Framework Programme 7

Information and Communication Technologies

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Outline

→ ❖ **EU ICT Strategy**

- ▪ The ICT Research Environment

❖ ICT in FP6

❖ ICT in FP7

❖ Conclusions

ICT – Key for growth and jobs creation

❖ ICT – a key enabler for productivity **growth & competitiveness**
  ▪ Half of productivity gains in our economies are due to ICT
    • ICT impacts business efficiency across the economy
    • ICT underpins innovations in all major products and services

❖ ICT – an important sector in its own right
  ▪ From 4% of EU GDP in early 90s to close to 8% today

❖ ICT – underpins **progress in all science & technology** fields
  ▪ Computation and simulation, data handling, sensing, control, collaboration, etc..
  ▪ e.g. GÉANT, the world-leading research network,

ICT helps address key societal challenges

❖ICT – providing tools for addressing key societal challenges

- ageing population, inclusion, healthcare
- Education, learning and preserving Cultural diversity
- Safety, environment and risk management

❖ICT – a facilitator for more efficient public services

- Helps modernise administrations and public services
- allows more participation in democracy and public life

ICT: a 'constitutive' technology

IST Advisory Group:

❖ 'ICT **is the new "constitutive technology",** much like electricity or combustion engines in the last century'

❖ 'ICT does not just enable us to *do* new things; it *shapes* how we do them'

❖ 'It transforms, enriches and becomes an integral part of almost everything we do'

i2010 initiative

❖Comprehensive and holistic approach:
- Umbrella initiative for EU Information Society and Media policies (regulation, research and deployment)
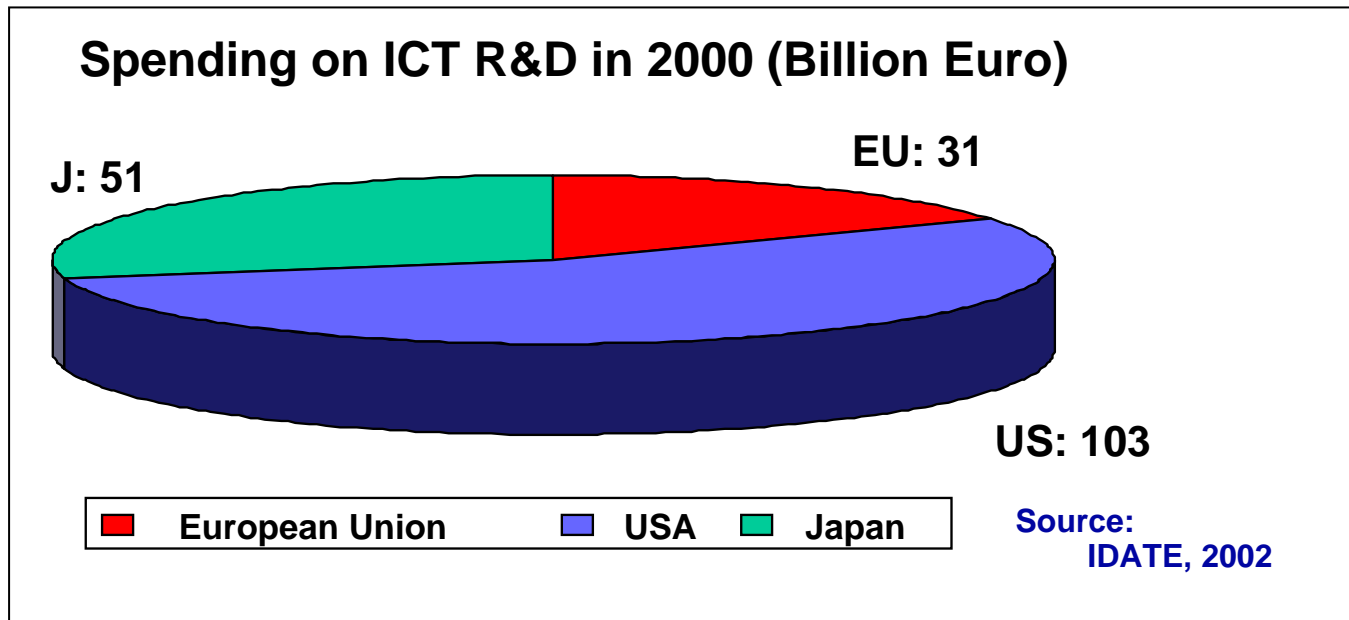
❖Three priorities:
- Completing the Single European Information Space
- Strengthening innovation and investment in research
- Achieving an Inclusive European Information society

i2010 – Community Actions

❖ Legislation, regulation

❖ Coordination, consensus-building

❖ Financial support:

- Two <u>distinct</u> and <u>complementary</u> financial instrument

- ICT in CIP: To drive forward innovation through the <u>adoption and best use</u> of ICTs

- ICT in FP7: To strengthen Europe's leadership role <u>in mastering and shaping the development of ICTs</u>

ICT R&D – Europe Lags

❖ ICT represents more than <u>a third of</u> total R&D budget in all major OECD economies, In <u>Europe it is 18%</u>

Spending on ICT R&D in 2000 (Billion Euro)

EU: 31

J: 51

US: 103

| ■ European Union | ■ USA | ■ Japan |

Source: IDATE, 2002

❖ Gap in ICT research makes <u>up half of total gap</u> with the US in R&D spending

The Changing R&D Environment

❖ Increasing global competition
- China, India, …

❖ De-localisation
- Off-shoring, out-sourcing, …

❖ Open Innovation
- Inside out
- Outside in

❖ New ICT R&D challenges
- Reliability, ease of use, new markets, new applications

*The new environment requires
more co-operation at all levels*

Outline

❖ EU ICT strategy

  ▪ The ICT Research Environment

❖ ICT in FP6

⟹ ❖ **ICT in FP7**

❖ Conclusions

FP7: structure

"Cooperation"
  Predefined themes, refined FP6 instruments

"Ideas"
  Frontier research, competition, individual grants
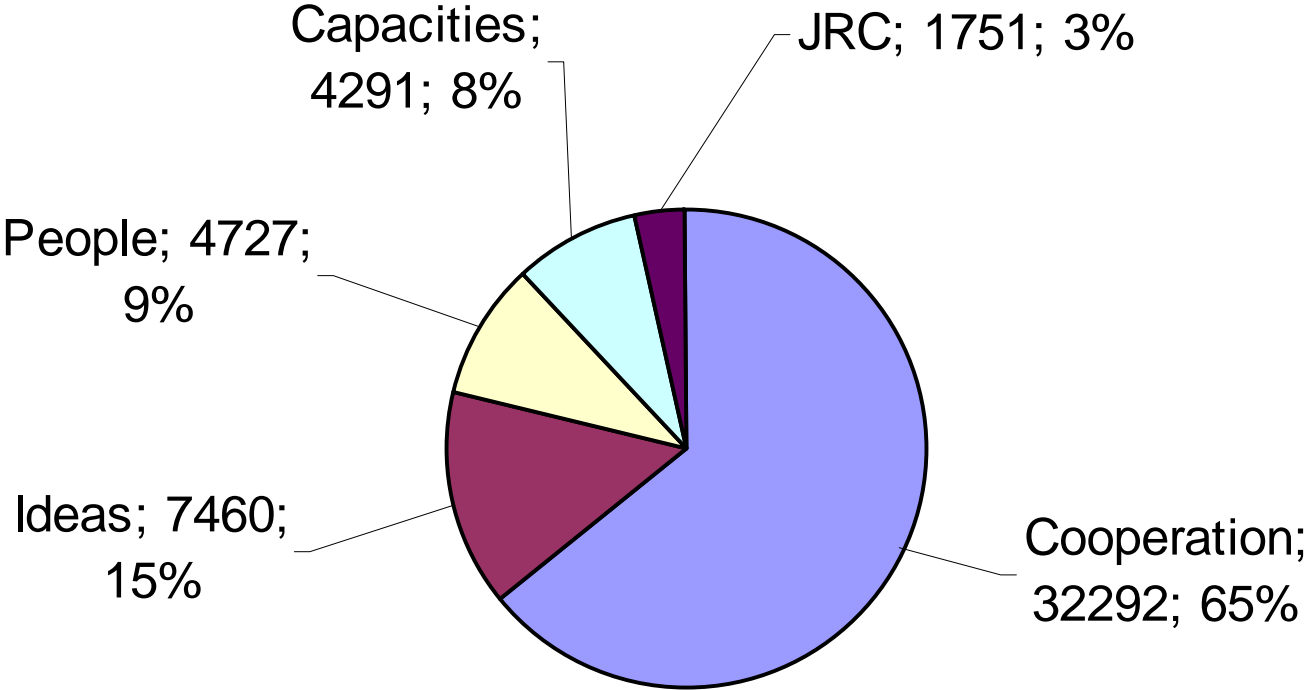
"People"
  Human potential, mobility

"Capacities"
  Infrastructure, SMEs, science and society,

Joint Research Center – non-nuclear

+

EURATOM

FP7 Specific Programmes: New Commission proposal

Capacities; 4291; 8%

JRC; 1751; 3%

People; 4727; 9%

Ideas; 7460; 15%

Cooperation; 32292; 65%

"Cooperation" – Collaborative Research – Themes

1. Health

2. Food, Agri, Biotech

3. Information and Communication Technologies

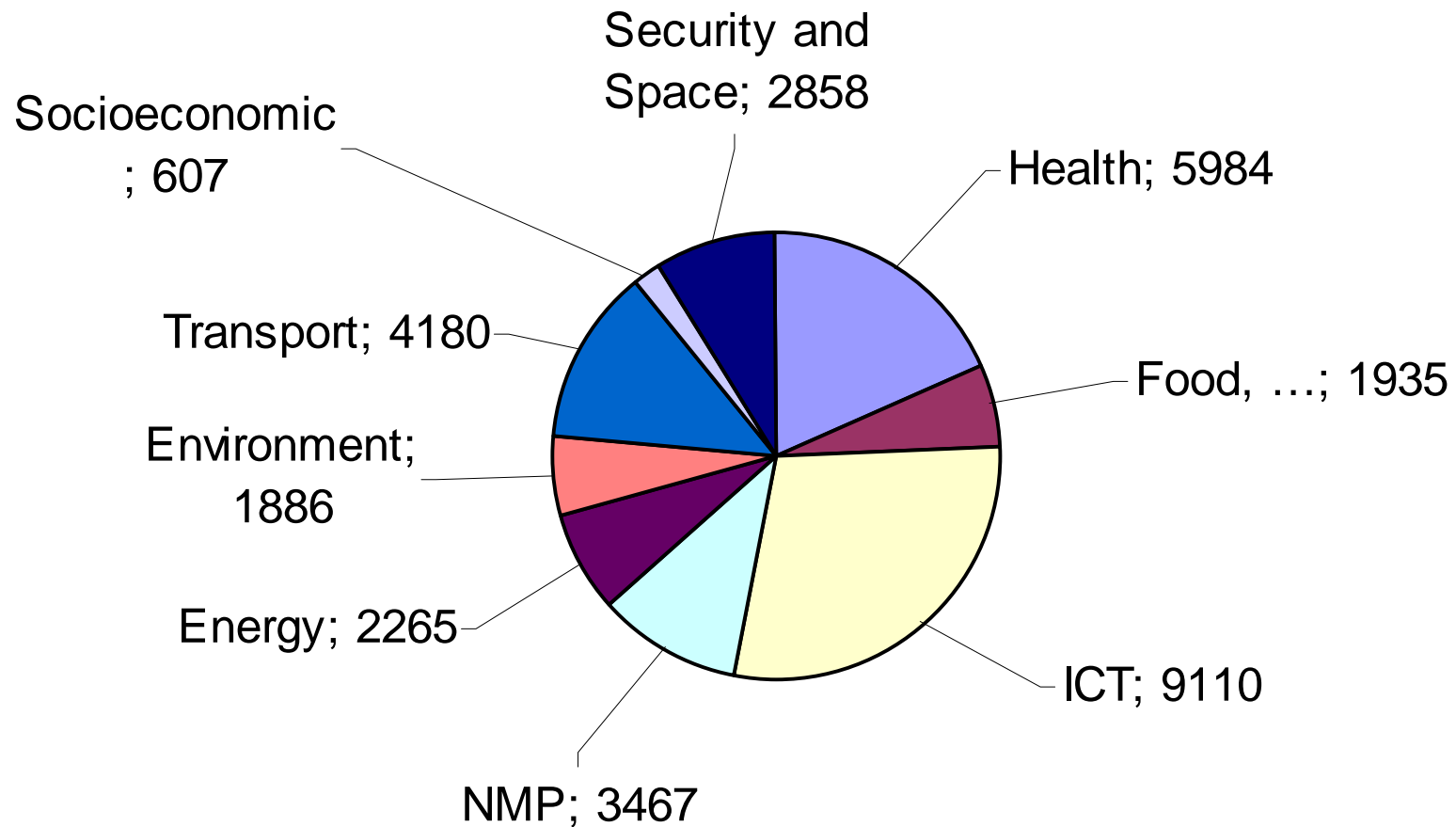4. Nano, Materials, Production

5. Energy

6. Environment

7. Transport (including Aeronautics)

8. Socio-econ

9. Security and space

"Cooperation" – Collaborative Research – Themes

Socioeconomic; 607

Security and Space; 2858

Health; 5984

Transport; 4180

Food, …; 1935

Environment; 1886

Energy; 2265

ICT; 9110

NMP; 3467

ICT in FP7 – Objectives

❖ "To enable Europe to master and shape the future developments of ICT so that the demands of its society and economy are met"

Thereby:

❖ Strengthen the **competitiveness of all industry** in Europe
- Master ICT for innovation and growth

❖ Reinforce the **competitive position of European ICT** sector
- Build industrial and technology leadership

❖ Supporting EU policies
- Mobilise ICT to meet public and societal demands

❖ Strengthening the European science & technology base
- A pre-condition for success

ICT in FP7 – Approach : "Striking the Right Balance"

- *Reinforce leadership* and *open new fields*
  - Reinforce areas where Europe has *recognised strengths*
  - Build capacity to seize *new opportunities* as they emerge

- *Mainstream ICT and Push the limits of technology*
  - Boost innovation from ICT use and new forms of content
  - Widen the performance and functionality of technology
  - Combination of *market or applications-pull* and *technology and science-push*

- Balance between *basic* and *applied* research
  - Flow of ideas from theory to practice and from academia to markets.

Building on Europe's Strengths

❖ Industrial & technological leadership in key ICT fields
  - Telecom, embedded IT, nano-electronics, micro-systems, rich audio-visual content etc

❖ Capacity to draw on multiple disciplines
  - ICT, biology and Biotechnology, physics, materials, social science,..

❖ Handling complexity
  - Transform progress in complex technologies into reliable products
  - e.g. infrastructures: energy, telecom, trains; complex devices: mobile, home,

❖ Strengths in "vertical" *markets*
  - e.g. automotive, aerospace, pharmaceuticals

❖ Partnering and collaboration
  - consensus-building, pursuing common goals

Seizing new Opportunities

❖Expanding prospects of ICT
- New needs, new areas; e.g.
  - New forms of digital content, new personal devices and systems, shifting computing & communication "out of the box";
  - more dependable ICTs,..

❖Extended borders of ICT R&D
- ICT-bio-nano-cogno

❖Wider range of actors
- Large firms, SMEs, universities, public research labs etc.
- Industry and technology suppliers in ICT sectors
- Users from ICT-intensive sectors
- Researchers in ICT, bio- and life-sciences, cognitive sciences, social sciences etc.

Stimulate Innovation from ICT Use

❖ Bring technology closer to people and organisational needs
- Make ICT simpler to use, available and affordable
- Make ICT more trusted and reliable

❖ Involve the *user* early
- A European tradition: user participation early in the process
- Strong user industries in Europe
  - automotive, aerospace, medical, pharmaceuticals, financial services, etc.

❖ Support innovative digital content and services that adapt to users' context
- Respond to evolving societal demand: e.g. higher ICT literacy, ageing,..

Push the Technology Limits Further

❖ Miniaturisation
- From micro to nano scale electronics

❖ ICT drawing on other sciences and technologies
- e. g. ICTs inspired from the living world; organic systems,.

❖ Systems able to learn and evolve
- Advanced robotics

❖ Convergence
- Computing, communications and media technologies

ICT in FP7: Main Themes and Activities

❖ ICT Technology Pillars
- pushing the limits of performance, usability, dependability, cost-efficiency

❖ Integration of Technologies
- integrating multi-technology sets that underlie new functionalities, services and applications

❖ Applications Research
- providing the knowledge and the means to develop a wide range of ICT-based services and applications

❖ Future and Emerging Technologies
- supporting research at the frontiers of knowledge

ICT Technology Pillars

❖ Nano-electronics, photonics and integrated micro/nano-systems

❖ Ubiquitous and unlimited capacity communication networks

❖ Embedded systems, computing and control

❖ Software, Grids, security and dependability

❖ Knowledge, cognitive and learning systems

❖ Simulation, visualisation, interaction and mixed realities

New perspectives emerging in ICT drawing on other science and technology disciplines

Integration of Technologies

❖ Personal environments

- personal communication and computing devices, wearables, implants..

❖ Home environments

- communication, monitoring, control, assistance;

❖ Robotic systems

- advanced autonomous systems; cognition, control, miniaturisation

❖ Intelligent infrastructures

- tools making infrastructures that are critical to everyday life more efficient, easier to adapt and maintain,

Applications Research

❖ ICT meeting societal challenges
- for health; to improve inclusion; for mobility; in support of the environment; for governments

❖ ICT for content, creativity and personal development
- new media and content; technology-enhanced learning; digital cultural assets

❖ ICT supporting businesses and industry
- business processes; collaborative work; manufacturing

❖ ICT for trust and confidence
- identity, authentication, authorization, privacy, rights

Implementation of ICT in the "Cooperation" part

❖ Continuity of instruments

- Collaborative projects;
- Networks of Excellence;
- Coordination/support actions

❖ + New schemes

- Joint Technology Initiatives
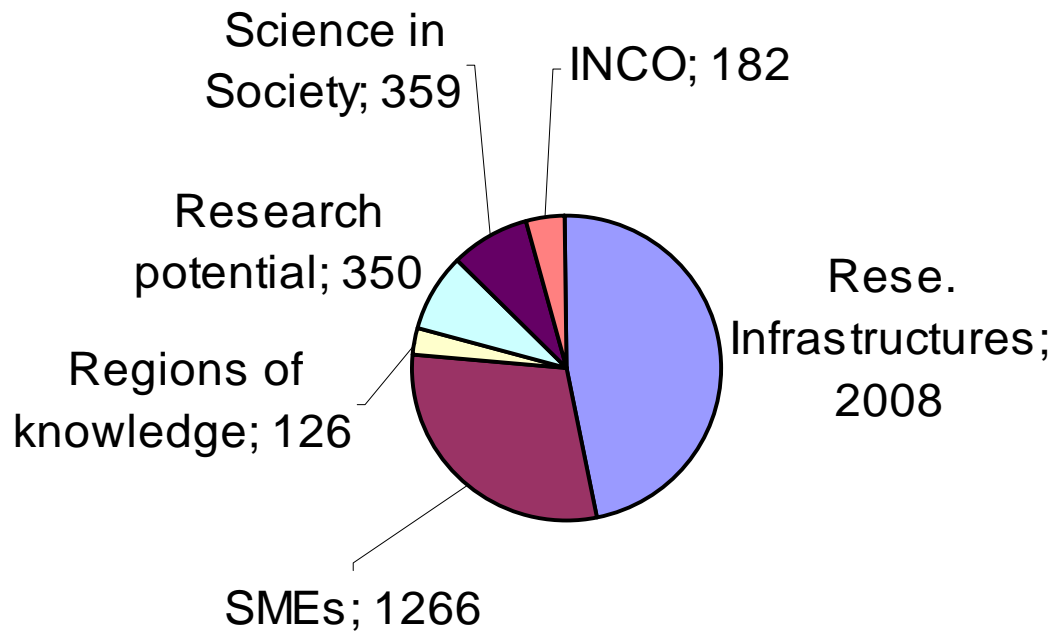- Coordination (ERA-NET; ERA-NET+; Article 169)

ICT – Joint Technology Initiatives

❖ In a limited number of cases

❖ Covering one or a small number of selected aspects

❖ Criteria include
- Inability of existing instruments to achieve objectives
- Degree and clarity of definition of objectives
- Financial and resource commitment from industry
- Capacity to attract additional national support
- and leverage current or future industry funding

❖ For ICT: Nanoelectronics, Embedded Systems, …

ICT– Coordination of programmes

❖ ERA-NET and ERA-NET-PLUS

❖ Community participation in national research programmes (based on Art. 169), with criteria including
- Efficiency of Art. 169 as the most appropriate means for achieving objectives
- Presence of pre-existing national research programmes
- Critical mass (size and number of programmes/activities)

❖ For ICT: Ambient Assisted Living

ICT in FP7: "Capacities" new

Science in Society; 359

INCO; 182

Research potential; 350

Rese. Infrastructures; 2008

Regions of knowledge; 126

SMEs; 1266

FP7 "Capacities" – Research Infrastructures

❖ Support to existing research infrastructures

- Research e-infrastructures
  - GÉANT, Grids, Super-/high-end-computing

- Transnational access

- Integrating activities

❖ Support to new research infrastructures

- Construction of new research infrastructures and major updates of existing ones
  - Nanoelectronics cleanrooms

- Design studies

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❖ EU ICT strategy

  ▪ The ICT Research Environment

❖ ICT in FP6

❖ ICT in FP7

⟹ ❖ **Conclusions**

ICT in FP7: Building on successes

❖ It is in areas where a focussed research effort has been done at European level that major successes in ICT have been obtained:

- Mobile Communications: World standards and huge Commercial successes

- Micro/nano electronics: From no European company in the top 10 suppliers in the early nineties to 3 major European supplier in top 10, ST Micro, Infineon and Philips

- Embedded ICT: e.g. World standard for dependable systems in cars, planes, nuclear power stations, etc..

- Innovative Applications: ICT for Health, *eSafety* in Transport, etc..

Conclusions

❖ **Information & Communication Technologies**
- key to the Lisbon agenda
- central to mastering innovation
- necessary to modernising public services

❖ **R&D in ICT, we need to:**
- intensify effort & reinforce our strengths
- extend scope & seize opportunities
- shape to fit the needs of businesses & citizens
- involve all stakeholders & reach out beyond Europe

ICT R&D: shaping our future!