



Nuclear Knowledge – Strategies, Information Management and Human Resource Development

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Towards a common knowledge base for nuclear fission: a challenge for the stakeholders' community and for the EC

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EURATOM RESEARCH AND TRAINING ON NUCLEAR ENERGY





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“Towards a European Research Area” / ERA / COM(2000)6

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INTRODUCTION

Driving forces towards a common knowledge base

REACTOR SAFETY (RS): common safety justification framework

- **objective, consistent and predictable environment within the triangle « manufacturing industry ↔ utilities ↔ regulators » in the context of European/world-wide deregulation**

RADIATION PROTECTION (RP): common standards

- **public acceptance of generic criteria for low dose irradiation effects (< 50 mSV) and for emergency management strategies**

WASTE MANAGEMENT (WM): common “best practices”

- **public acceptance of generic criteria for ultimate waste disposal, in particular, for siting and monitoring of geological repositories**





Transition between FP5 and FP6

Main political and societal challenges to Community research programmes

(1) * **Lisbon** strategy (“most competitive knowledge-based economy by 2010”), March 2000

* **Enlargement** of the EU (from 15 to 25), May 2004 / + 3 new Candidates later

(2) Towards achievement of the **Internal Energy Market**:

Green Paper: “Towards a European Strategy for the **security of Energy Supply**
until the year 2010” (November 2000)

(3) General concerns about **environment and sustainable development** (Kyoto)

(4) Changes in the public decision making processes: **new “governance”**
(emphasis on accountability, transparency, rigour and credibility)





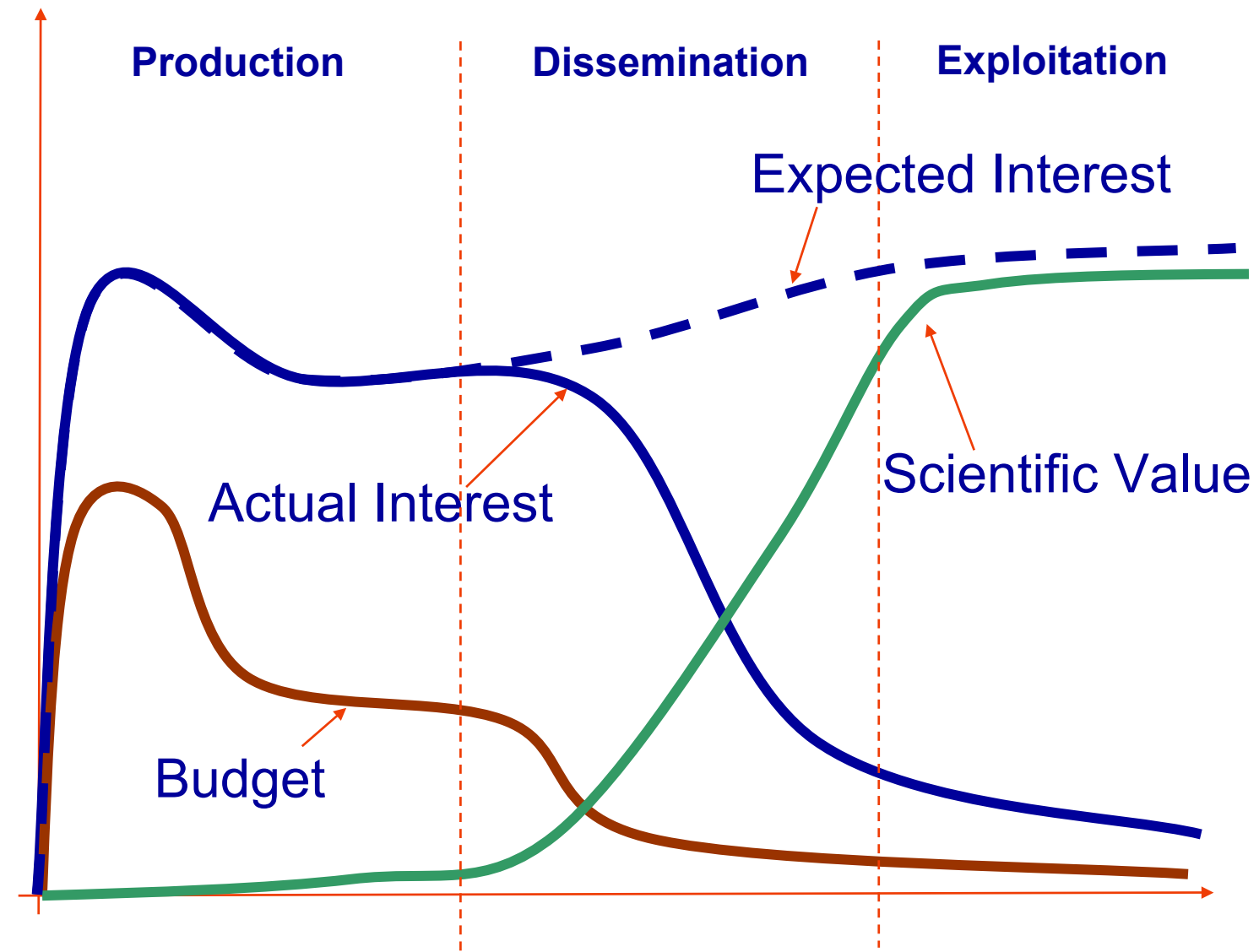
“Towards a European Research Area (ERA)” (Communication COM(2000)6, January 2000)

- A stock of material resources and facilities optimised at the European level
(e.g. maximising the potential offered by electronic networks)
- More coherent use of public instruments and resources
(e.g. opening up of national programmes)
- More dynamic private investment
(e.g. encouragement of risk capital investment and protection of intellectual property)
- A common system of S&T reference for policy implementation
(e.g. development of the research needed for political decision-making)
- More abundant and more mobile human resources
(e.g. harmonisation of university systems and free circulation of researchers)
- A dynamic landscape, open and attractive to researchers and investment
(e.g. use of the EU structural funds)
- An area of shared values
(e.g. development of a shared vision of ethical issues in science and technology)





Knowledge Management in the life cycle of a research project



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A common durable base for nuclear knowledge

Production of knowledge

- e.g. national (public / private) research and plant operational feedback

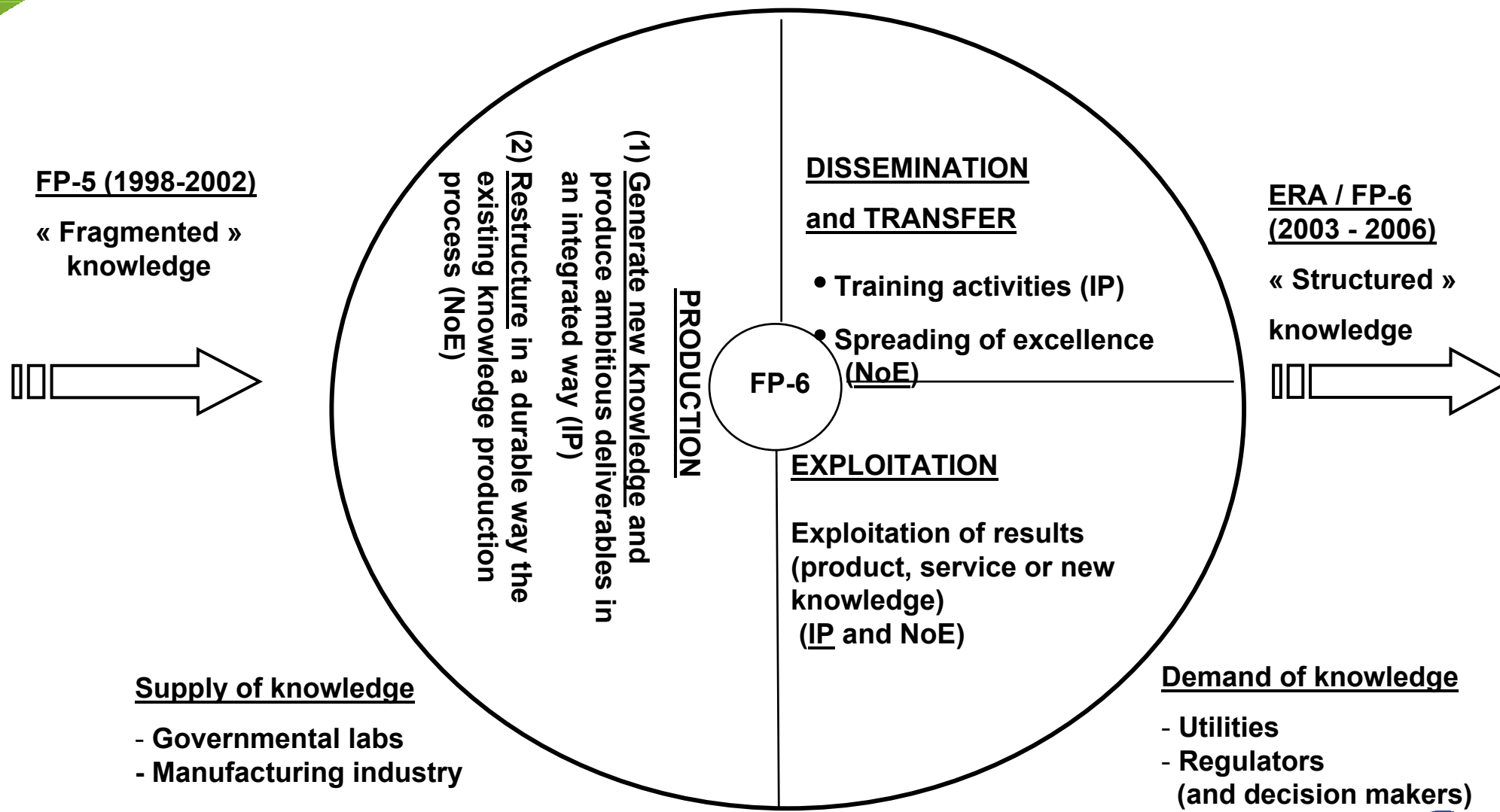
Dissemination and transfer of knowledge

- e.g. education and training + workshops, publications, communication

Exploitation of knowledge

- e.g. further research or industrial innovation

PDE knowledge management system (Production, Dissemination / transfer, Exploitation)



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Stakeholders in nuclear fission research

- 1 - the regulatory bodies and associated technical safety organisations
- 2 - the electrical utilities and waste management organisations
- 3 - the manufacturing industry and associated engineering companies
- 4 - the research organisations (public / private) and training services
- 5 - the academia (universities) and associated education services.

groups n° 1 and 2 : exploitation of research results (demand)

groups n° 3 and 4 : production (supply of knowledge)

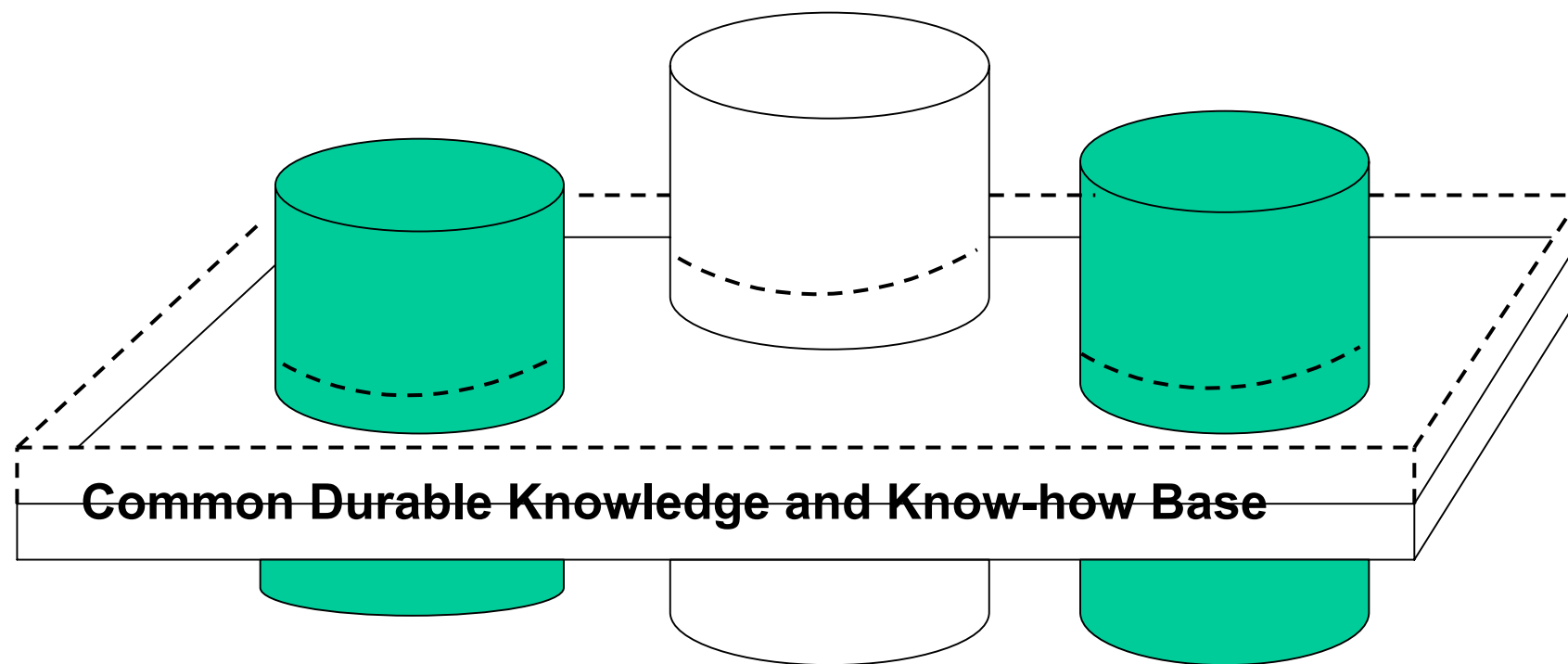
group n° 5 : dissemination / transfer (link demand and supply)

all 5 stakeholders' groups strongly interdependent :

internal EU knowledge market / balance between “demand ↔ supply”

Harmonisation of regulatory practices based on Community research

Example: systematic approach for construction of the safety justification and prequalification of components



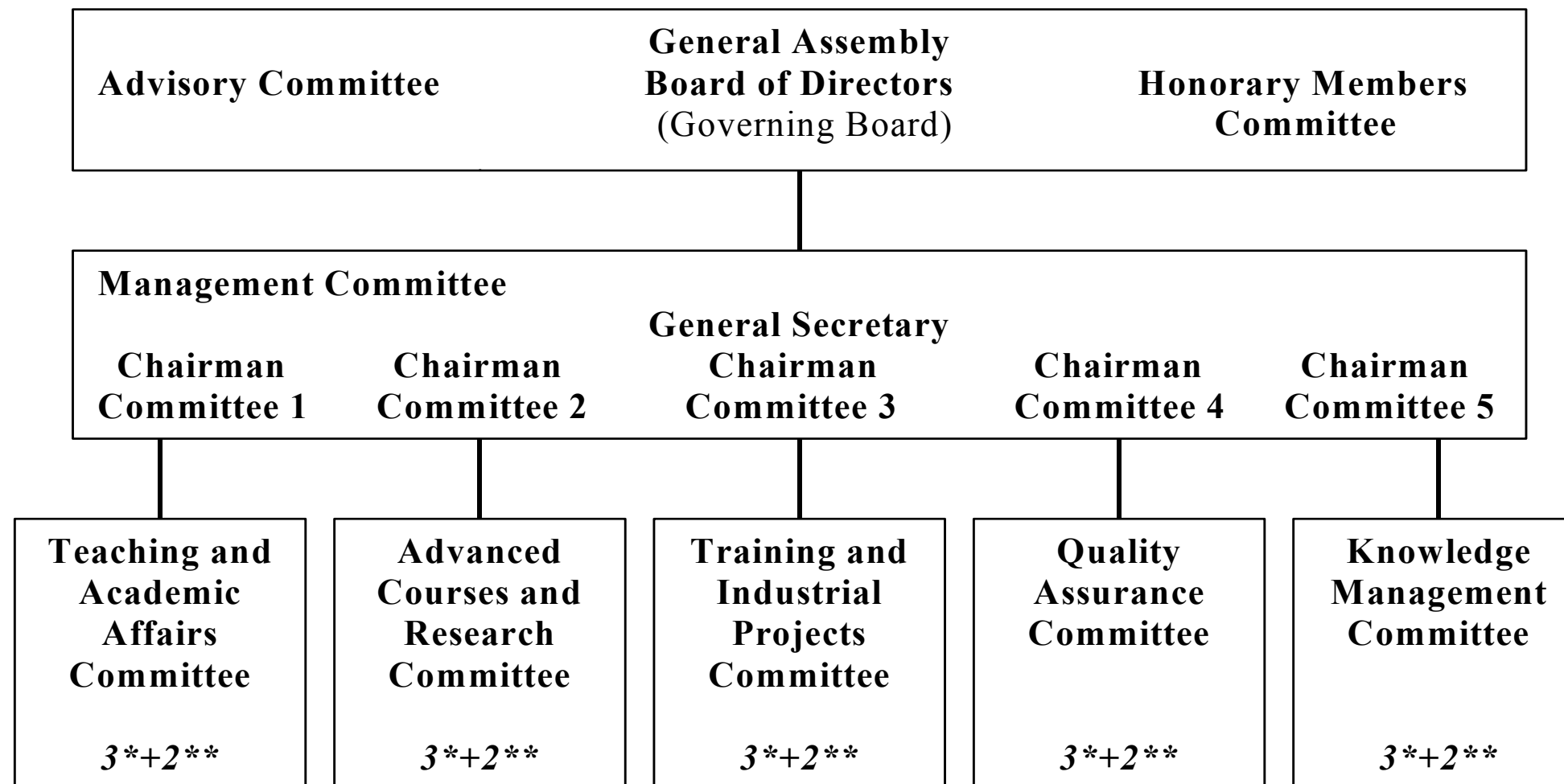
Examples of “integrators” of research and training capabilities: national/regional strategies

- **1- United Kingdom :** - Nuclear Research Index (1995) and
- University Research Alliance programme (1999) : radiochemistry,
particle technology, waste immobilisation and materials performance
- **2 - Germany :** Kompetenzverbund Kerntechnik (2000)
RWE ⇔ Aachen region; EnBW ⇔ Karlsruhe/Stuttgart region;
E.on Energie ⇔ Munich region; and Vattenfall ⇔ Dresden region
- **3 - France :** INSTN (1956) / a service of CEA, for education and professional training activities
- **4 - Belgium :** BNEN (2002) / "European Master degree of Science in Nuclear Engineering"
- **5 - Sweden :** NTC (1995) / composed of SKI, Westinghouse-Atom AB and all Swedish NPPs
- **6 - Finland :** STUK (2002) / training needs related to the fifth NPP in Olkiluoto
- **7 - Italy:** CIRTEN (1994) / maintaining a critical mass on nat'l and intern'l scene



European Nuclear Education Network / ENEN

(legal non profit making association, Paris, Sept. 03)



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Education and Training

(FP-6 strategic studies about needs and resources)

NEPTUNO

“**Nuclear** European Platform of Training and University Organisations”

CETRAD

“Co-ordination Action on Education and Training in Radiation Protection and **Radioactive Waste Management**”

EURAC

“Securing European Radiological Protection & **Radioecology** Competence to meet the Future Needs of Stakeholders”

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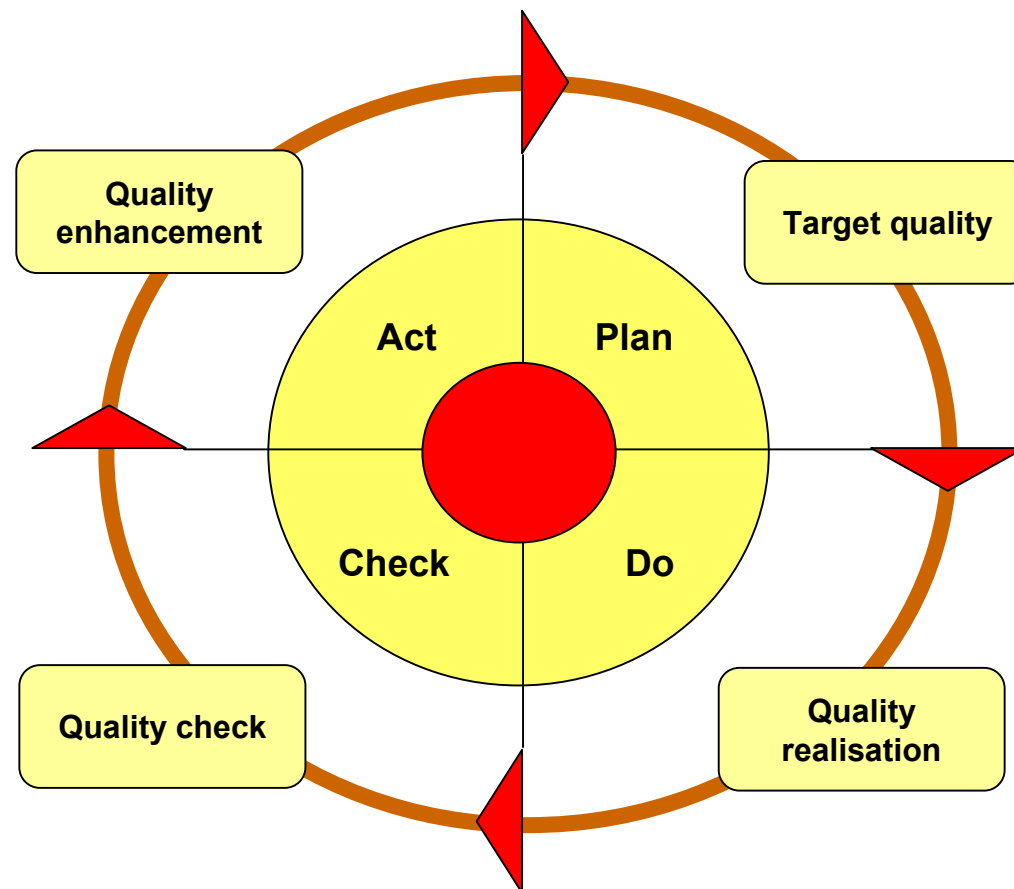




Quality Assurance

Example : Best Practice Guidelines in FP-5 project ECORA

ISO 9001:2000 Certification



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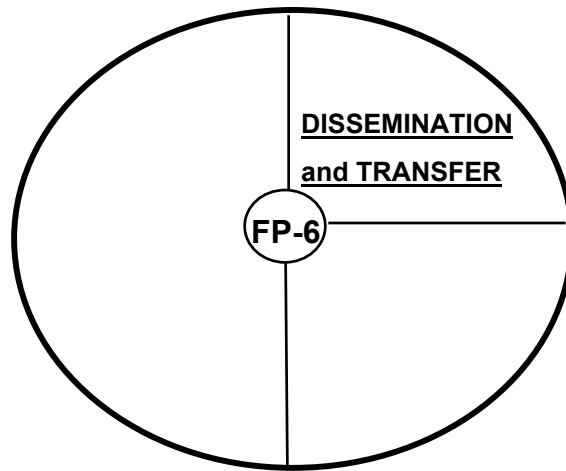




Knowledge management in FP-6

Dissemination and transfer : a contractual obligation under FP-6

Cost categories in the contractual forms (A3.1)



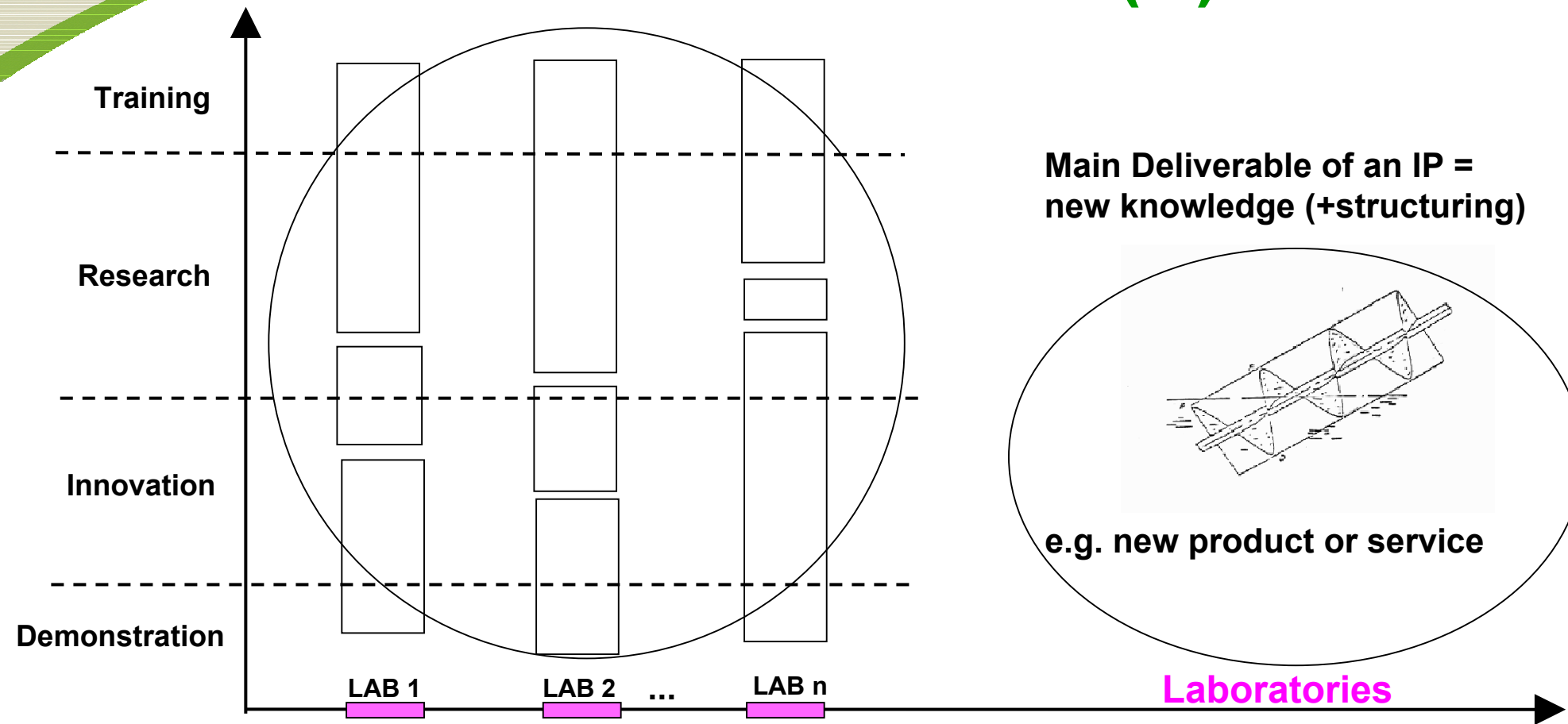
- IP :**
- 1. RTD or innovation related
 - 2. Demonstration
 - 3. Training
 - 4. Consortium management

- NoE :**
- 1. Joint programme (integrating, jointly executed research, spreading of excellence)
 - 2. Management

- CA :**
- 1. Coordination
 - 2. Training
 - 3. Consortium management



INTEGRATED PROJECT (IP)



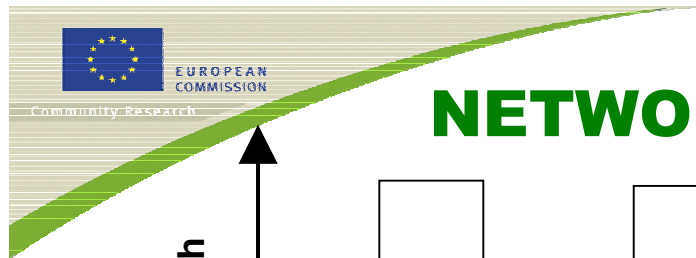
➤ contractual aspects: implementation plan and associated budget covering activities for integration of “research / innovation, demonstration, training + consortium management”

Commission contribution : grant to the budget (EC is cofinancing a product !)

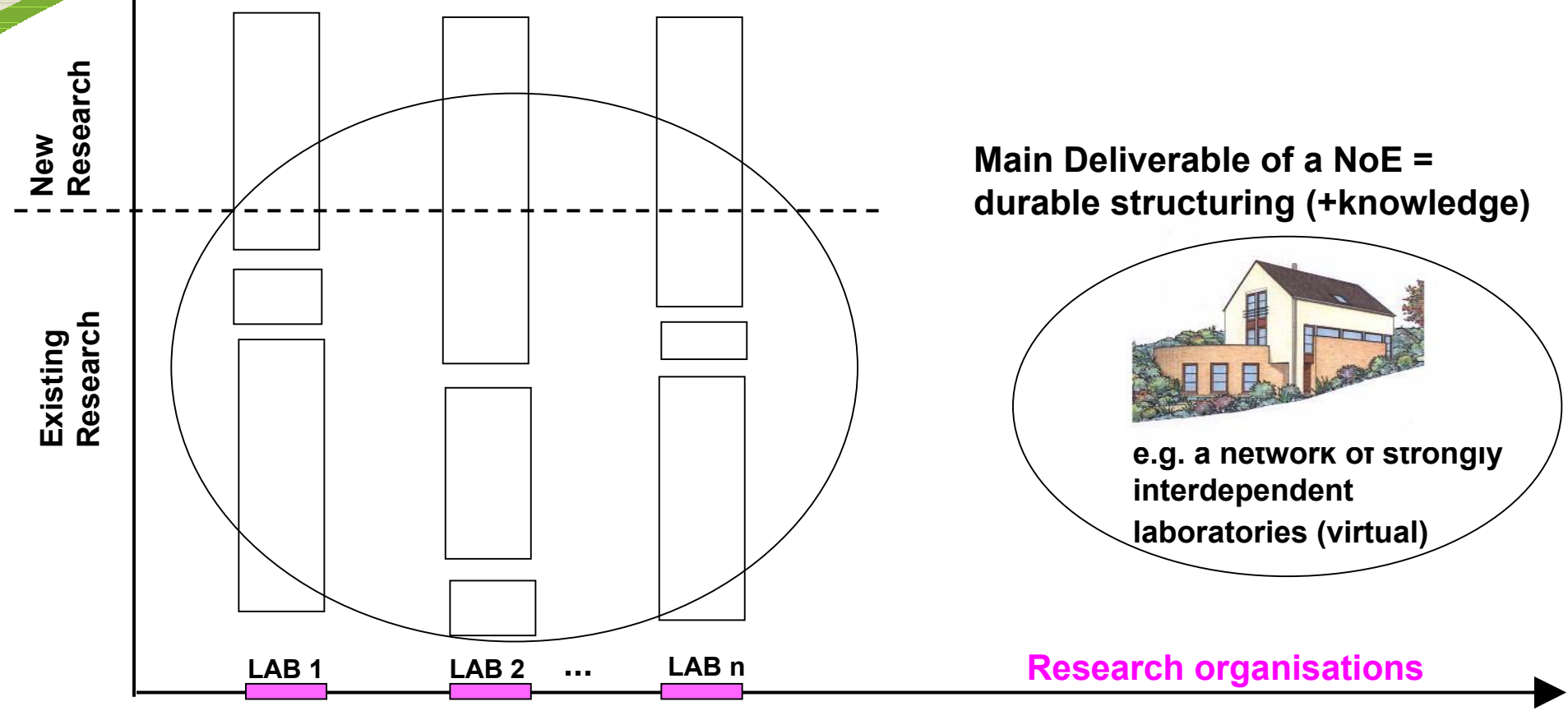
autonomy and flexibility ⇔ consortium agreement : governance structure; overall legal, financial and administrative management; knowledge management and other innovation related activities

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NETWORK OF EXCELLENCE (NoE)



contractual aspects: joint programme of activities (JPA) to cover activities for "integration; jointly executed research and spreading of excellence +consortium management"

Commission contribution : grant for integration (the EC is cofinancing a process!)

autonomy and flexibility ↔ consortium agreement : governance structure; overall legal, financial and administrative management; knowledge management and other innovation related activities

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CONCLUSION

Towards a common knowledge base for nuclear fission

Nuclear energy continues to supply 32% of EU-25 electricity: vigilance is still required to ensure a continuation of Europe's outstanding safety record, to efficiently manage the treatment and storage of waste, to maintain the high standards of radiation protection and to maintain efforts to avoid proliferation.

New political/economical challenges to Euratom research

A common durable knowledge base for nuclear fission

need, vision and instruments : common strategy missing

cost/benefit assessment of participation in EU research (gain = 10 !)

a "knowledge manager" is recommended in each large FP-6 project

European Research Area 2003-2006, including FP-6 and other instruments

... and for later on : technology platforms, OMC ("think globally, act locally")



Role of the stakeholders in the knowledge system

