

KITeS - BOCCONI UNIVERSITY

**Trends and Evolution of the EU ICT Research
and Deployment Landscape**

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Outline of the presentation

- **Study objectives**
- **Analytical steps and evaluation questions**
- **Methodology**
 - **Results from the network analysis**
 - **Findings from the interviews**
- **Lessons learned and policy implications**

Study Objectives (1)

The core objectives of the study are:

- **to assess how effectively IST-RTD and deployment activities are being exploited in systems of innovation at the regional level;**
- to assess whether and to which extent ICT RTD activities in FP6 and FP7, and ICT PSP activities:
 - **are integrated into the eco-systems of innovation and deployment of Information Society initiatives at the regional level**, thus helping strengthen European competitiveness;
 - are linked to the European Network of Living Labs and whether this network is strengthening links to innovation at the regional level;
 - **are linked to ERDF knowledge and innovation networks** such as INTERREG and URBACT networks, and to the relevant Innovative Actions Networks (2000-2006);
 - are bridged with pre-commercial public procurement in policy target areas such as eGovernment, eHealth, and eInclusion.

Study Objectives (2)

In particular, the study has involved:

- A systematic **mapping of collaboration networks across the EU innovation eco-system linking RTD and deployment** of Information Society initiatives and innovation at the regional level;
- An analysis and assessment of the **strength of linkages between research and deployment activities** of the Information Society at the Member State and regional levels, notably the **European Network of Living Labs** and those under the ERDF knowledge and innovation networks, such as **INTERREG** networks and the Innovative Action networks ;
- An analysis of the **facilitating factors** for IST innovation to increase uptake and impact;
- An identification of **knowledge hubs (public and private) in the regional eco-system of innovation** and their collaboration networks at the European and regional level.

Methodology (1)

Our methodology has involved the following **analytical steps**:

1. Use *FP6* and *FP7*, *eTen*, *eContent* (*eContentplus*) and *CIP-PSP* data to build the networks of participants, examine their structural properties and identify the most central actors at the regional level (NUTS2):
2. Examine for each region **the intensity of participation** (number of regions' participants in research and/or deployment programs) and **the strategic position of regional players** (number of hubs across research or deployment programs).
3. Categorize the regions in four groups:
 - i) **Core members** (High frequency of participation and strategic positioning);
 - ii) **Followers** (High frequency of participation but small connecting role);
 - iii) **Peripheral participants** (Low frequency of participation and small connecting role);
 - iv) **Selective players** (Low frequency of participation but strong strategic positioning)

Methodology (2)

4. Select **6 regions** for in-depth interviews, representing a spectrum of experience and capabilities, according to the following criteria:
- Degree of participation and centrality in IST-RTD (FP6 and FP7) projects;
 - Degree of participation and centrality in eTen, eContent (eContentplus) and CIP-ICT-PSP projects (first two calls);
 - GDP per capita (level and growth rate over the past 5 years) and level of techno-economic development;
 - Innovative performance and trends as measured by the most recent Regional Innovation Scoreboard (2006) and as resulting from available empirical analyses of the regional innovation systems.

| | |
|-------------------|------------------|
| Oberbayern (DE21) | Lisbon (PT17) |
| Lombardy (ITC4) | Praha (CZ01) |
| Cataluna (ES51) | Thuringen (DEG0) |

Results of the network analysis (1)

1. **The deployment networks are overall more fragmented** as compared to the RTD ones: their largest component accounts for a smaller share of participants and the average distance between nodes is significantly shorter in RTD networks.
 - However there seems to be **a trend towards a higher connectivity – more recent deployment networks (eContentplus, CIP1 and CIP2) tend to be more connected as compared to previous ones**
2. **The deployment networks are *locally* more cohesive and dense than the RTD ones** (higher clustering coefficient)

| | FP6 | FP7 | eContent | eContentplus | eTen | CIP 1 | CIP 2 |
|--------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <i>Number of projects</i> | 1162 | 622 | 108 | 67 | 179 | 87 | 66 |
| Number of nodes (participants) | 5527 | 2741 | 622 | 759 | 1123 | 1042 | 810 |
| Number of edges (linkages) | 142715 | 48451 | 2176 | 9357 | 5312 | 8836 | 6562 |
| Network density | 0.009 | 0.013 | 0.011 | 0.032 | 0.008 | 0.016 | 0.020 |
| Average degree | 51.643 | 35.353 | 6.994 | 24.856 | 9.460 | 16.960 | 16.202 |
| Betweenness centralisation | 0.141 | 0.134 | 0.031 | 0.158 | 0.162 | 0.102 | 0.097 |
| Size largest component | 5495 (99.4%) | 2741 (100%) | 161 (25.9%) | 755 (99.5%) | 706 (62.9%) | 862 (82.7%) | 622 (76.8%) |
| Average distance* | 2.587 | 2.723 | 4.839 | 2.998 | 4.813 | 3.400 | 3.911 |
| Max distance* | 5 | 7 | 11 | 5 | 12 | 8 | 8 |
| Clustering coefficient* | 0.844 | 0.845 | 0.914 | 0.910 | 0.920 | 0.944 | 0.950 |

Results of the network analysis (2)

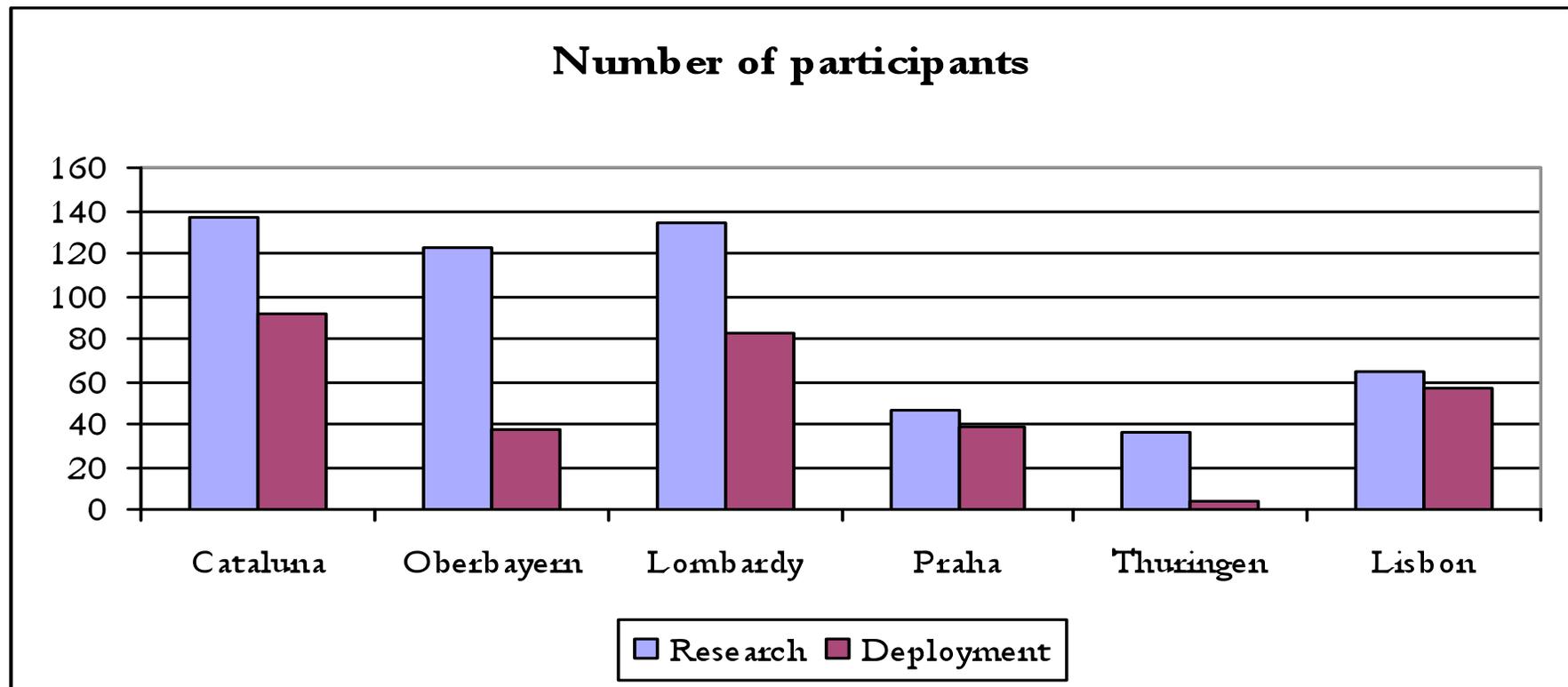
Network Hubs - nodes with a large number of connections or highly influential nodes that play the role of *network connector*, i.e. one which connects nodes that would otherwise remain unconnected → different degree of centrality of regions in Research and Deployment

Most central regions in Research and Deployment networks (Number of hubs)

| RTD networks | | Deployment networks | |
|------------------|----------------|---------------------|----------------|
| Region | Number of Hubs | Region | Number of Hubs |
| Ile de France | 13 | Attiki | 7 |
| Attiki | 9 | Wien | 5 |
| Madrid | 8 | Brussels | 5 |
| Inner London | 6 | Madrid | 5 |
| Lombardy | 5 | Lazio | 5 |
| Oberbayern | 5 | Cataluna | 4 |
| Koln | 5 | Etela - Suomi | 4 |
| Vlaams - Brabant | 5 | Emilia - Romagna | 4 |
| Lazio | 4 | Oberbayern | 3 |
| Etela - Suomi | 4 | Paris | 3 |
| Stuttgart | 4 | Zuid - Holland | 3 |

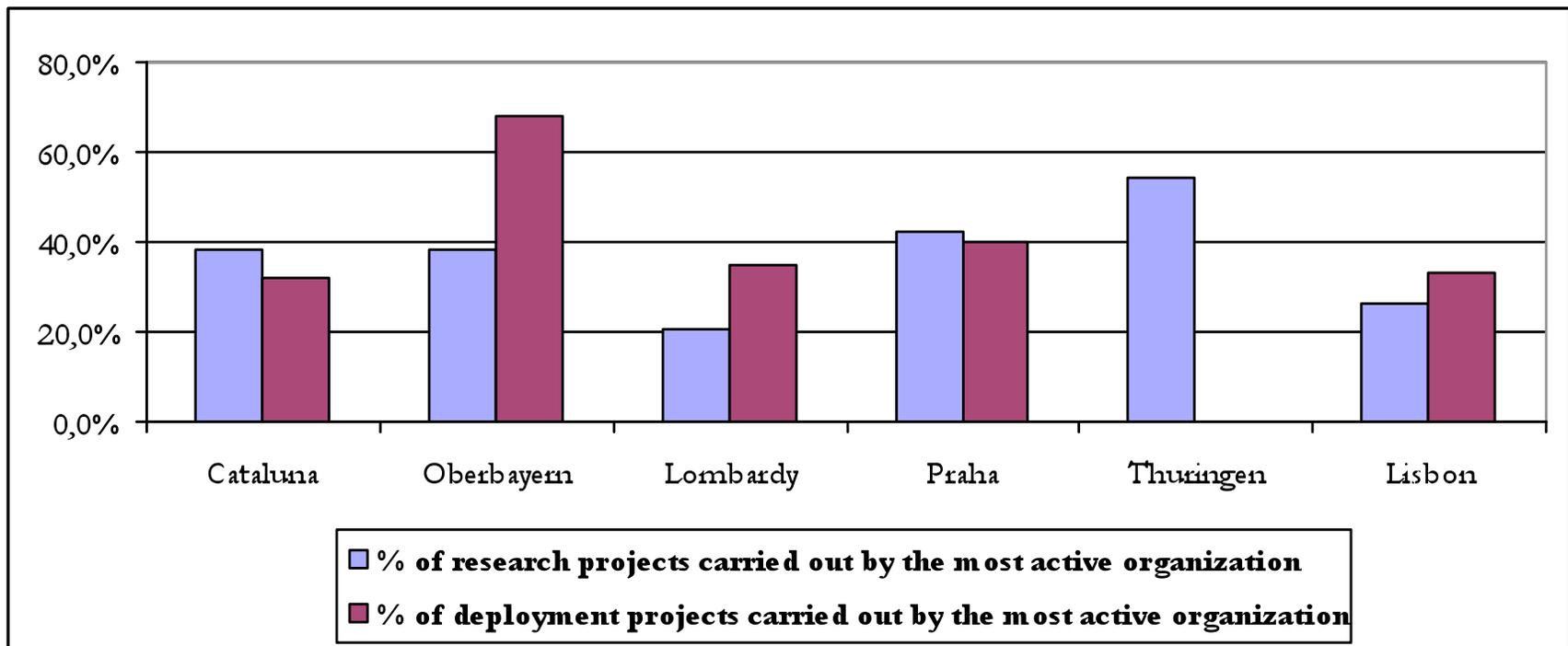
Networks in the selected regions (1)

- **Lombardy and Cataluna** - regions with good capabilities in science, technology and economy - have the highest number of organisations participating in research and deployment networks.
- **Praha** - a “rising star” region in terms of science and technology - still records a low number of participants to research and deployment activity.



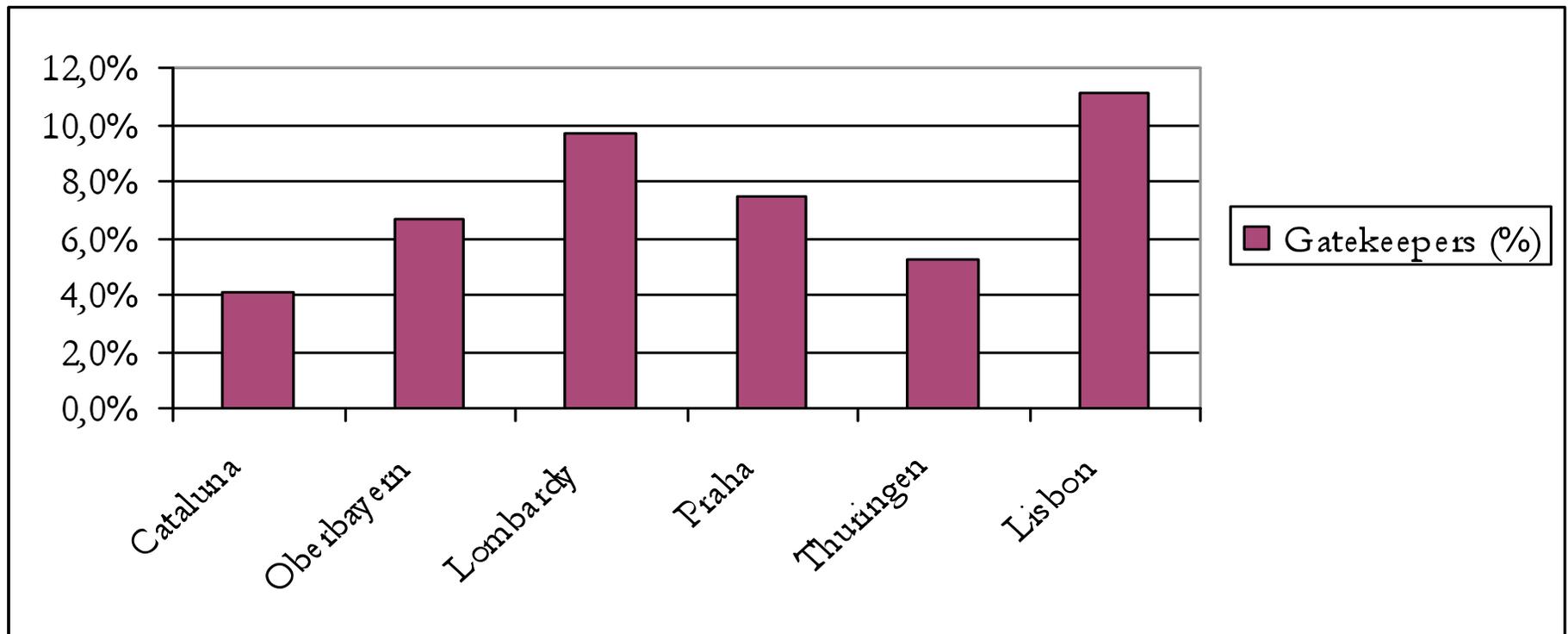
Networks in the selected regions (2)

- A large number of organizations does not imply that the region has a higher number of connections to external hubs: what matters is **the presence of hubs in a region (as in the case of Oberbayern, Lombardy and Cataluña)**
- The frequency of participation has a skewed distribution: few organizations participate to many projects and the vast majority participate just to one or two projects **Oberbayern (our “leader”)** in particular has very concentrated networks; **Lombardy and Lisbon record the most “pervasive” networks**



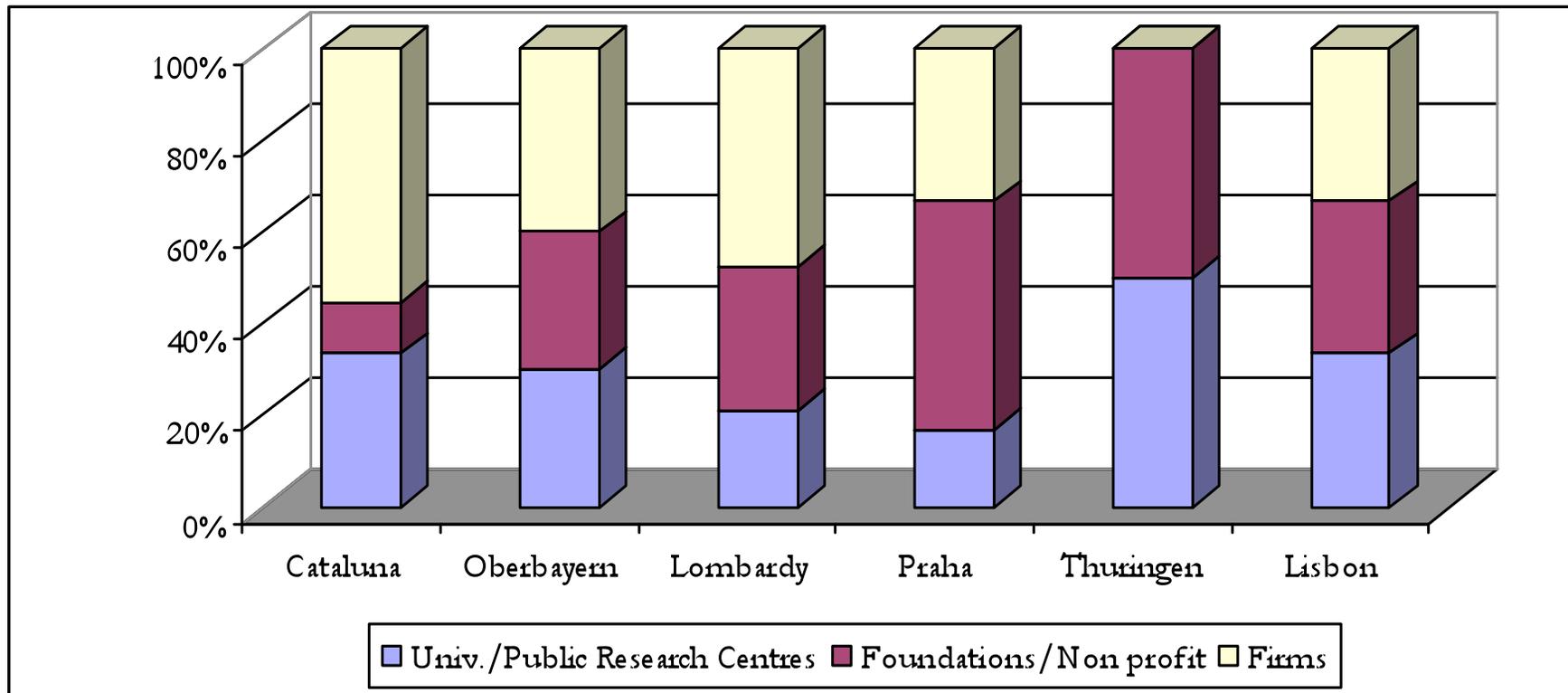
Networks in the selected regions (3)

GATEKEEPERS: organizations participating to research AND deployment programs → **Lisbon and Lombardy** have the highest (relative) number of gatekeepers.



Networks in the selected regions (4)

Most of the gatekeepers are **private firms**, but there are important regional differences



Findings and lessons learned from the interviews (1)

- a) **The participation to IST networks constitutes a valuable tool for different types of organizations within European regions** → access to additional funds, opportunities of networking with key players in the research and deployment ICT areas and of implementing and deploying partners' ideas and improvements on the current state-of-art of technology.
- b) EU projects are not only a means of exploiting existing knowledge and competences, but also a valuable opportunity to explore new research directions → **EU networks can be interpreted as a useful tool to overcome the trade-off between exploration vs. exploitation**

Findings and lessons learned from the interviews (2)

- c) Participation into networks of research helps to speed up the diffusion process of new products and services in the region, also thanks to **an indirect effect → mechanism of personnel training** (specialists who test the new products and services and can support their adoption at a large scale.
- d) IST networks are a tool for encouraging **interactive innovation involving users and producers** → they promote a process of knowledge generation and diffusion which characterized by **continuous feedbacks and interaction among the relevant actors in the innovation systems at the EU, national and regional level**
 - **Importance of connections with actors strongly rooted in the regional contexts (technological districts)**

Findings and lessons learned from the interviews (3)

- e) **Particularly for emerging regions**, the desire to be involved into the European community and expert social networks and the possibility to examine the *best and worst practices in IST-related areas* are crucial drivers of participation
- f) **The identification of good partners, the distribution of tasks in the consortium (and of the related responsibilities and budget), as well as the governance of the consortium itself are perceived as crucial aspects for the success of EU projects**
 - *“The most important actors in terms of development and deployment at the regional scale are those already tightly linked to and rooted into the territory such as **universities and SMEs**. Universities and users are probably better positioned to carry out deployment activities because of a deeper knowledge of local conditions and demand.”*

Findings and lessons learned from the interviews (4)

- g) Obstacle to the participation in research and deployment networks: administrative burdens and rigidities, and the bureaucracy costs of projects → **particularly problematic if an organization acts as a *project coordinator***
- h) Big gap between the expectations of a project and its actual results and impact at the regional level → research projects have a clear international perspective → **limited financial instruments and difficulties in identifying and targeting a specific and interested audience **at the regional level**** hinder the diffusion process
- i) The **absence of a strong and well defined dissemination strategy and its implementation since the beginning of the project can seriously undermine its success.**
 - Specifically for new member states, a significant obstacle is a frequent change of political leadership in regions and **the absence of sustainable political priorities for regional development**

Findings and lessons learned from the interviews (5)

- j) The impact of research projects in terms of commercial and market results is not strong, because of the **limited time frame** (three years in most organizations' experience).
- k) **The small number of people involved in a project** does not allow to develop new products, but simply to deliver intermediate results in the form of prototypes and proof of concepts → the **staff structure** of research projects involves almost only **scientists with limited vocation to dissemination**, who prioritise research over diffusion of the results.
- l) **The availability of relevant information in appropriate time and form, the provision of effective support in process of project preparation (both in technical and administrative parts), as well as help in the identification of specific needs provided by state agencies and national contact points would increase participation to EU projects.**

Policy implications (1)

COMMISSION

- In order to strengthen the deployment phase of projects, the Commission could provide **mechanisms of linking the distribution of research grants to the efforts undertaken to make the research results publicly available and widely diffused.**
- Each project is often just one in long chains of research and commercialization. **Clearer links between FP and deployment projects could be enforced by requesting participants to explicitly connect their projects when applying for funds.**

Policy implications (2)

- The time span of EU projects has been reported to be too short to achieve meaningful results in terms of new products/process development. **The Commission could envisage:**
 - **differentiated sets of projects** that, on the basis of the specific proposed activities for subsequent dissemination and diffusion of research results at the regional level, could be characterized by **longer time-spans**
 - **“dissemination follow-up” funding**, for specific deployment activities over 1-2 years after the project completion, which would allow for enriched deployment-driven elaboration on the project results
- **The creation of specific bodies in charge of dissemination activities**, such as Agora Scienza in Piemonte which groups all universities in Piemonte, **could provide a bridge between science and society and foster dissemination within the regional system, beyond the scientific community.**

Policy implications (3)

- The composition of the staff in the research projects calls for some changes. **The Commission could envisage specific guidelines and funding criteria that require the inclusion of deployment-experienced staff and dissemination capabilities**
- **Participation to deployment projects is highly concentrated at the regional level.** Given the weak links of projects' deployment activities with other dissemination mechanisms, there is a risk that such a concentration reduces the impact of deployment programmes at the regional level.
The Commission should promote broader participation to deployment activities, in terms of number and typologies of organizations.

Policy implications (4)

REGIONAL AUTHORITIES/COMMISSION

- The diffusion of ICT products and services in the region does not rely only on the mechanisms envisaged in the projects; however, such alternative mechanisms are related to efforts and initiatives independent of the EU financial support. **Opportunities for stronger synergies and complementarities among these alternative mechanisms are thus perceived and would be highly welcome.**
- A more developed innovation culture in Public Administration is considered as a boost to diffusion processes of new products and services at the regional scale. **Dissemination of best practices examples through magazines, newspapers, events, (online) forums, information and training days, especially at the local and regional level, is considered and expected to be more widely promoted and used.**

Policy implications (5)

REGIONAL AUTHORITIES

- The creation of ad-hoc mechanisms for the diffusion of ICT products, processes and services at the regional level outside the specific projects would constitute an important benefit for the effectiveness of deployment at the regional level. For example, **the development of an information platform and the creation of technology centres and business incubators within a regional cluster would greatly improve the potential of EU projects to deliver successful outcomes.**
- Regional government bodies generally participate to RTD and deployment projects with distinct Units/Departments, largely relying on external consultants and ad-hoc staff. This can result into fragmentation and dispersion of experience and capabilities.

Regional authorities should increase co-ordination and better exploit synergies across type of programmes and range of projects, for instance increasing co-ordination across units and supporting broader participation of permanent staff.

Policy implications (6)

EU STATISTICAL OFFICES

The process of data cleaning and harmonization across different databases leads to a specific recommendation for the European Commission's statistical offices, aimed at improving data base management and evaluative exercises.

Participants to the FP7 can register through the **Unique Registration Facility (URF)**, which provides them with a **Participant Identification Code (PIC)**, which will identify the organization also for future applications.

- We believe that this code should be harmonized throughout the datasets of different research and deployment programmes. This would allow the statistical tracking of each organization's participation **over time**, which is important to capture the dynamics of EU research and deployment networks.
- Furthermore, the **PIC** should include information also about the type of organization (private company, government, higher education...) and **NUTS2 region**.