A Strategy for ICT R&D and Innovation in Europe: "Raising the Game"

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European Commission

Outline

- **1 Proposed strategy: objectives and context**
- **2 The Need for a Strategy**
  - New opportunities for technology leadership and business growth
  - Underinvestment and fragmentation
- **3 A Strategy for leadership**
  - Invest more and better
  - Supply-demand
  - Cutting across policy silos
- **4 ICT in FP7, ICT in the CIP where do we stand?**

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Objectives of Commission's proposal

- To present for debate a policy for ICT R&D&I in the EU
  - Highlighting the opportunities ahead in, and through ICT
  - establishing Europe's industrial and technological leadership in ICT
  - facilitating the emergence of new markets and businesses,
  - increasing Europe's attractiveness to investments and skills in ICT.

- Focusing the debate on a concrete set of measures.
  - Feed the process of political consensus building
  - inform upcoming decisions on support to future R&D&I.

- Preparing for Europe's digital agenda for the next decade
  - ICT R&D&I a key pillar of the EU digital policy
  - Ensuring " a green and digital recovery"

Consultation of stakeholders

- National ICT research directors
  - Vienna, Berlin, Ljubljana, Lyon
  - WGs: PCP, Fut. Internet, Res. Infr.
- ISTAG, WG on revising the EU ICT R&D strategy
- On line consultation:
  - 565 responses including 16 associations.
- Studies
  - REDICT, PREDICT on EU research effort, innovative ICT SMEs (2007), impact of ICT in the FP, Aho panel
- Inside the Commission
  - Inter-service group to discuss "Staff Working document", DG RTD, ENTR, Markt, DIGIT, TREN, BUDG, Legal,…

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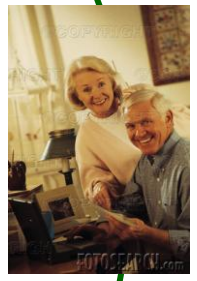
ICT an engine for sustainable growth in a low carbon economy



ICT services:
energy efficiency
eHealth,
business,
education,
inclusion,
transport etc







ICT equipments

Embedded ICT
in all sorts of
products and
applications



Electronic Components

ICTdevices

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ICT today: world-wide

- A market of around 2000 Billion Euro
  - Average growth 7% per year in the last five years
  - Driven by "more for less", performance doubling every 18 months
- High research intensity:
  - ~10% of turn over, ~30 % of total R&D effort WW
  - Continuously renewed opportunities for innovations
- An essential enabler of economic growth
  - Responsible for 40% of productivity gains in our economies
  - Underpins innovation in all sectors
- Helps address key societal challenges
  - Health, environment, energy efficiency, ageing, inclusion,..
- Underpins progress in all major science fields

ICT today: in Europe

- A market of more than 660 Billion Euro
  - Largest market WW, ~34% of world market
  - Average growth 4% per year
  - represents ~5-6% of EU GDP
- EU produces 23% of the world ICT value added
- ICT, one of the largest exports sectors of the EU (10%);
- ICT a large part of our imports (14,5 %).
- ~12 Million people work in ICT in the EU
- ICT markets liberalised since 1999 in the EU
  - Opened competition and lowered prices drastically for consumers

Global competition

- The race to high value innovative products is fierce.
  - Systematic outsourcing/offshoring of production of low-value mass products.
- Global competition also to attract investment in R&D and skills
- All emerging and developed economies position ICT at the core of their economic growth policies

ICT: the innovation goes on

ICT today

- 45 nanometer scale……
- Silicon-based……
- PC and phone based access……
- Internet, IP-based networks
- Limited bandwidth, diff. networks….
- Mobile telephony (voice)……..
- Text-based information search……
- "Writing and reading"……..
- *e*Services emerging……
- Social networking……..
- Programmable machines/robots…

"ICT" tomorrow (2020…)

- ✓Down to the 10 nano-scale & beyond
- ✓ + new materials
- ✓"Our surrounding" is the interface
- ✓Future Internet, trillions of devices ,..
- ✓Infinite bandwidth, convergence, ..
- ✓ Mobile/Wireless "everything"
- ✓ Context-based, semantics,
- ✓ Use all senses, intuitive, cognitive
- ✓Internet of services
- ✓ Web of creators
- ✓ auto-adaptable, learning artefacts

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New opportunities ahead: 1- Technology driven

Some main drivers

- Future Internet: services, network, access devices
- Alternative paths to ICT components
  - Nano-electronics, Photonics, organic electronics, biochips
- Technology convergence and new paradigms

Future Internet

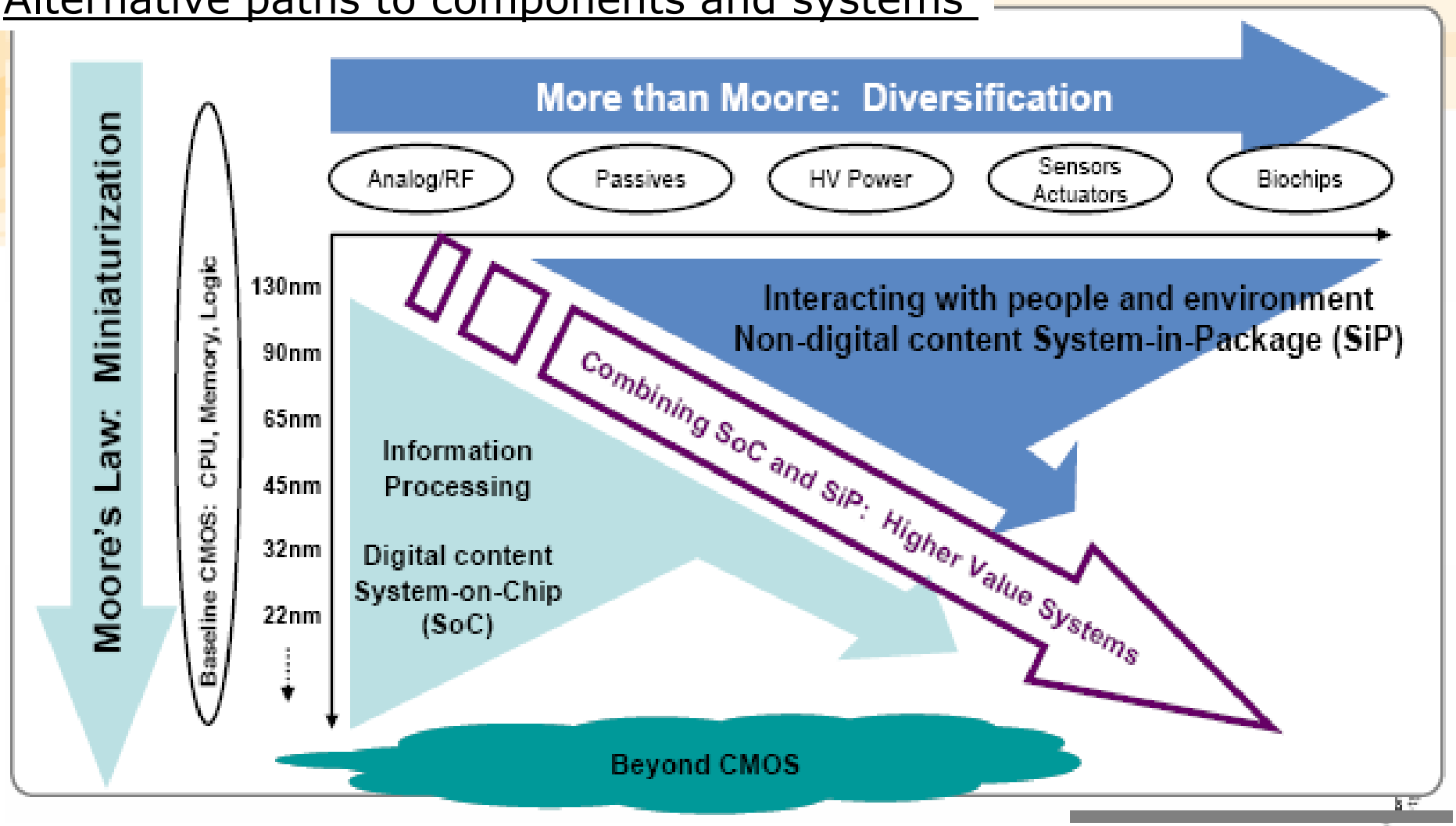
New emerging network and service infrastructures

- unlimited bandwidth and computing capacity
- Mobile/wireless access anywhere
- trillions of devices interconnected
- integrated security and trust for all
- adaptive and personalised services
- 3D semantic-based search

Offering

- Anywhere anytime connection for everyone
- An internet of services,
  - Web-based.
- An internet of things
  - Sensors, RFIDs, MEMS, ..

Alternative paths to components and systems



- **'More Moore'**: more nano (miniaturisation: silicon<45nm: smaller, higher perf, lower cost)
- **'More than Moore'**: more functions (heterogeneous techs: sensors, actuators, bio-nano)
- **Micro/nano-systems, SoC & SiP**: integration and diversification
- **Organic and large area electronics** : disposable electronics: e-paper, e-tags
- **Photonics** : light sources, fibres, lasers: lighting efficiency, medicine, biology

Technology convergence

- Bio- inspired ICT
  - Cognitive systems
  - Self-adaptable and learning systems
  - Robotics, in unstructured environments
  - New interaction techniques
- Quantum information processing
- Handling complexity

New opportunities ahead
2- use-driven

- Energy efficiency
  - Green ICT and ICT for greening..
- Health
  - Personalised health systems, implants, imaging..
- Ageing, inclusion
  - Active ageing, social interaction, health monitoring
- Climate change and environment
  - Better understanding/monitoring, etc..
  - Green transport, Green car
- Manufacturing and production systems
  - Smart manufacturing, virtual manufacturing, etc..

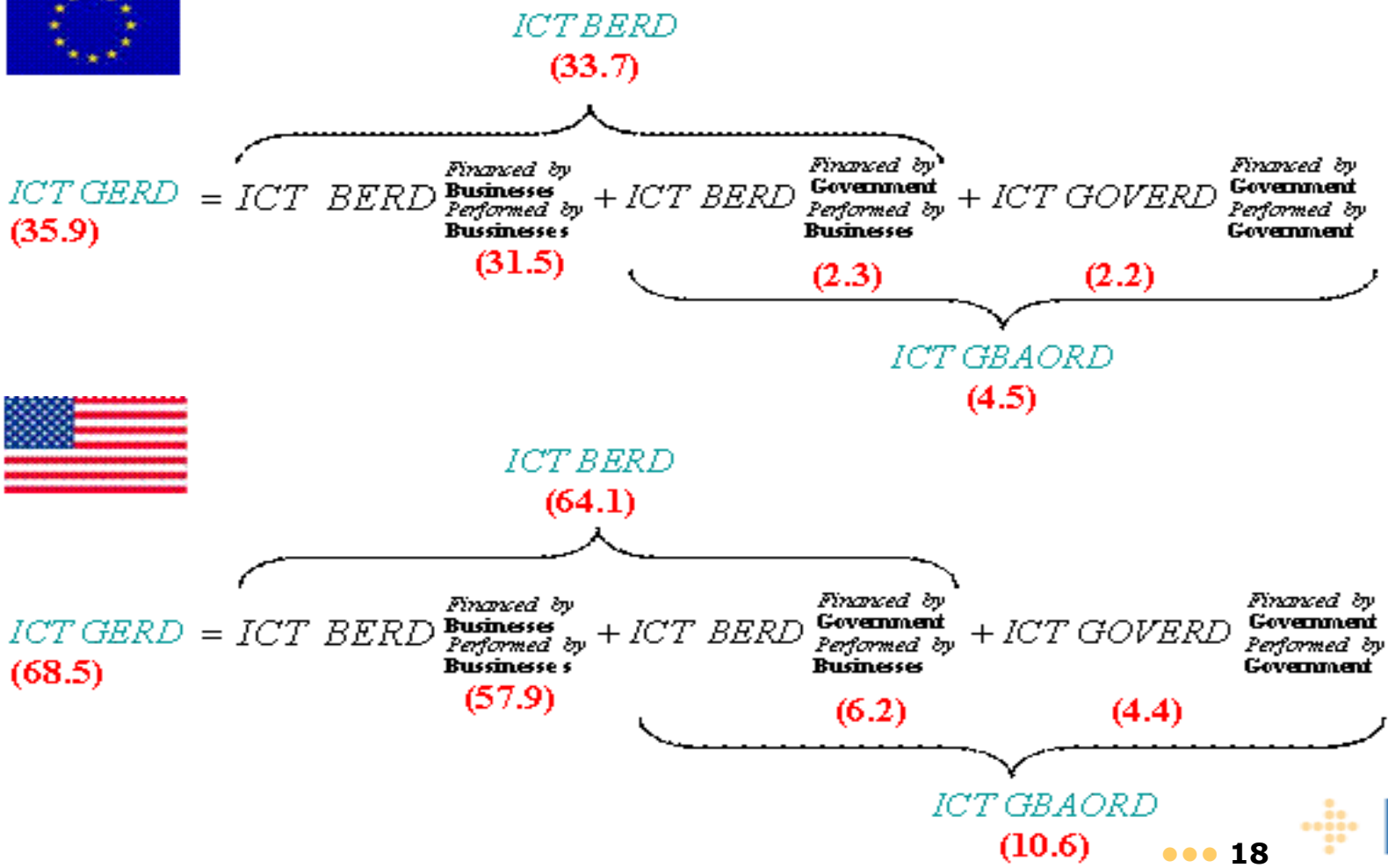
Europe is still well placed

- Industry strengths
  - Telecom,
  - ICT for vertical markets, (automotive, aerospace, energy,..)
  - Business and service software
- Strong technology know how
  - Multidisciplinary, World level skilled workforce
- Largest market
  - Several MSs, top of the lot in ICT use

Two key problems: **Underinvestment**, fragmentation

- EU's ICT business sector spends 50% less on R&D than its US counterpart
  - ~34 against ~74 B€/year
  - Weak attractiveness to private equity
- Public sector investment is at least 60% lower
- Pre-commercial public procurements of ICT is underutilized in the EU
  - <1 B€ against >10 B€

EU –US GERD in ICT

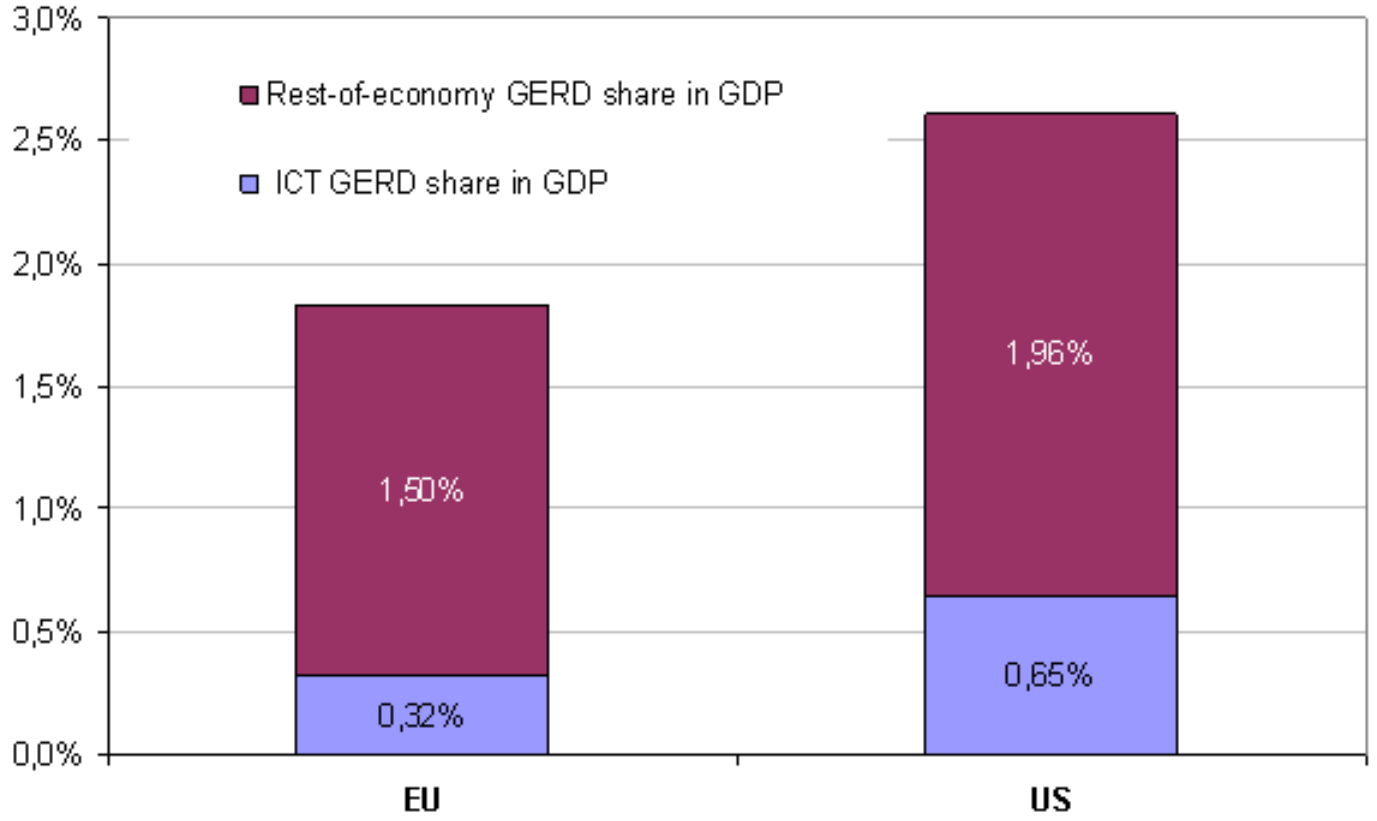


Contribution of the ICT Sector to the total business R&D intensity in the economy

(ICT GERD/GDP, 2005)

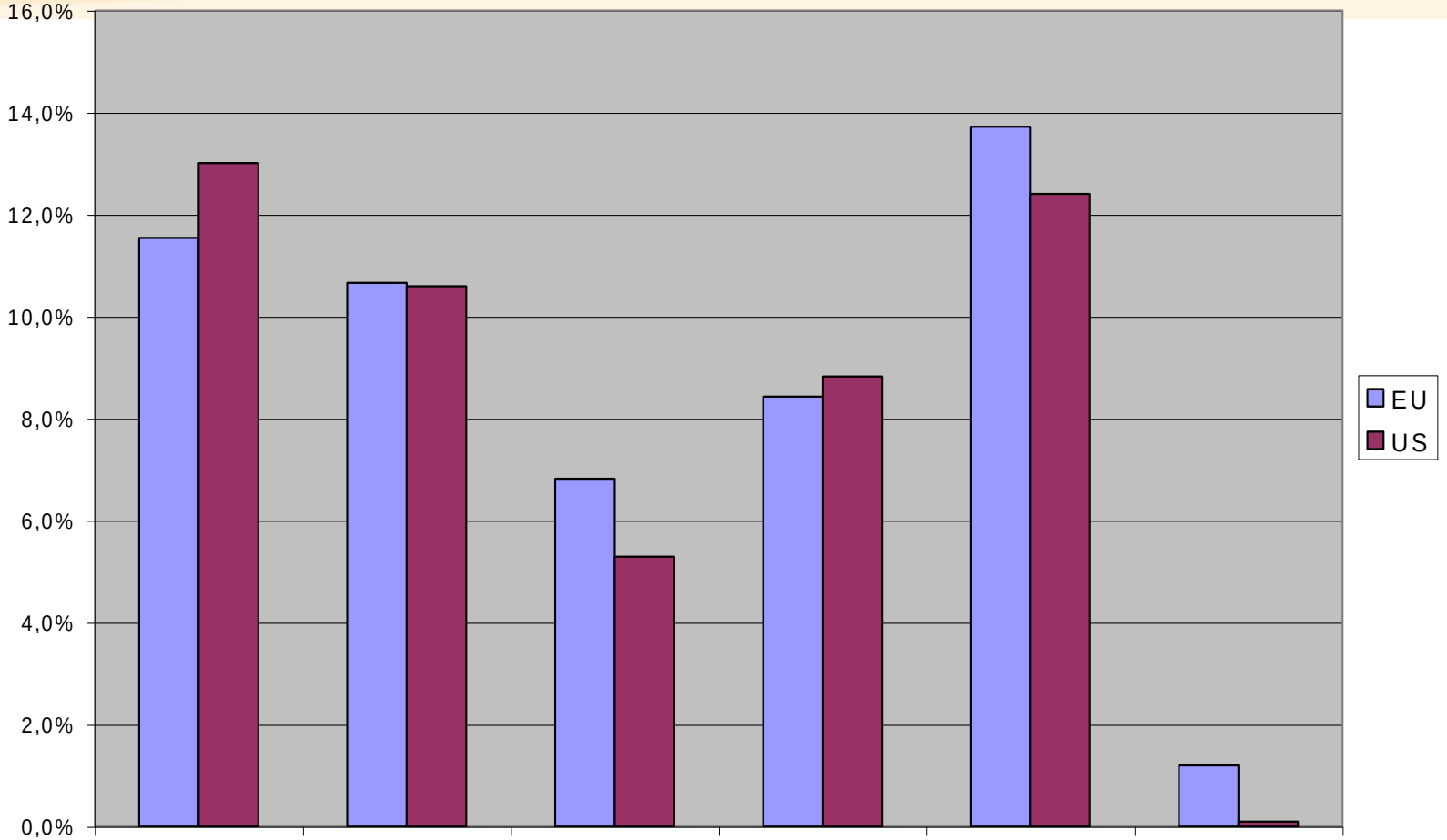
GERD 2010

BERD 2010



Source: REDICT estimations based on data from Eurostat, OECD and national statistical offices. IPTS 2007

Company R&D investments as percentage of net sales for ICT sub-sectors – comparison EU and US



Source: IPTS elaboration on data from the 2006 EU Industrial R&D Investment Scoreboard, IPTS, JRC

Two key problems: Underinvestment, **fragmentation**

- Fragmentation of markets (demand)
  - no single European market for innovative ICT
    - fragmented regulation, standardisation, IPR and patent sys.
  - fragmented public demand,
    - slower uptake of ICT-based innovations in the public sector
  - Weak cross-portfolio interaction in the public sector
    - procurers in policy ministries, innovation, research actors)
- Fragmentation of R&D&I investments (supply)
  - Few world reference competence centres in ICT
    - despite the many good research teams
  - Lack of common approaches, targets, visions
    - ETPs, JTIs, AAL good move forward but..
  - growing deficit in the EU of qualified skills in ICT R&D
    - 100s of thousands
  - Lack of coordination across the knowledge triangle

Results/Symptoms: High barriers to ICT business growth

- Barriers to business growth pose a bigger problem than barriers to start a business in the EU
  - No new major world player in the last 20 years in ICT
  - Europe is unable to capitalise on the size of its ICT market
    - the largest world wide
- Reasons:
  - sub-optimal conditions for their access to EU-wide markets for innovations
  - sub-optimal conditions for their access to finance
  - excessive regulatory burdens

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What to do about it- suggested approach

- Actions to address both supply and demand
- Closer articulation of EU and MS actions
- The policy should cover the range of activities
  - from R&D and stimulation of technology uptake to procurement and deployment of solutions
  - 'Knowledge Triangle' (research, innovation, education) to address socio-economic challenges
- Communication issued on 13 March, 09
  - http://ec.europa.eu/information_society/tl/research/documents/ict-rdi-strategy.pdf

Actions: Raising the Game

- Raise R&D investments level
  - Public: e. g. through new means (public procurement, etc..)
  - Private through public-private partnerships,..
- Strengthen collaboration/coordination and concentrate & specialise resources
  - EU/MSs, Industry, policies etc..
- Open up new markets for innovation
  - Pilots, standards, public sector diving innovation
  - and support projects cutting across the innovation chain

Increase investments

- Public investments:
  - Grants: FP7 reaching 1.7 B€/year in 2013 (+70% in three years) + **MS to match this increase**
  - Pre-commercial procurements: Cion to raise awareness and provide incentives + MS to engage more
  - Structural Funds: MS to use more often, e.g. for ICT R&D facilities
- Attract private investments:
  - Public-Private Partnerships: Cion to examine other candidates for JTIs and Joint Research Programmes
    - Future Internet+ ICT for Green Car, Factories of the future, EE building
  - VC/BA/EIB-loans: Cion to set up platforms for dialogues
    - support awareness-raising of EU technologies
  - More focused cluster policies, MSs
  - Reinforce support to innovative SMEs; MSs+Cion

Strengthen collaboration, concentrate & specialise resources

- Shared strategies and policies
  - Cion and MSs to strengthen dialogue between stakeholder groups,
    - National ICT Research Directors Forum, ICT Advisory Group (ISTAG), ICT ETPs, other policy areas, e.g. i2010 ad hoc groups (health,..)
- Pooling of resources
  - Cion to examine other candidates for JTIs & Joint Research Progs.
- ICT R&D infrastructures & knowledge-based innovation clusters
  - MS to strengthen collaboration in planning, implementing and sharing infrastructures/clusters
  - Cion to support shared ICT R&D infrastructures in FP8
- EIT KICs: Cion proposes ICT as a priority area
- Qualified skills in ICT R&D: Cion support to 'New Skills for New Jobs' and e-Skills initiatives

Open up new markets for innovation

- ICT R&D&I policy must help drive forward other policies:
  - MS to promote tighter collaboration between users/buyers and producers/suppliers of ICT innovations;
  - MS to define & implement public demand for ICT innovation together;
  - Cion to support experience sharing
- Interoperability and standards:
  - Cion to revise ICT standardisation process + to reinforce pan-European pilots in CIP;
  - MS to support and participate in CIP pilots + to complement by actions at local level + to use the Structural Funds more to roll-out innovative ICT applications
- More favourable conditions for business developments: single market measures, regulation, public procurements etc.

Support projects cutting across the innovation chain

- Cion proposes to support a set of 'single-heading' focused European-scale projects that cut across the innovation cycle
  - Incl. grants to R&D, pre-commercial procurement and support to innovation and deployment
  - Addressing specific mid-term societal goals, with intense users/producers, local/regional/national/European collaborations
  - Example modern pan-European service infrastructures: Innovative ICT solutions for sustainable healthcare, for energy-efficiency, and for an electronic identity management infrastructure
  - Test and validate cases using existing instruments; later: full implementation under MAFF 2013+
  - E.g. personalised health systems, energy efficiency, eID,

… In parallel …

- Simplification and streamlining of procedures
  - Cion call on EP and Council to support new drive to cut red tape + to allow greater flexibility + to develop more risk-tolerant approach
- International cooperation
  - Cion to seek global partnerships to tackle S&T and socio-economic 'grand challenges'
  - MS to define priority areas together

Targets: 2015-20

- A doubling of private and public investments in ICT R&D
  - A doubling in venture capital investments in high growth ICT SMEs,
- The emergence of five world class poles of ICT excellence
- The break through of five new global firms from the EU to global prominence;
- Increasing by one third our share of the global ICT supply so as to match the scale of demand.

To sum up

- Proposal for a systemic approach: combined 'demand pull' / 'supply push'
  - Raise investments
  - Prioritise and coordinate resources
  - Open new markets

- To focus the debate and inform future decisions

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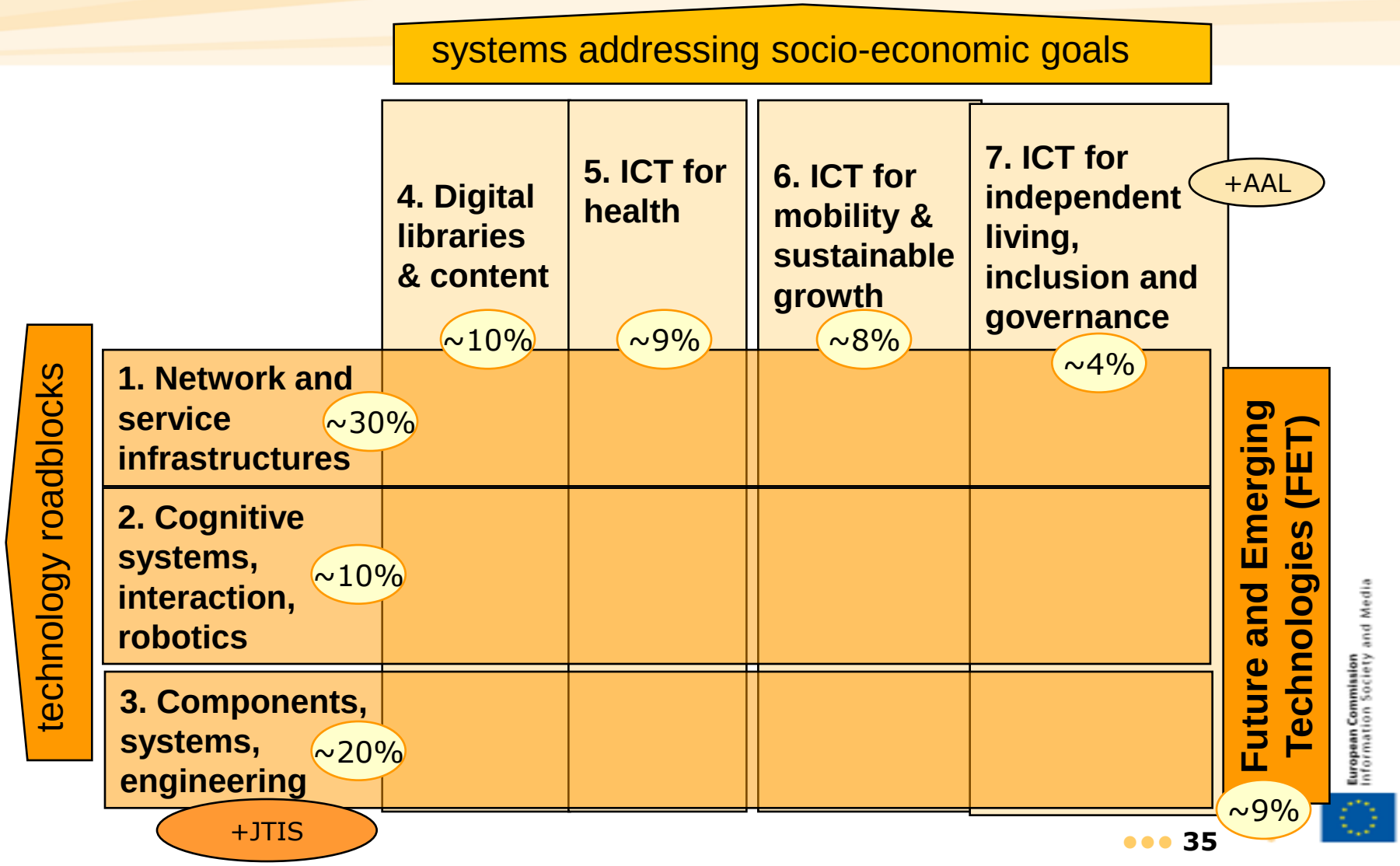
Work Programme approach & structure

- A limited set of Challenges that
  - respond to well-identified industry and technology needs and/or
  - target specific socio-economic goals
- A Challenge is addressed through a limited set of Objectives
  - that form the basis of Calls for Proposals
- An Objective is described in terms of
  - target outcome
  - expected impact on industrial competitiveness, societal goals,..
  - Funding schemes
- A total of ~25 Objectives expressed within 7 Challenges

ICT in FP7: 7 Challenges + FET



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ICT in FP7: Where do we stand?

- In 2009 the FP7 ICT Programme is in its third year of implementation.
- Four main calls have been launched
- Three Calls for proposals have been finalised and projects contracted
  - 581 projects have been launched so far for a total Community funding of about 2 B€.
- A fourth call has just been evaluated
  - contracts in negotiation for 801 M€
- A call is currently open, Call5 for 722 M€
- Call 6 will be launched in Nov 2009.

Call 6: Open 24 Nov 2009, Close **13 April 2010**; 286 M€

Challenge	Objectives
Challenge 2: Cognitive systems, interaction, robotics	ICT 2009.2.1 Cognitive Systems and Robotics
Challenge 4: Digital Libraries and Content	ICT 2009.4.1 Digital Libraries and Digital Preservation
Challenge 5: Towards sustainable and personalised healthcare	ICT 2009.5.3 Virtual Physiological Human
Challenge 6: ICT for mobility, environmental sustainability and energy efficiency	ICT 2009.6.2 ICT for Mobility of the Future
Future and emerging technologies	ICT 2009.8.7,8,9,10 FET-Proactive
Horizontal support actions	ICT 2009.9.1 International Cooperation ICT 2009.9.2 Supplements to support International Cooperation between ongoing projects

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ICT in the CIP, where do we stand?

- Support to uptake of ICT innovations
  - A direct policy support programme
- Focus on areas of public interest
  - Energy efficiency, health and ageing, cultural heritage and digital libraries, mobility, smart cities,....
- Support large scale pilots
  - Users in the lead
- 115 M€ per year
- 3 Calls so far, around 30 pilots launched

More Information

Thank you!!

http://cordis.europa.eu/fp7/ict/