


**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

IRMA Workshop  
*Dynamics of EU industrial structure and the growth of innovative firms*  
European Commission, JRC-IPTS-KfG and DG RTD-C2



**The dynamics of smaller R&D-intensive firms**  
- results of recent IRMA analyses -

Pietro Moncada-Paternò-Castello  
European Commission, JRC-IPTS

Session III:  
*The relevance of the growth of innovative companies for the competitiveness of the EU*  
Brussels, 18 November 2010

**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

**Outline of the presentation**

- **Structural issues**
- **Smaller and leading young innovative firms in the EU**
- **Critical factors & challenges for policy**
- **Summary and concluding remarks**

**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

**1. The structure of the economy & firms' R&D investment**

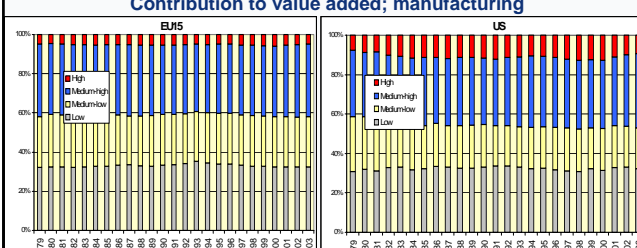
**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

**Sectors' dynamics: EU vs US**

**Contribution to value added; manufacturing**



Data: Groningen's 60-Industry Database 2006  
Source: European Commission, JRC-IPTS / DG RTD - Moncada-Paternò-Castello (*Science and Public Policy*, 2010)

The contribution of the high and medium-high tech manufacturing sectors to value added in the EU has hardly changed in the past decades

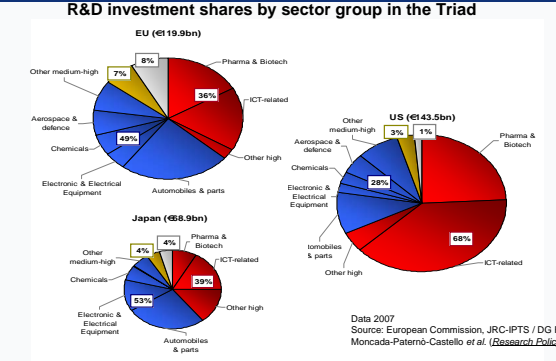
**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

**Distribution of R&D across sectors**

**R&D investment shares by sector group in the Triad**



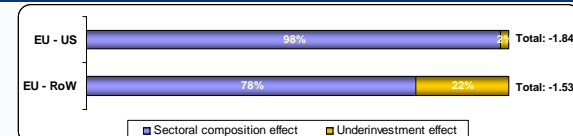
Data 2007  
Source: European Commission, JRC-IPTS / DG RTD - Moncada-Paternò-Castello et al. (*Research Policy*, 2010)

**JRC**  
EUROPEAN COMMISSION

*ips*  
Institute for Prospective Technological Studies

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

**Decomposition of R&D intensity gap**



Data 2007; Source: European Commission, JRC-IPTS / DG RTD - Moncada-Paternò-Castello et al. (*Research Policy*, 2010)

It seems that here is **no systematic underinvestment in R&D** by the companies in the EU samples compared to those in the US, or in the overall non-EU 1000 sample.

Rather, it confirms that there is a **big difference in sector mix** that exists between these economies.

➔ **But, does the sectoral composition influence the typology & the dynamics of firms investing in R&D? Or vice-versa ?!**

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## 2. Smaller & leading young innovative firms in the EU

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## Distribution of R&D across top R&D investing firms by their R&D size

Cumulated average R&D intensity by company size (R&D investment) and world region

Data 2007; Source: European Commission, JRC-IPTS / DG RTD - Moncada-Patemo-Castello et al. (Research Policy, 2010)

**There is a larger population of smaller US companies that invest more strongly in R&D!**

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## The size (employees) of top R&D investing firms by groups of R&D intensity

There are US-EU differences in the size of high R&D intensity firms

These differences tend to disappear at lower R&D intensity levels

Data: 2006  
Source: European Commission, JRC-IPTS / DG RTD - Ortega-Argilés and Brandmaier (Science and Public Policy, 2010)

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## EU is lacking firms among young leading innovators [→YLI]

Share of YLI in number of firms, R&D, sales and employment by region (2007)

The graph is based on a sample of 1077 companies, obtained from the 2008 EU Industrial R&D Investment Scoreboard.

Among the largest R&D investors, Leading Innovators are defined both by the R&D expenditures and age:  
Young (YLI) = < 1975 of firm creation  
Old (OLI) = > 1975 of firm creation

Annual average Net Sales growth (2004-2007) of YLIs and OLIs by region (in %)

Net Sales	EU	US	World
Total Growth	8	8	9
Growth YLI	12	13	14
Growth OLI	8	7	8
Contribution from YLI to total	6	23	27

YLI have a higher sales growth than OLIs  
**The higher contribution of YLIs to sales growth in the US is therefore due to having more YLIs**

Data: 2007  
Source: European Commission, JRC-IPTS / DG RTD - Cincera and Veugelers (2010)

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## - Age of Leading Innovators - Decomposing the EU-US R&D-intensity gap

Data: 2007  
Source: European Commission, JRC-IPTS / DG RTD - Cincera and Veugelers (2010)

**The lower R&D intensity of EU YLIs is the largest factor responsible for the total EU-US R&D intensity gap (55%)**

JRC EUROPEAN COMMISSION *ipts*

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 18 November 2010

## Cluster analysis of EU' R&D-intensive SMEs

From the results of a recent study (for new EU-wide taxonomy of R&D-intensive SMEs according to their inputs to the innovation process): (European Commission – JRC-IPTS / DG RTD - Ortega-Argilés, Potters and Voigt - submitted to Research Policy in 2010)

1. There are SMEs within the top EU R&D investors across all sectors
2. The biggest investors in R&D among these R&D-intensive SMEs are not necessarily the fastest growing companies
3. There is **no common success pattern** among R&D-intensive SMEs: **Their growth depends on many factors in addition to the R&D**, i.e. sector specificity, business models, access to capital, niche strategies,...

Accordingly, **measures supporting their growth need to be equally diverse**, depending on sector / typology of SME

→ We are presently studying the growth of R&D-intensive vs. 'non-R&D' SMEs

JRC  
EUROPEAN COMMISSION

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 16 November 2010

13

**Critical factors for the growth of smaller innovative firms and challenges for policy**

JRC  
EUROPEAN COMMISSION

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 16 November 2010

14

**Some critical factors**

- Skills in S&T management together with business management**
  - Training and culture on R&D and innovation management
  - Mastering best business management practices
- Access to capital**
  - *Human Capital*
  - *Financial Capital*
- Open and global access to market(s) and knowledge suppliers and users**
  - *Business and institutional environment*, and tailored support mechanisms
  - *Cooperation* (incl. in R&D and innovation) between smaller/young companies with peers and with incumbents leading in innovation
  - Inbound open innovation approach and increasing absorptive capacity
  - *Rely on an integrated EU internal market*

Source: European Commission, JRC-IPTS / DG RTD – Moncada Paternó-Castello (*Science and Public Policy*, 2010)

JRC  
EUROPEAN COMMISSION

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 16 November 2010

15

**Some challenges for policy**

Public enablers can help boosting the *growth of smaller innovative firm* by improving the flows of knowledge/ideas, projects and investments:

- **Beforehand:** early support to training, diagnosis, planning, financing and implementation for smaller and young companies
- **Integration:** to provide integrated multi-layer support services, e.g. the Brazilian FINEP and the "Programme First Innovative Firm (Prime)"
- **Differentiation:** Different policy measures for different typology of companies and sectors; e.g. it should be distinguished
  - High R&D intensive vs. Low R&D intensive sectors  
*Investment in physical capital stock results in higher productivity returns in low-tech and service sectors than R&D investment; while R&D investment results in higher productivity returns in high-tech sectors (Ortega-Argiles et al., 2010)*
  - Typology of SMEs  
*The support to R&D investment in newborn NTBF is not so critical as it is in established SMEs to be able to grow fast (Stam and Wennberg, 2009)*

JRC  
EUROPEAN COMMISSION

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 16 November 2010

16

**Summary / Concluding remarks**

- **Smaller and young EU companies are less represented among the leading innovators** than similar companies in competing economies, notably the US.  
There is a **need to favour a positive dynamism of the demographics** of such firms to eventually become large global players because of their **contribution to reach the following interlinked objectives:**
  - Dynamics of the economic structure
  - Knowledge intensity economy & society
  - Competitiveness and growth.
- Critical factors are: **skills upgrading, organizational innovation, access to human and financial capital, and to external knowledge all highly dependent on the 'framework conditions'**
- EU Policy: "**Europe 2020 Strategy**" and the follow up initiatives recognize the relevance of EU smaller firms' dynamics

➔ **We claim for differentiation of policy strategy and means according to typology of companies and industries.**

JRC  
EUROPEAN COMMISSION

IRMA Workshop – Dynamics of EU industrial structure and the growth of innovative firms – Brussels, 16 November 2010

17

**Thank you**

**Contact information:**  
Pietro.Moncada-Paternó-Castello@ec.europa.eu  
Economics of Industrial Research and Innovation  
European Commission  
JRC-IPTS's Knowledge for Growth Unit  
Edif. Expo, Calle Inca Garcilaso n. 3  
41092 Seville (Spain)  
Tel: +34-95-448 84 88



**More information can be found here:**  
**Industrial Research and Innovation website:** <http://iri.jrc.ec.europa.eu/>  
**IPTS - Institute for Prospective Technological Studies:** <http://ipts.jrc.ec.europa.eu/>  
**JRC - Joint Research Centre:** <http://ec.europa.eu/dgs/jrc/index.cfm>  
**DGRTD –** [http://ec.europa.eu/invest-in-research/index\\_en.htm](http://ec.europa.eu/invest-in-research/index_en.htm)