



Innovation, regulation and institutions:

Futures and a global European perspective

C.Montalvo





New global competitive context

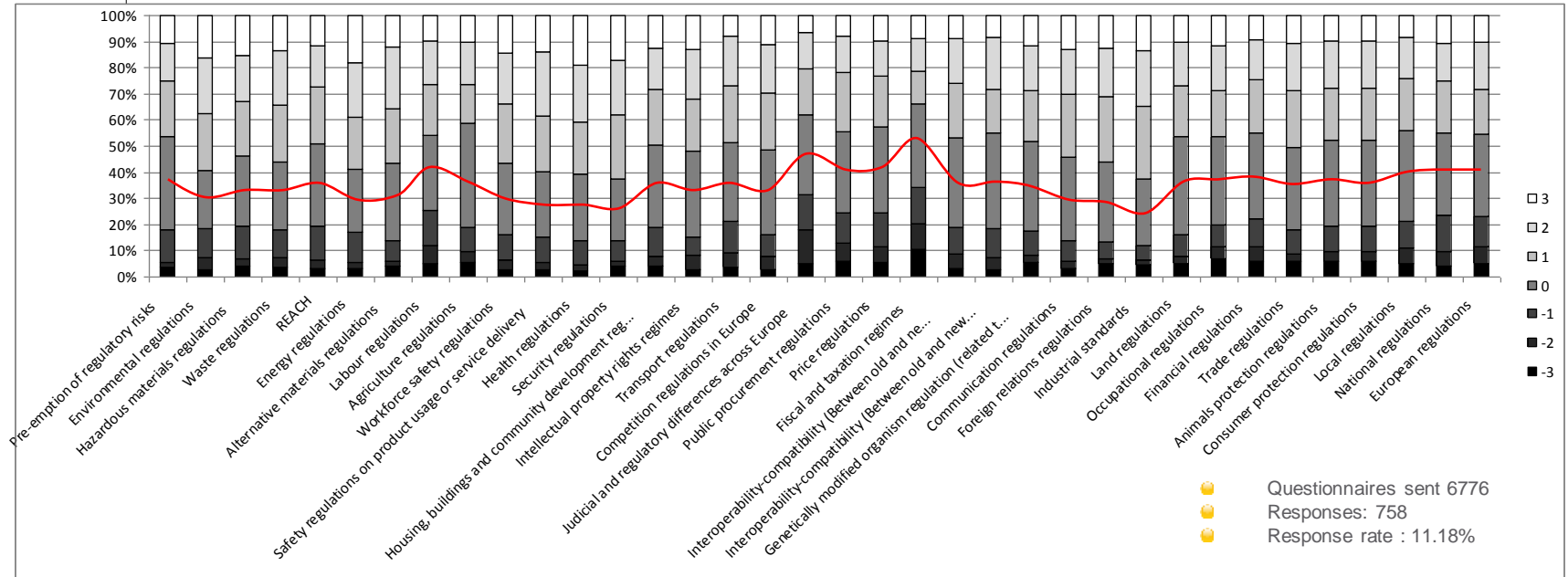
From low cost driven to challenge driven collaborative-competitive strategies

- › **Then**
- › Substitution of imports (-1980)
- › Export oriented (1965 -) Flexible technologies, labour & capital
- › *Everybody learned the tricks! Race to the bottom. Lose-lose strategies*
- › **Now and medium term future**
- › Control - Upgrade value chains – Innovation-Networks (2000 -)
- › Role of regulation and institutions

- › **Future – long term?**



Effect of regulation on innovation activity



High	Medium	Low
<ul style="list-style-type: none"> Space and aeronautics Construction Biotechnology 	<ul style="list-style-type: none"> Automotive Food and beverages Textiles and clothing 	<ul style="list-style-type: none"> Electrical and optical equipment Wholesale and retail KIBS

Source: Sectoral Innovation Watch 2010 Survey



Market and policy factors affecting innovation in Europe

(Factors not significant statistically)

R1	R2	Rank Factor	Var	Factor group	EU av. std β
1		Improved employee satisfaction	EFORSA	Outcomes pro competitiveness	0,236
2		Reduced costs per unit	EFORCO	Outcomes pro competitiveness	0,213
3		Increased range products and services	ERANGE	Outcomes pro competitiveness	0,103
4		Improved product flexibility	EFLEX	Outcomes pro competitiveness	0,094
5	1	Collaboration	CO	Resources for innovation	0,091
6		Improved quality product/service	EQUA	Outcomes pro competitiveness	0,090
7		Info own enterprise	SENTG	Resources for innovation	0,086
8		Increase market share	EMAR	Outcomes pro competitiveness	0,079
9	2	Meet regulation & standards	ESTD	Policy and regulation	0,060
10		Improved capacity production and services	ECAP	Outcomes pro competitiveness	0,058
11	3	Info from conferences	SCON	Resources for innovation	0,050
12	4	Info suppliers	SSUP	Resources for innovation	0,045
13	5	Info consultants	SINS	Resources for innovation	0,043
14		Reduced labour cost	ELBR	Outcomes pro competitiveness	0,043
15	6	Lack of information on markets	HInf	Market conditions	0,042
16	7	Info from Associations	SPRO	Resources for innovation	0,039
17	8	EU funding	FUNEU	Policy and regulation	0,038
18	9	Lack of qualified personnel	HPer	Market conditions	0,035
19	10	Uncertain demand new products/services	HDEM	Market conditions	0,030
20		EU Framework Program	FUNRTD	Policy and regulation	0,025

Data source: Eurostat CIS4, 63917 observations, 22 EU countries



Market and policy factors affecting innovation in Europe

(Factors not significant statistically)

21	Info from clients	SCLI	Resources for innovation	0,024
22	Federal funding	FUNGMT	Policy and regulation	0,024
23	Local and regional funding	FUNLOC	Policy and regulation	0,022
24	Info from competitors	SCOM	Resources for innovation	0,014
25	Info from universities	SUNI	Resources for innovation	0,012
26	Info from Science Journals	SJOU	Resources for innovation	0,012
27	No innovation due to prior innovation	HPrior	Market conditions	0,006
28	Reduced environmental impacts or improved health and safety	EENV	Regulation	0,002
29	Market dominated by incumbents	HDOM	Market conditions	-0,013
30	Difficulty in finding co-operation partners	HPAR	Resources for innovation	-0,013
31	Lack of funds within the enterprise	HFENT	Resources for innovation	-0,015
32	No demand for innovations	HMAR	Market conditions	-0,019
33	Info from Government	SGMT	Policy and regulation	-0,023
34	Lack of funds outside organisation	HFout	Market conditions	-0,032
35	Lack of information on tech opportunities	HTEC	Market conditions	-0,033
36	Innovation cost too high	HCos	Outcomes for competitiveness	

Data source: Eurostat CIS4, 63917 observations, 22 EU countries



New global competitive context

From low cost driven to challenge driven collaborative-competitive strategies

- › **Then**
- › Substitution of imports (-1980)
- › Export oriented (1965 -) Flexible technologies, labour & capital
- › *Everybody learned the tricks! Race to the bottom. Lose-lose strategies*
- › **Now and medium term future**
- › Control - Upgrade value chains – Innovation-Networks (2000 -)
- › Role of regulation and institutions
- › *Everybody is learning the tricks! Progressive race to the bottom. R&D&I are becoming commodities...!*
- › **Future – long term?**



New rationale for future global competitive context

From low cost driven to challenge driven collaborative-competitive strategies

- › **Then**
- › Substitution of imports (-1980) and Export oriented (1965 -) Flexible technologies, labour & capital
- › *Everybody learned the tricks! Race to the bottom. Lose-lose strategies*
- › **Now and medium term future**
- › Control - Upgrade value chains – Innovation-Networks (2010 -) (Innovation UNION!)
- › *Everybody is learning the tricks! Progressive race to the bottom. R&D&I becoming commodities...!*
- › **Future – long term: Challenge driven innovation and growth**
- › Energy, Food, Water, Transport & Mobility, Environmental quality, Healthy living, Integral safety and security, Sustainable Cities, Sustainable oceans, Sustainable Innovation, etc.
- › Establishment of new institutions, rules and standards globally (e.g., IPCC)
- › Massive innovation,
- › Systems integration (2020 -)



Common Strategic Framework: Horizon 2020

(2007-2013)

Framework 7 (€50bn)

CIP (€3.6bn)

EIT (€309m)

(2014-2020)

Horizon 2020

Other EU Funding*

**Joint Programming
(National Funding)**

Common Funding Schemes

CIP (Competitiveness and Innovation Programme)
EIT (European Institute for Innovation and Technology)

* COSME, Erasmus for All, Life + Structural Funds etc.



Action example: European FET Program 2014-2020

Future and Emerging Technologies (FET)

Framework 7 'Cooperation'

1. Health

2. Food, agriculture and biotechnology

3. Information/communication **FET (Topic 8.0)**

4. Nanosciences + nanotechnologies,
Materials+new Production technologies

5. Energy

6. Environment and climate change

7. Transport

8. Socio-economic sciences + the humanities

9. Space

10. Security

Horizon 2020


FET*
Programme
(Covering all Areas)
ICT
€3.5 bn (proposed)

*FEST?

Future
Emerging
Science and
Technology



ICT Challenges FP7

<i>Content of Calls for Proposals</i>	<i>16</i>
<i>Challenge 1: Pervasive and Trusted Network and Service Infrastructures</i>	<i>16</i>
<i>Challenge 2: Cognitive Systems and Robotics.....</i>	<i>33</i>
 <i>Challenge 3: Alternative Paths to Components and Systems</i>	<i>37</i>
<i>Challenge 4: Technologies for Digital Content and Languages</i>	<i>47</i>
<i>Challenge 5: ICT for Health, Ageing Well, Inclusion and Governance.....</i>	<i>53</i>
<i>Challenge 6: ICT for a low carbon economy.....</i>	<i>66</i>
<i>Challenge 7: ICT for the Enterprise and Manufacturing</i>	<i>77</i>
<i>Challenge 8: ICT for Creativity and Learning</i>	<i>81</i>



Specific Objectives of FET ICT R&D&I

Challenge 3 covers nanoelectronics and photonics, the heterogeneous integration of these key enabling technologies with related components and systems, as well as advanced computing and control systems at a higher level. Energy-, resource- and cost efficiency as well as recycling/end of life issues are major drivers across the Challenge. Its overall aims are:

- to reinforce European industrial leadership in these key enabling technologies through miniaturisation, energy-efficiency, performance increase and manufacturability, for information and communication systems and other applications in 2020 and beyond;
- to enable further integration and cross-fertilisation of key enabling technologies towards building energy- and resource-efficient components and systems through the convergence of nanoelectronics, nano-materials, biochemistry, measurement technology and ICT;
- to expand Europe's industrial leadership in embedded and mobile computing systems towards powering the cloud with cost and energy efficient servers, and towards exploring new paradigms for control in systems with mixed criticalities where the embedded world meets the internet world, and systems of autonomous systems with emergent behaviour.
- to promote inter-disciplinary R&I activities by bringing together different research domains and constituencies with the aim of increasing impact and of bridging to Horizon 2020;



Example specific lines of research and challenge driven innovation

Objective ICT-2013.3.4 Advanced computing, embedded and control systems

Driven by use cases addressing the grand societal challenges in Europe, the objective is to combine and expand Europe's industrial strengths in embedded and mobile computing and in control of networked embedded systems along two dimensions: (1) designing the next generation of cost- and energy-efficient computing systems to power the future "cloud", and (2) expanding the functionality of embedded systems architectures towards controlling their behaviour within a system of systems (SoS) and towards seamlessly integrating safety- and time-critical with non-critical functionalities sharing common computing resources and evolving from the convergence of the embedded and the internet worlds.



Example specific R&D project calls

d) From analysing to controlling behaviour of Systems of Systems (SoS)

Analysing and modelling SoS with possibly emergent behaviour and their control, and validating new SoS engineering approaches in industry-driven case studies of real applications, such as distributed energy systems and grids, multi-site industrial production, or automated transportation. Generic aspects of the approaches should be stressed, basic concepts elaborated and open research issues identified.



New rationale for future global competitive context

From low cost driven to challenge driven collaborative-competitive strategies

- › **Then**
- › *Everybody learned the tricks! Race to the bottom. Lose-lose strategies*
- › **Now and medium term future**
- › *Everybody is learning the tricks! Progressive race to the bottom. R&D&I becoming commodities...!*
- › **Future – long term: Challenge driven innovation and growth**
- › Energy, Food, Water, Transport & Mobility, Environmental quality, Healthy living, Integral safety and security, Sustainable Cities, Sustainable oceans, Sustainable Innovation, etc.
- › Establishment of new institutions, rules and standards globally (e.g., IPCC)
- › Massive innovation, Role of science and technology (**KEY**)
- › Systems integration (2020 -)
- › **Institutional and regulatory challenges**