovation with skilled people
- Branch-head topics
- Attract and involve industrial commitment

(Tell me I will forget; Show me I will remember; Involve me and I will understand , B. Franklin)

- Analysis and risk management
- Improve European approach
- Improve public funds use (national local level)

Red Queen Effect

Well, in our country," said Alice, still panting a little, "you'd generally get to somewhere else—if you run very fast for a long time, as we've been doing

My dear, here we must run as fast as we can, just to stay in place. And if you wish to go anywhere you must run twice as fast as that

Lewis Carroll