MANAGING KNOWLEDGE FOR GROWTH

Public research programmes for business and academia

COURSE 4
1. SME PUBLIC RESEARCH PROGRAMMES
1.1 ANALYSIS: WHY WORRY?
1.2 ROLE OF PUBLIC RESEARCH PROGRAMMES
1.3 SMEs IN FP7 and BEYOND
2. INNOVATION IN AN AGEING EU
2.1 A POSSIBLE SUSTAINABLE MODEL
2.2 INVEST IN PEOPLE
2.3 EXPLOIT DEMOGRAPHIC TRENDS
2.4 INNOVATE IN COLLECTIVE GOODS
1. SME PUBLIC RESEARCH PROGRAMMES

1.1 ANALYSIS : WHY WORRY ?
SMEs are much more important in EU

THE SME CONTRIBUTION IN MAIN WORLD ECONOMIES

<table>
<thead>
<tr>
<th></th>
<th>EU (&lt;250)</th>
<th>US (&lt; 500)</th>
<th>Jap (&lt;300)</th>
<th>Chi (&lt;500)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprises</td>
<td>99.8%</td>
<td>96.0%</td>
<td>99.5%</td>
<td>95.0%</td>
</tr>
<tr>
<td>Manufacturing Enterprises</td>
<td>94%</td>
<td>92%</td>
<td>93%</td>
<td>90%</td>
</tr>
<tr>
<td>Employment</td>
<td>68%</td>
<td>58%</td>
<td>67%</td>
<td>55%</td>
</tr>
<tr>
<td>Employment Share 87-00</td>
<td>+9%</td>
<td>+11%</td>
<td>-3%</td>
<td>n.a.</td>
</tr>
<tr>
<td>GDP</td>
<td>61%</td>
<td>47%</td>
<td>53%</td>
<td>40%</td>
</tr>
<tr>
<td>Total Exports</td>
<td>40%</td>
<td>&lt;20%</td>
<td>&lt;15%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>High-Tech Exports</td>
<td>8%</td>
<td>18%</td>
<td>8%</td>
<td>n.a.</td>
</tr>
<tr>
<td>Innovations</td>
<td>25-30%</td>
<td>35%</td>
<td>4%</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

SMEs are much more important in EU

Figure 2.3.11 Share of BERD performed by SMEs (%), 2002 (1)

- SMEs do most of EU RTD.
- RTD in France as much by big business as in the US!
SMEs are much more important in EU

Figure 2.3.13 Publicly funded R&D executed by SMEs in the business sector as % of total BERD, 2002 (1)

- Public research programmes support most EU SMEs.
- US Public programmes support SMEs more than 3 out of 4 major EU countries!
SMEs are much more important in EU

Figure 2.3.14 High-Tech venture capital by stage per 1000 GDP, 2003

- Private equity does not support most EU SMEs.
- Innovating EU countries support early investment but not expansion: is small really so beautiful?
EU SMEs - THEIR IMPORTANCE

MOTOR OF EUROPE’S CHANGING ECONOMY

- BY GENERATING NEW PRODUCTS & TECHNOLOGIES
  High tech SMEs create two-times more innovations per employee than large companies

- BY SUPPORTING THE COMPETITIVENESS OF LARGE COMPANIES
  50% of SMEs are subcontractors

- BY CREATING EMPLOYMENT
  SMEs and especially micro-firms are the main source of new jobs
EU RTD PROGRAMMES: An OPPORTUNITY for SMEs

- Completion of Economic & Monetary Union - Globalisation of Economy

Increasing technological content of products and services

Widening of the Knowledge base required for core business

SMEs NEED TO:
- Internationalise strategy
- Modernise their production systems and products
- Widen their networks of knowledge suppliers

EU RTD Programmes allow SMEs to simultaneously:
- improve their technological base
- develop new transnational partnerships
- widen their knowledge base
SMEs: RESEARCH NEEDS & CAPABILITIES

1. TECHNOLOGY DEVELOPERS (~3-5%)
   - Well established R&D capabilities
   - Mostly active in EU collaborative RTD
   - May need support to participate effectively in international R&D co-operation

2. LEADING TECHNOLOGY USERS (~10-15%)
   - Have R&D needs but limited or no R&D capability
   - research is mainly carried out by third parties on their behalf
   - Although many can find adequate solutions at national/regional levels…
   - …an increasing number is involved in EU RTD activities through CRAFT projects

3. TECHNOLOGY USERS - FOLLOWERS (~80%)
   - Absorption of new technologies through the purchase of equipment, etc.
   - Generally no need or interest in RTD projects
1. SME PUBLIC RESEARCH PROGRAMMES

1.2 ROLE OF PUBLIC RESEARCH PROGRAMMES
THE OBJECTIVES

To Promote RTD by SMEs and for SMEs

- Develop Technologies Adapted to the Needs of SMEs (especially traditional sectors)
- Increase Capability of SMEs to Absorb and Develop Technologies
- Foster European Networking between SMEs and Others
- Improve SME Participation In Research Projects as Leading or Major Partners
MANAGING KNOWLEDGE for GROWTH - SMEs

Giorgio Clarotti

Teach/Trento/SMEs

April 2012

Economic and Technological Intelligence (FP5 + FP6)

Exploratory Awards (FP3 to FP5)

Support Knowledge Analysis

Help find partners

Submission of a proposal

Final proposal, one of the following categories:

Cooperative Research (CRAFT)

Collective Research

Integrated Project

Network of Excellence

Other Instruments

Network of SME National Contact Points

Direct proposal submission

SME

Information & assistance
1. SME PUBLIC RESEARCH PROGRAMMES

1.3 SMEs in FP7 and BEYOND
## Complementary pillars of SME support in FP7

<table>
<thead>
<tr>
<th>Optimized participation of SMEs</th>
<th>Dedicated scheme with special emphasis on SMEs</th>
<th>Budget increase for the SME specific measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Cooperation&quot;</td>
<td>&quot;People&quot;</td>
<td>&quot;Capacities&quot;</td>
</tr>
<tr>
<td>Research performing SMEs</td>
<td>Research performing SMEs</td>
<td>SMEs outsourcing research</td>
</tr>
<tr>
<td>Thematic areas</td>
<td>Industry-academia pathways</td>
<td>Bottom-up approach</td>
</tr>
</tbody>
</table>
"Cooperation"

- Identification of areas of particular interest to SMEs in the individual work programmes
- Dedicated SME strategy under each Theme
- Simplified financial and administrative procedures (e.g. 75% funding rate for SMEs, no bank guarantees)
- Greater flexibility in choosing the appropriate project type
SMEs in FP7: Main initiatives - 3

Collaborative projects targeted to SMEs

3 different types of projects (Large projects, Smaller ones + "projects targeted to special groups such as SMEs")

- Stimulate the participation of SMEs
- Research-intensive SMEs should play a leading role in such projects
- Requested EC contribution to participating SMEs must in all cases be substantial
SMEs in FP7: Main initiatives - 4

“People”

Industry-academia partnerships and pathways support cooperation between academia and industry encourage SME participation through

- Staff secondments between academia and industry
- Temporary hosting of experienced researchers from outside
SMEs in FP7: Main initiatives - 5

“Capacities” - Research for the benefit of SMEs

Strengthen the innovation capacities of SMEs to develop new products and markets by outsourcing of research:

- Increase their research effort
- Acquire technological know-how
- Extend their networks
- Improve the exploitation of research results
## Structure & content of the work programme

### 1. Supporting SMEs outsourcing research activities
- Research for SMEs
- Research for SME associations

1336 Mio€/7yrs

### 2. Developing and coordinating support to SMEs at national level
- Eurostars Article 185 Initiative
- ERA-NET
- Support to national and/or regional “exploratory awards”
- NCP-network

Total 400 Mio€/6yrs

### 3. Support measures
- Coordination and Support Actions
- Studies

Access ~4750 Mio€ (15%)
2. Coordinating national support for SMEs - 1

EUROSTARS: ARTICLE 185 INITIATIVE

- EUREKA initiative with a joint programme, based on national schemes.
- Supporting trans-national, multi-partner R&D projects initiated and led by at least two R&D-performing SMEs (bottom-up approach).
- Complements other SME-targeted actions at national and EU-level.
- Up to twenty-two Eureka countries have agreed to participate in the joint programme.
- 300 M€ from participating countries + 100 M€ from EC
2. Coordinating national support for SMEs - 2

ERA-NET

- Continuation of FP6 ERA-NET projects: ERA-SME & CORNET
- Increase integration, coverage and number/budget of common calls.

Support to national and/or regional “exploratory awards”

- Establish durable schemes and services to increase the number of awards provided by the national and/or regional schemes.
- A first preparatory Coordination and Support Action dedicated to the development of implementation modalities.

Network of SME National Contact Points (NCPs)

- Identifying and sharing good practices, developing common tools.
- Supporting less experienced NCPs rapidly acquire the know-how accumulated in other countries.
2. Coordinating national support for SMEs - 2

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**Support to national and/or regional“exploratory awards”**
- Establish durable schemes and services to support a larger number of awards provided by the national and/or regional schemes.
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**Network of SME National Contact Points (NCPs)**
- Identifying and sharing good practices, developing common tools.
- Supporting less experienced NCPs rapidly acquire the know-how accumulated in other countries.
Research for the benefit of SMEs:

CORDIS/SME TechWeb:
http://ec.europa.eu/research/sme-techweb/index_en.cfm

National Contact Points
2. INNOVATION IN AN AGEING & RISK AVERSE EUROPEAN UNION

2.1 POSSIBLE SUSTAINABLE MODELS
EU VALUES AND HABITS: CONSTRAINT AND OPPORTUNITY

- Geographical constraints have shaped economies
- China was the first knowledge economy, but it closed up in 1500
- Europe was the first open knowledge economy: print, commerce (and war? and religion?) – Change is positive.
- US took advantage of space and opportunity, tolerance…
- Japan had little space, little skills, little energy, little materials
  - Micro-Electronics require little space, energy, sand & skills
- Europe can build on its values: tolerance (diversity), talent and technology (Michel Rocard – 2006)
  + Stable employment, quest for quality (sustainable), ageing
Taux d'emploi des États membres, 1998 et 2003

70% = objectif de taux d'emploi de Lisbonne (2010)

Source: Eurostat, QLFD. Note data for MT refers to 2002 only, CY 2003 only and LU to 1998 and 2002
SOCIAL REALITIES – 1.2

EMPLOYMENT IN EUROPE (2003)

Chart 5 - Unemployment rates by gender, 2003

Source: Eurostat, harmonised series on unemployment
SOCIAL REALITIES – 1.3

Taux d'emploi des femmes dans les États membres, 1998 et 2003

>60% = objectif de Lisbonne pour le taux d'emploi des femmes (2010)

Source: Eurostat, QLFD. Note data for MT refers to 2002 only, CY 2003 only and LU to 1998 and 2002
SOCIAL REALITIES – 1.4

Taux d'emploi des travailleurs âgés dans l'UE25, 1998 et 2003

% de la population des 55-64 ans

Source: Eurostat, QLFD. Note data for MT refers to 2002 only, CY 2003 only and LU to 1998 and 2002

50% = objectif de Lisbonne (2010)
SOCIAL REALITIES – 2.1
AN AGE OF LONGEVITY

Gains in life expectancy between 1960 and 2002, EU-25

Source: Eurostat NewCronos. 1960 data for Cyprus not available, and for Germany excluding ex-GDR.
SOCIAL REALITIES – 2.2
STRONG DECLINE IN FERTILITY RATES

Total fertility rate, 2003 and change between 1960* and 2003

Source: Eurostat; * Except Estonia and Latvia 1970

Level needed for the replacement of generations
MANAGING KNOWLEDGE for GROWTH - SMEs

TOTAL POPULATION GROWTH RATE 2002

Relative contribution of natural increase and net migration

Major changes 2004-2006

Will not change for 20 years

Source: Eurostat - Statistics in focus – Theme 3 -25/2002

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MANAGING KNOWLEDGE for GROWTH - SMEs

Year at which (working) population is expected to stop growing/start declining

Total Population

Working age population

IE, MT, CY, LU, SE, TR
FR, UK
BE, NL, SI, DK
AT, FI
EU15, EU25
ES
GR
IT, DE
IT
HU

LV, BG, RO, EE, LT, CZ, SK, PL

Source: Eurostat 2004 Demogr. Projection (Baseline scenario); For Croatia (HR) and Turkey (TR): UN WPP (2002 Rev.)
SOCIAL REALITIES – 2.5
GROWING OLD & VERY OLD EUROPEANS

Distribution of the population (EU25) per age group (1950-2050)

Source: UN World Population Prospects (2002 Revision) and Eurostat 2004 Demographic Projections (Baseline scenario)
EMPLOYED EUROPEANS (if 70% target in 2010)

Source: Eurostat, Commission services calculation, based on Eurostat Populations projections.
SOCIAL REALITIES – 2.7
ADDRESS DEMOGRAPHY & GLOBALISATION

◆ Main source of income are pensions:
  ❍ *around 12% of GDP for old age and survivors in 2001*

◆ The elderly are the main users of health and long-term care:
  ❍ *around 7.5% of GDP (for the entire population)*

◆ Share of total consumption of the elderly could be slightly higher than their share in the population
  ❍ *around 16.5%*

◆ Economic Policy Committee of the EU: foresees increase of public spending on pensions, health and long-term care:

<table>
<thead>
<tr>
<th></th>
<th>in % GDP</th>
<th>2000</th>
<th>2050</th>
<th>Increase ’00 → ‘50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pensions</td>
<td>10.4%</td>
<td>13.3%</td>
<td>+ 2.9%</td>
<td></td>
</tr>
<tr>
<td>Health &amp; long-term</td>
<td>6.6%</td>
<td>8.8 to 9.5%</td>
<td>+ 2.2 to 2.7%</td>
<td></td>
</tr>
<tr>
<td>care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data for EU15 – based on Eurostat, ESSPROS and demographic statistics 2004*
A EUROPE SCARED OF RISK

Europe was the 1\textsuperscript{st} progressive continent
- Renaissance & Enlightenment: change brings progress
- Progress makes most people better
- Challenge established values (King, Church, Power…)
- Science and Reason triumph over doctrine

Science does not equal progress anymore (not in US or Japan)
- Nazism and Communism claimed to be science based
- Seveso, Tchernobyl, Mad Cow, Contaminated blood… affected EU citizen’s faith in science and technological progress

Business establishment does not promote risk (not in US)
- Banks do not understand immaterial investment
- Hard to find Venture Capital
- Businessmen must succeed moderately

Innovating is risky. Not innovating is riskier!!
2. INNOVATION IN AN AGEING & RISK AVERSE EUROPEAN UNION

2.2 INVEST IN PEOPLE
BUILD ON STABLE EMPLOYMENT & HIGH EDUCATION

◆ Invest in People (the least mobile factor)

◆ Invest in services to people
  – Employment is based on services to people, Knowledge intensive business services: leisure, ageing, health… (P. Laredo – 2007)

◆ Develop high quality manufacturing sector (structural investment, less mobile)
GO FOR HIGH ADDED VALUE SEGMENTS

"The BRIC" attack

Traditional Products
- Consumer Goods
- Designer Shoes
- Designer Clothes

Medium-High Technology Products
- Cars
- Digital Video Cameras
- Investment Goods (Components)
- Digital Photo Cameras
- Investment Goods (Machinery and System)
- Computers
- White Goods
- Mobile Phones

"EURO/Kg"

5.000
500
50
5

5.000
500
50
5
MANAGING KNOWLEDGE for GROWTH - SMEs

Giorgio Clarotti

INVEST IN PEOPLE - 3

PYRAMID POWER

“Attack the BRIC”

Solveable (high-end) consumers in Western world
◆ Increasingly saturated, sustainability of the model?

Solveable consumers in emerging economies
◆ More dynamic, open to change
◆ Same model, same products & services

Poor consumers in emerging economies
◆ Different model, products & services
◆ Small margin on very large volume (Unilever soaps), franchise (Philips scanners)...
◆ Scojo vision: 3$ glasses to 10 M Indians

3$ glasses (0.9$ production, 1$ to distributor, 1$ to seller) to 10 M Indians using internet kiosks, Unilever & tobacco networks (FT 1-07)

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Uni TRENTO / Crash course on Research funding...

Teach/Trento/SMEs - 4/12 - Gi©
NEW MODELS – FRUGAL INNOVATION

◆ **New mobile services:** Beeping, Mobile money to 250 m in Asia (A Little bird) & Africa (M-Pesa), Mobile drug certification & delivery, Crowdvoicing...

◆ **Reverse Innovation for new products (cheap and solid):** GE’s 4 buttons ECG, Tata’s rice husk water filter, Tata’s Nano, Nokia’s GSM + flashlight

◆ **New production processes & business models** (*jugaad*):
  - Bharti Airtel (Ind) outsources network to Ericsson, business to IBM and shares towers with other suppliers
  - Tata uses GSM to connect TVs to the Web, using remote controls to surf
  - Service mass produced: 1000 Beds hospital in Bangalore (Dr. Shetty)

◆ **New “guerilla” products** (*shanzai*): from counterfeit to new devices (watch-phones, solar charging phones, money reading phones….)
Competere: dal costo al valore aggiunto: Manufacture

Visione-previsione-strategia della MUTAZIONE INDUSTRIALE, con il supporto dell’EPP Lab ITIA

COSTO
Competere sul COSTO
Cheap labour, Automation

VALORE AGGIUNTO
Competere sul VALORE AGGIUNTO derivante dalla ricerca
Alte prestazioni
Customizzazione
Nuove risorse umane per le imprese

SETTORI INDUSTRIALI
Industria tradizionale
Produzione di massa
Produzione specializzata
Alta tecnologia

© F. Jovane -CNR
Mutazione Industriale research based

Une TRENTO / Crash course on Research funding...

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THE QUEST FOR QUALITY
(Metzler scales, Austria 1990-1995)

◆ A co-ordinated attack from south-east economy:
  ✓ 40% cut price competition with varying quality.

◆ Support from the EU Knowledge infrastructure (education, research, innovation): Fractal factory concept (one man, one machine)

◆ A modified industrial strategy:
  ✓ Invest in research, vocational training and social dialogue
  ✓ Reduce product range

◆ Reap sustainable rewards:
  ✓ Turnover doubled in the next 5 years
  ✓ Stock replaced by a first in, first out approach
  ✓ Increased job satisfaction and turnover, reduced conflicts

Remark: An industrial model cannot be licensed or pirated
## VOCATIONAL TRAINING in DISTRICTS
(Automobile suppliers, US & Piedmont ‘95-’00)

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>DETROIT</th>
<th>PIEDMONT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Centralised model</td>
<td>Distributed engineering</td>
</tr>
</tbody>
</table>
| Purchasing | - 6 monthly procurement  
- bids to the 4th decimal | -Long term relationship  
- Flexible pricing  
- No exclusivity |
| IPR      | Leasing of proprietary machines | Design |
| Workforce | - Mobile (μ = 6 month)  
- Illiterate (30% "can't read") | - Stable (μ = 15+ years)  
- Educated |
| Equipment | Mandelli NCC machine | Mandelli NCC machine |
| Vocational training | Unions | Torino Polytechnic |
| Knowledge absorption | Little | Knowledge Production |
2. INNOVATION IN AN AGEING & RISK AVERSE EUROPEAN UNION

2.3 EXPLOIT DEMOGRAPHIC TRENDS
EXPLOIT DEMOGRAPHIC TRENDS
BUILD ON DEMOGRAPHIC TRANSITION

◆ Constraints:
  – Less openness to innovation, less dynamism, less public and private investment in innovation, more social costs...

◆ Opportunities: internationally tradable + future global trend,
  – Require gov investment (infrastructures, market support, standards, best practices, social expenditure…) → employment in services
  – Extension of working life (Life-long learning, Flexible work organisation, Age-neutral processes…)
  – Enhanced activity, mobility & quality of life (Transport & mobility infrastructure, age relevant ICT at work, home or in society…)
  – Health, well-being & support (Understanding & prevention, seamless care & support, distance medicine for decentralised care…)

◆ Joint EU research efforts: Art.185 AAL action for ambient assisted living, ERA-NET action ERA-AGE for interdisciplinarity
2. INNOVATION IN AN AGEING & RISK AVERSE EUROPEAN UNION

2.4 INNOVATE IN COLLECTIVE GOODS
EU is good in Collective Innovation (P. Laredo –2007):
- GSM, Wind technology, TGV, Smart Card require social networks, role of public champions, demonstrators (collective experiments), procurement, standards (collective patents)

Quest for quality, sustainability (Lisbon strategy)

Develop collective effort: Joint technology Initiatives (JTIs)
- JTIs build on European Technology Platforms (ETPs):
  - in a small number of cases, scale and scope of Strategic Research Agendas of ETPs require implementation through dedicated legal structure
  - normal FP instruments not sufficient
- Joint technology Initiatives aim to:
  - establish long-term public-private partnerships in research at European level in fields of high industrial and policy relevance
  - co-ordinate research efforts and respond to industry needs
  - lead to flagship projects for European competitiveness
INNOVATE IN COLLECTIVE GOODS - 2

JOINT TECHNOLOGY INITIATIVES

◆ Legal Basis:
  – Joint Undertakings set up under Article 171 of the Treaty

“The Community may set up joint undertakings or any other structure necessary for the efficient execution of Community research, technological development and demonstration programmes.”

◆ Identification Criteria:
  – Added value of European-level intervention
  – Degree and clarity of definition of objective
  – Strength of commitment from industry
  – Scale of impact on industrial competitiveness and growth
  – Importance of contribution to broader policy objectives
  – Capacity to attract additional national support and leverage industry funding
  – Inability of existing instruments to achieve objective
INNOVATE IN COLLECTIVE GOODS - 3

JTI on HYDROGEN AND FUEL CELLS

◆ **Objective**:
  - To deliver “fit-for-use” hydrogen energy and fuel cell technologies developed to the point of commercial take-off

◆ **Key deliverable**:
  - new generation of prototypes and demonstrators for testing and validation in the fields of transport, stationary and portable applications
Objective:
- To develop environmentally-friendly and cost efficient aircrafts

Key deliverable:
- Demonstrated technologies and concepts for environmentally-friendly, cost efficient aircraft
Objectives:
- To improve the overall efficiency of the pharmaceutical R&D process

Key deliverable:
- Reduced drug development time and clinical attrition rates, thus ensuring that patients have access to more targeted medicines with fewer side effects
Objective:
- To support the design of electronic and software systems of high complexity and a *lingua franca* that allow diverse electronic devices and systems to “talk to” and “understand” each other.

Key deliverable:
- Development of building blocks that underpin the emergence of new markets and societal applications of ambient intelligence.
Objective:
- To keep Europe abreast of the shrinking size in most widely-used technologies and to address next generation technologies.

Key deliverable:
- New development of the capabilities of nanoelectronics in Europe through the creation of an attractive R&D and human capital environment for investment generation of prototypes and demonstrators for testing and validation in the fields of transport, stationary and portable applications.
Objective:
- To use geo-strategic information to support policy making in resource management, planning or hazard mitigation as well as every-day life optimisation

Key deliverable:
- the provision, on a sustained basis, of reliable and timely information services (data, simulations, scenarios, etc.)
INNOVATE IN COLLECTIVE GOODS - 9

TOWARDS COMPETING ECO-SYSTEMS?

◆ Apple: from computer to lifestyle
  – The exobrain - Closed system, extreme compatibility, easy to use, smart & cool.

◆ Google: from search engine to global system
  – The brain content - Open system (Android), open innovation, targeted advertising, crowdsourcing, low price

◆ Nokia: only a mobile phone company (S. Elop)?
  – The future office? Alliance with Microsoft Mobile in 2011