Net!Works

Support of innovative SMEs as part of European collaborative research framework programs

Werner Mohr

Chairman of Net!Works European Technology Platform

Nokia Solutions and Networks, Munich, Germany

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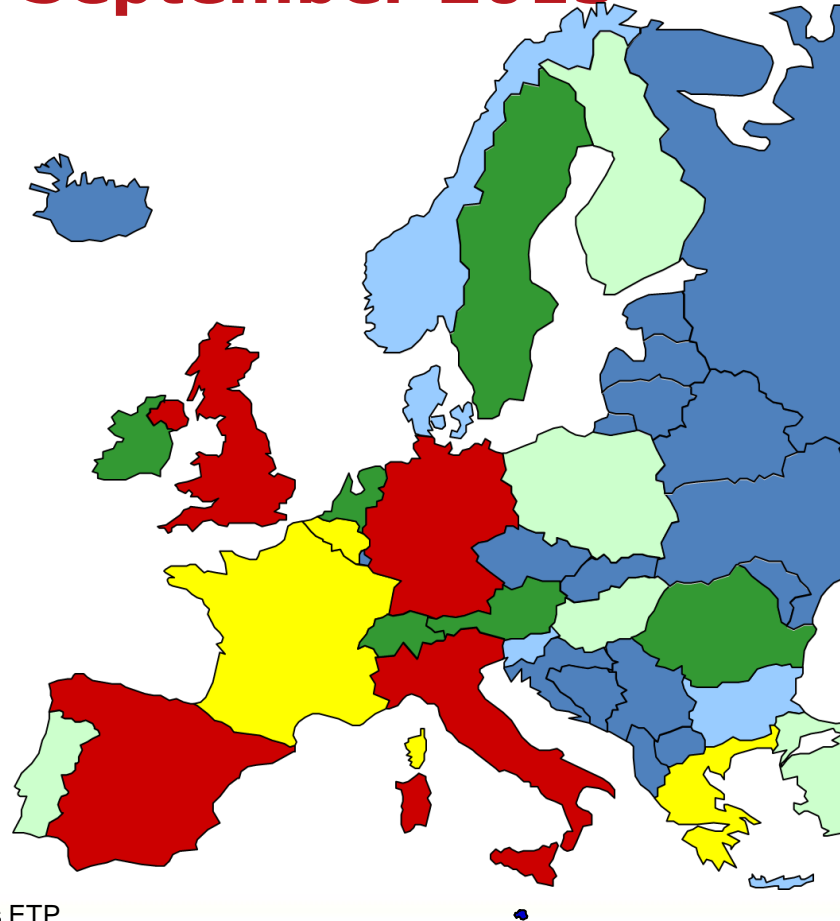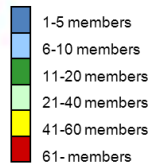
Net!Works

Outline

- Introduction European Technology Platform Net!Works

- Collaborative research programs

- Economic impact of the ICT sector

- Horizon 2020 – The new Framework Research Program

- SME support measures

- Conclusions

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Membership – 884 members
Status September 2013

Legend:
- 1-5 members
- 6-10 members
- 11-20 members
- 21-40 members
- 41-60 members
- 61- members

Total number of members **884**

Industry	157
Research	321
SME	317
Cooperation	89

Steering Board of 25 members (all elected).
In addition:
- Expert Group
- Mirror Group
- Executive Group

Source: Net!Works ETP.

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Net!Works

Net!Works and the Digital Agenda (1/2)

Net!Works

- **The "Digital Single Market" Priority**
  - Net!Works supports the development of all new technologies that make possible a digital single market to exist.

- **The "Interoperability and Standards" priority**
  - Net!Works cooperates with the Commission and with other ETPs in order to develop interoperable standards.

- **The "Trust and Security" priority**
  - Net!Works-related research projects will help Europeans feel that they can fully rely upon their networks.

- **The "Fast and Ultra Fast Internet Access" Priority**
  - Investing in R&D in this sector is the only solution to develop the appropriate innovative technologies.

Source: Net!Works ETP.

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Net!Works and the Digital Agenda (2/2)

- **The "Research and Innovation" priority**

  - Research and innovation on broadband fixed and mobile communication systems is the core of Net!Works.

- **The "Enhancing Digital Skills, Literacy and inclusion" priority**

  - Bringing Internet access subscriptions above 100 Mbps to 50% of Europeans will ensure that websites providing public services are accessible to all citizens.

- **The "ICT-enabled benefits for EU society" priority**

  - Supporting solutions for Grand Societal Challenges such as climate change, health, aging population.

Digital Agenda
100110010101110111000010**0 2010-2020**
for Europe

Source: Net!Works ETP.

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Net!Works and the Grand Societal Challenges

- **The "Environment and Energy Efficiency" Challenge**

  - Monitoring environmental parameters, and providing the means to have alarms; Efficient resources management; Technology waste.

- **The "Health and Demographic Change" Challenge**

  - Future wireless diagnostic and disease management systems; hospital consultation and emergency scenarios; assistive technologies; well being and personalisation.
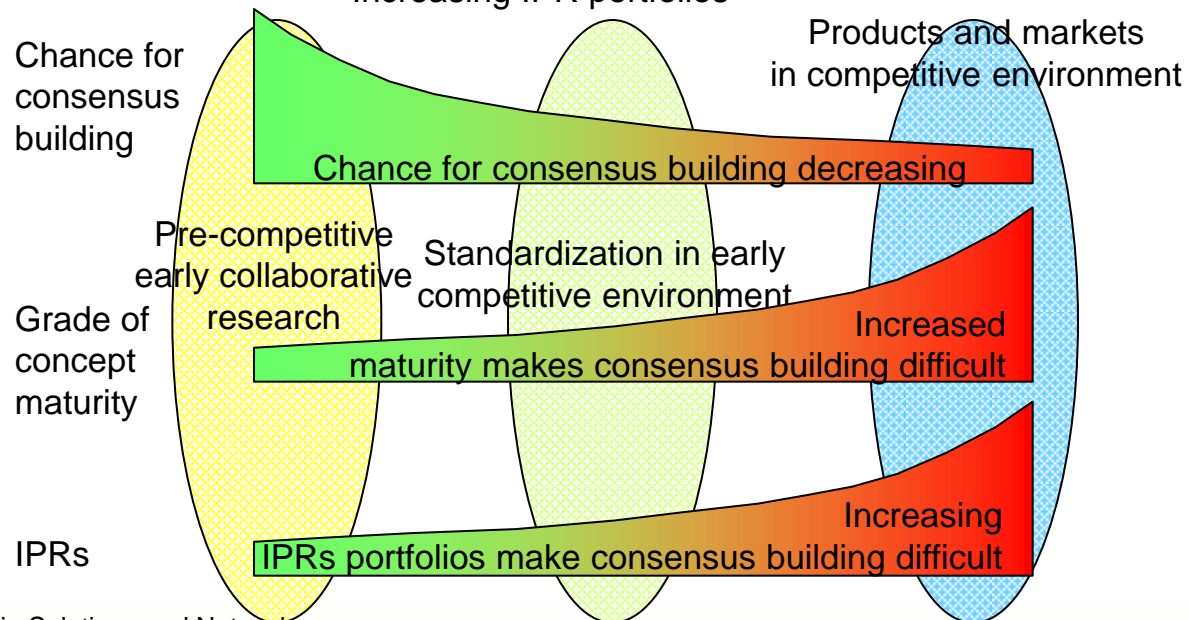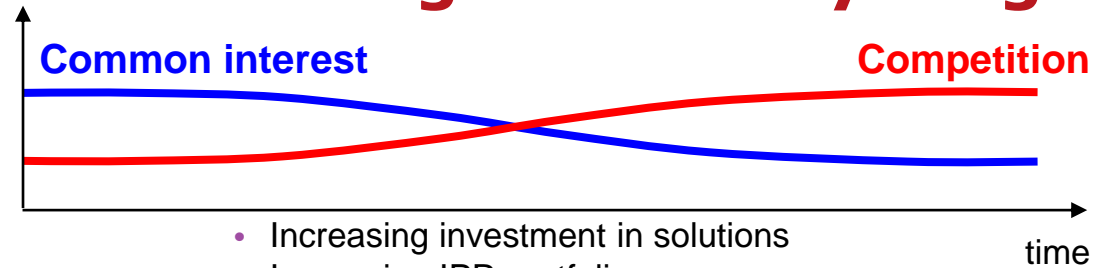
- **The "Transport" Challenge**

  - Urban and road traffic control; efficient trip management; vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications; the mobile office.

Source: Net!Works ETP.

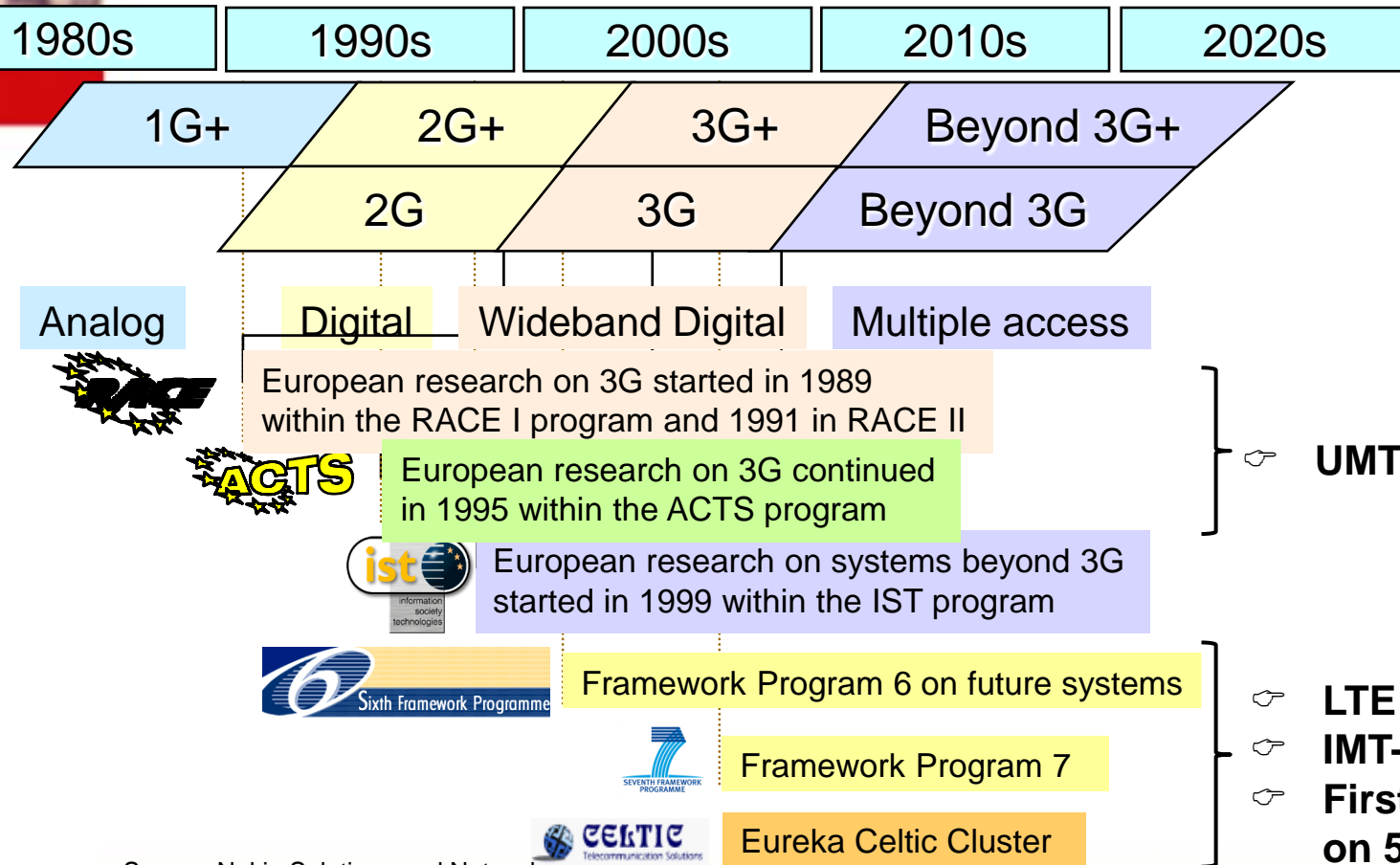the **Heartbeat** of a smarter Society

Collaborative research: International consensus building at an early stage

Common interest

Competition

- Increasing investment in solutions
- Increasing IPR portfolios

time

Chance for consensus building

Products and markets in competitive environment

Chance for consensus building decreasing

Pre-competitive early collaborative research

Standardization in early competitive environment

Grade of concept maturity

Increased maturity makes consensus building difficult

Increasing IPRs portfolios make consensus building difficult

IPRs

Source: Nokia Solutions and Networks.

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European research programs on mobile and wireless

1980s	1990s	2000s	2010s	2020s

1G+	2G+	3G+	Beyond 3G+
	2G	3G	Beyond 3G

Analog	Digital	Wideband Digital	Multiple access

European research on 3G started in 1989 within the RACE I program and 1991 in RACE II

European research on 3G continued in 1995 within the ACTS program

☞ **UMTS**

European research on systems beyond 3G started in 1999 within the IST program

Framework Program 6 on future systems

Sixth Framework Programme

Framework Program 7

SEVENTH FRAMEWORK PROGRAMME

CELTIC Telecommunication Solutions

Eureka Celtic Cluster

☞ **LTE**
☞ **IMT-Advanced**
☞ **First projects on 5G**

Source: Nokia Solutions and Networks.

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Success stories

1991

The development of the **GSM** standard was part of the early formation of the European Union at the level of technology and mobile communications. For the first time, a solution was developed for Europe and the world enabling users to roam internationally using only one phone. Europe pooled its R&D, industrial base and services to provide the user with a mobile world without national borders. This initiative and the further collaborative R&D created a new generation of technologists focused on European and global needs.

The GSM group was formed in 1982. GSM networks are now accessible in more than 85% of the world's land area.

First commercially introduced in 1991

2001

European research projects developed the key contributions to the **3G UMTS** standard in the '90's. 3G systems provide users with broadband multi-media mobile communications, including voice and video services, mobile Internet access, mobile TV services and machine to machine communications services. Key Framework Programme co-funded project:

FRAMES (FP 4)

First introduced in 2001

2010

European research projects developed key contributions to the **LTE system** in the '00's. **LTE** provides high speed mobile broadband connectivity to laptops, smart phones, tablet PC's and other mobile devices. On-line gaming services, streamed video and cloud computing services are brought to life by LTE.

The LTE service is already commercially available in Stockholm and is being introduced widely in European cities in 2011.

Key Framework Programme co-funded projects:

WINNER (FP 6),
WINNER II (FP 6)

First introduced in 2010

future

The technical basis for ultra high speed broadband and M2M communication using energy efficient techniques are research challenges being addressed in Framework Programme 7 projects at present. European research has to continue in Framework Programme 8 to ensure that European organisations further develop their leadership positions in communications technologies!

2025 and beyond

Source: Net!Works ETP.

Net!Works

Success stories on mobile communication

Net!Works

EUROPEAN RESEARCH & INNOVATION IN TELECOMMUNICATIONS

SUCCESS STORIES

MOBILE COMMUNICATIONS

An international success story which has it's origins in EU-funded research projects

The growth of mobile communications, since the launch of the GSM system on the market in 1991, has been phenomenal.
Mobile communications has changed people's lives for the better the world over by enabling people to communicate anytime and anywhere. Mobile communication drives productivity growth and economic performance across all sectors of the economy and is expected to continue to do so for many years to come. The services enabled by mobile networks made a strong contribution to the rapid growth in the ICT sector in Europe and generated several million new jobs. The results of Framework Programme research projects have played a key role in enabling this growth. The projects developed the basic concepts, processes and product innovations, contributing to several generations of mobile communication systems and services (e.g. GSM, UMTS, DVB, LTE and IMT-Advanced), over a twenty-five year period.

The introduction of mobile technology accelerated the global growth in the ICT sector. The Information and Communication Technologies (ICT) sector now generates 5% of European GDP, with an annual value of € 660 billion. ICT has become a ubiquitous technology and investments in ICT are responsible for at least 50% of European productivity growth in recent years.

We can already see a dramatic increase in data traffic on converged mobile and fixed communications networks generated by smart city, smart energy, environmental monitoring and ehealth applications. By 2020, enormous growth in network traffic is expected. The European success story resulting from the investment in collaborative research projects is certain to continue for many years to come, if Europe continues to invest in collaborative research!

MANY OF THE BASIC CONCEPTS AND TECHNOLOGIES USED IN THE 3G UMTS STANDARDS AND THE NEWER LTE STANDARD HAD THEIR ORIGINS IN FRAMEWORK PROGRAMME COLLABORATIVE RESEARCH PROJECTS, CO-FUNDED BY THE EUROPEAN UNION.

The investment of Framework Programme funds in mobile communications research has contributed strongly to job creation in Europe and improvements in living standards and economic growth on a global scale. The level of return on investment achieved by the key collaborative research projects has few, if any, parallels in other sectors and contributes to the export power of European industry. Collaborative research provides an environment in which many stakeholders (competitors, customers and research experts) can cooperate to prepare consensus before global standardisation starts.
Collaboration provides the opportunity to quickly exploit research results through standardisation, leading to the global deployment of new ICT systems.

Source: Net!Works ETP.

Net!Works HISTORY OF MOBILE COMMUNICATIONS

1991 | The development of the GSM standard was part of the early formation of the European Union at the level of technology and mobile communications. For the first time, a solution was developed for Europe and the world enabling users to roam internationally using only one phone. Europe pooled its R&D, industrial base and services to provide the user with a mobile world without national borders. This initiative and the further collaborative R&D created a new generation of technologists focused on European and global needs. The GSM group was formed in 1982. GSM networks are now accessible in more than 85% of the world's land area.

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• FRAMES (FP 4)

First introduced in 2001

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Key Framework Programme co-funded projects:
• WINNER (FP 6),
• WINNER II (FP 6)

First introduced in 2010

FUTURE | The technical basis for ultra high speed broadband and M2M communication using energy efficient techniques are research challenges being addressed in Framework Programme 7 projects at present. European research has to continue in Framework Programme 8 to ensure that European organisations further develop their leadership positions in communications technologies!

2025 and beyond

THIS LEAFLET IS DESIGNED AND PRINTED THANKS TO FUNDING FROM THE EUROPEAN'S COMMUNITY SEVENTH FRAMEWORK PROGRAMME (FP7) (2007-2013) UNDER GRAND AGREEMENT N° 317705

www.networks-etp.eu
netsoc.future-internet.eu

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Success stories on optical communication and broadband access

11

Source: Net!Works ETP.

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Importance of the ICT and networking sector for society and economy

- According to Bitkom worldwide ICT market volume increased in 2010 by nearly 5% to about 2500 Billion €

- Biggest ICT market are USA with market share of 28.7 %

- For example Germany with 5.1% global market share is No. four after the USA, Japan and China

World market share for ICT in 2010 without consumer electronics

28.7 % USA

5.1 % Germany

9.3 % Japan

8.1 % China

28.7 % Rest of World

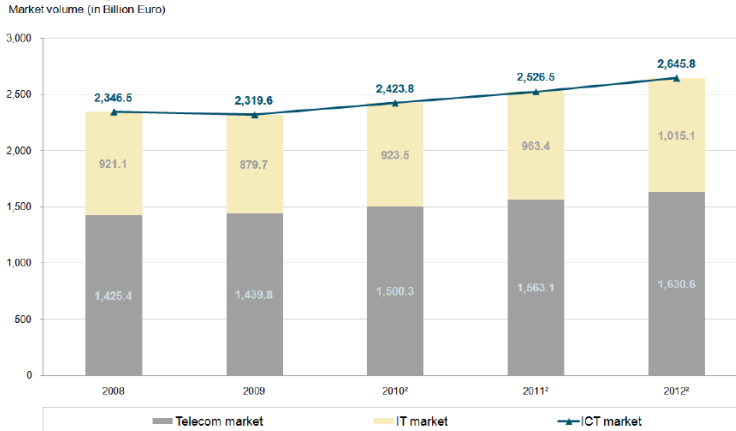20.1 % EU25 (without Germany)
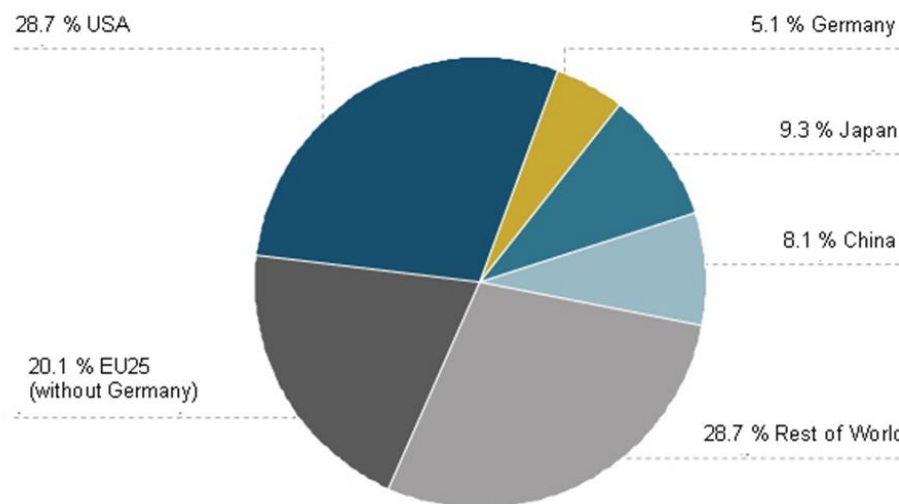
BITKOM: Basis EITO

Source: Bitkom: Bitkom Branchenbarometer 2012,
http://www.bitkom.org/de/markt_statistik/64074_64903.aspx.

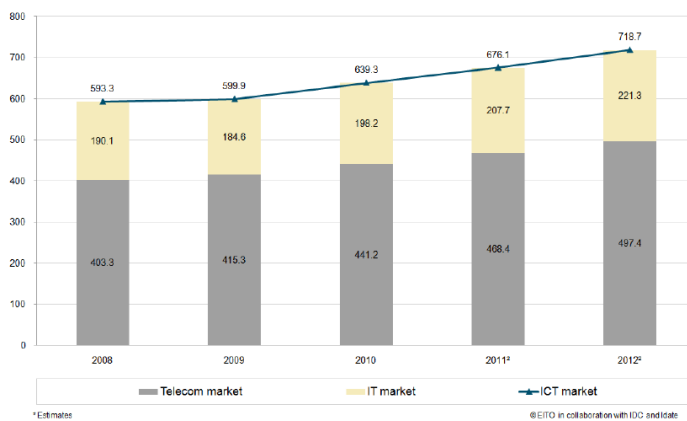the **Heartbeat** of a smarter Society

Global ICT market I

World ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

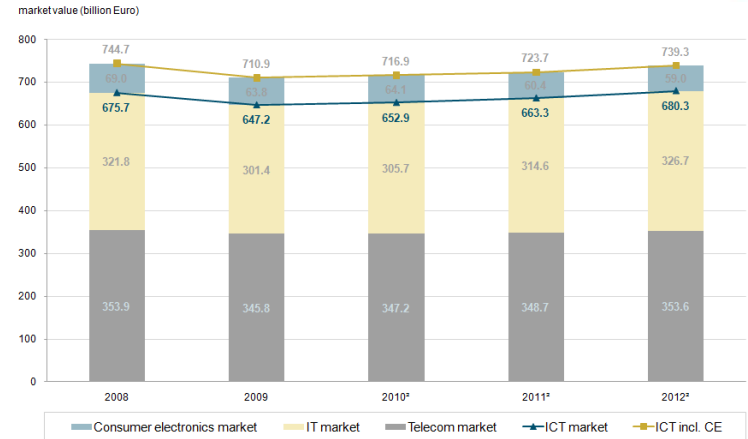**EU25** ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

APAC ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

USA ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

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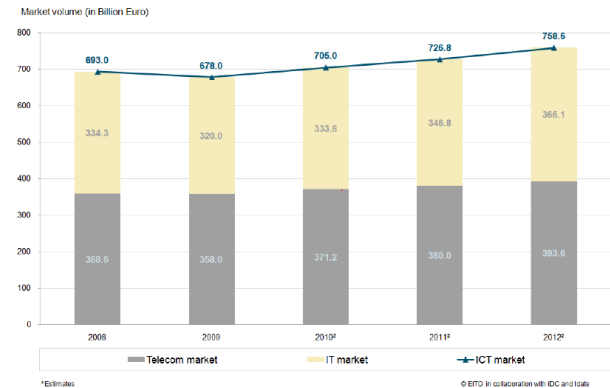# Global ICT market II

Brazil ICT market value 2008 – 2012 *
* Data and forecast are based on information available as of May 2011

Russia ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

India ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011
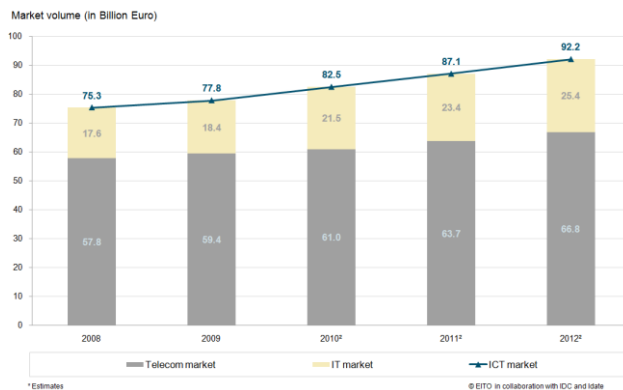Source: EITO Report including Consumer Electronics. 2011.

China ICT market value 2008 – 2012*
* Data and forecast are based on information available as of May 2011

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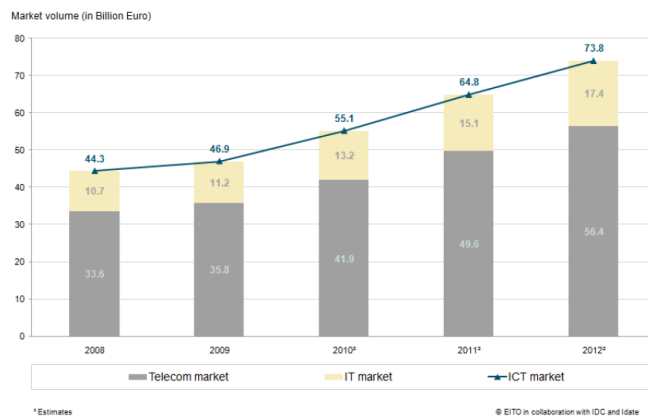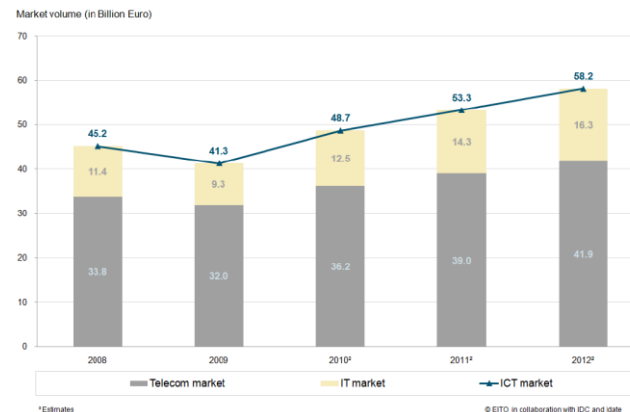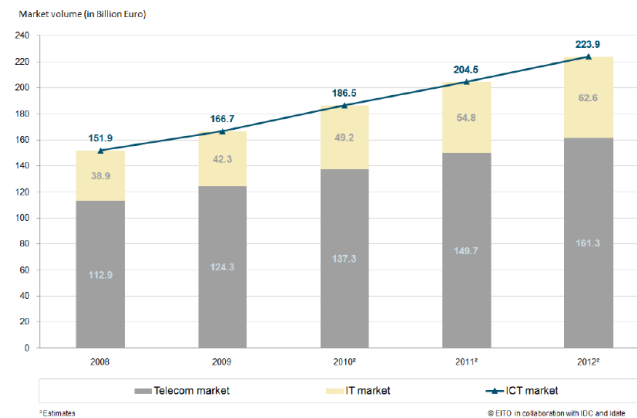# Economic weight of the ICT sector
% of sector's value added in GDP
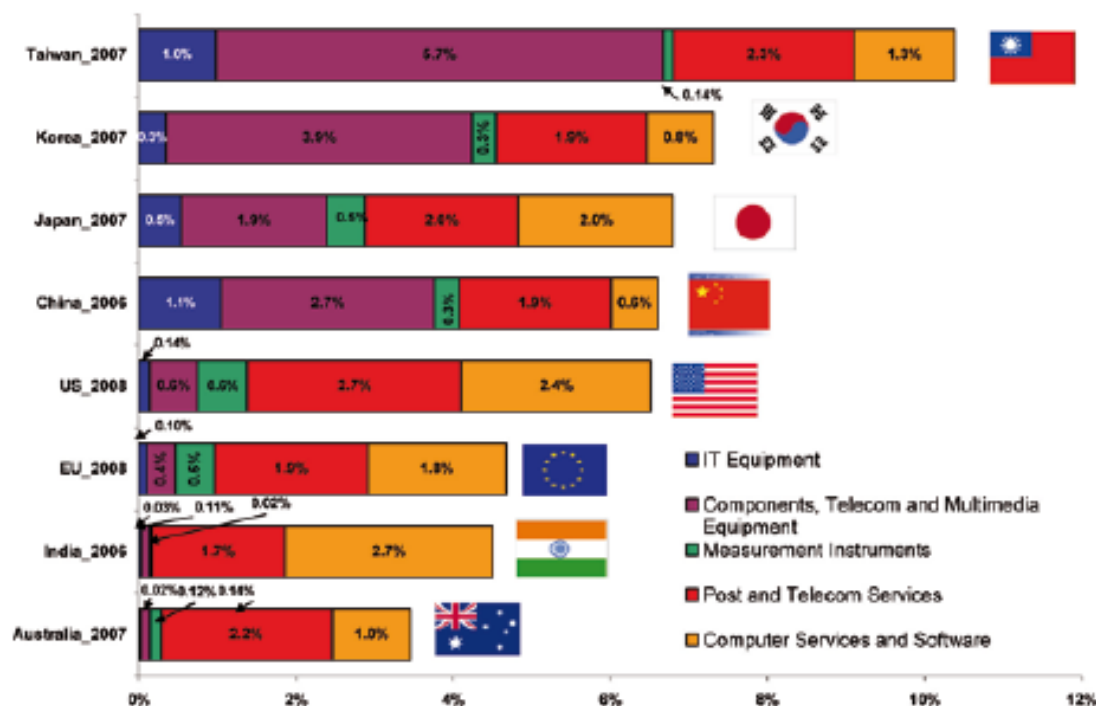
Source: JRC-IPTS based on data from EUROSTAT, OECD, EU KLEMS, and IPTS.[13]

Source: Joint Research Center of the European Commission: The 2011 Report on R&D in ICT in the European Union, 2011, http://ftp.jrc.es/EURdoc/JRC65175.pdf.

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Importance of the ICT and networking sector on economic growth

Source: Qiang 2008.

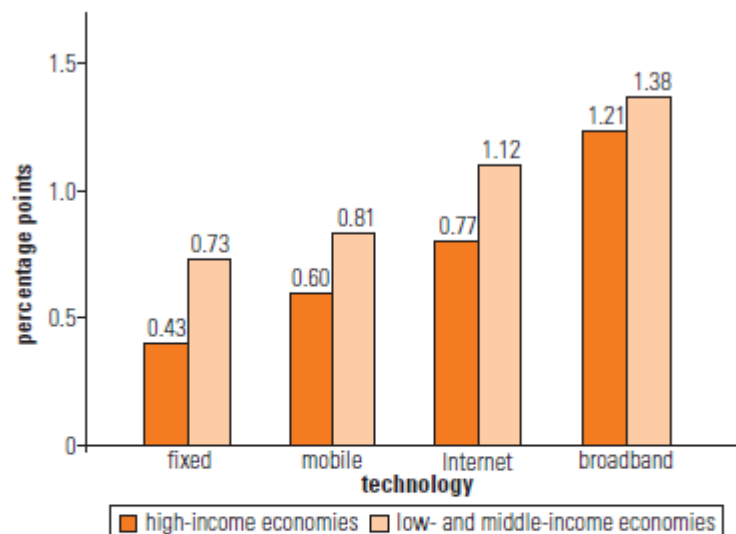**Note:** The y axis represents the percentage-point increase in economic growth per 10-percentage-point increase in telecommunications penetration. All results are statistically significant at the 1 percent level except for that of broadband in developing countries, which is at the 10 percent level.

Source: Worldbank, Information and Communication for Development: Extending Reach and Increasing Impact – Economic impacts of broadband, 2009, http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf.

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OECD Key ICT indicators: Contributions of ICT investment to GDP growth, 1990-95 and 1995-2003 (1), in percentage points
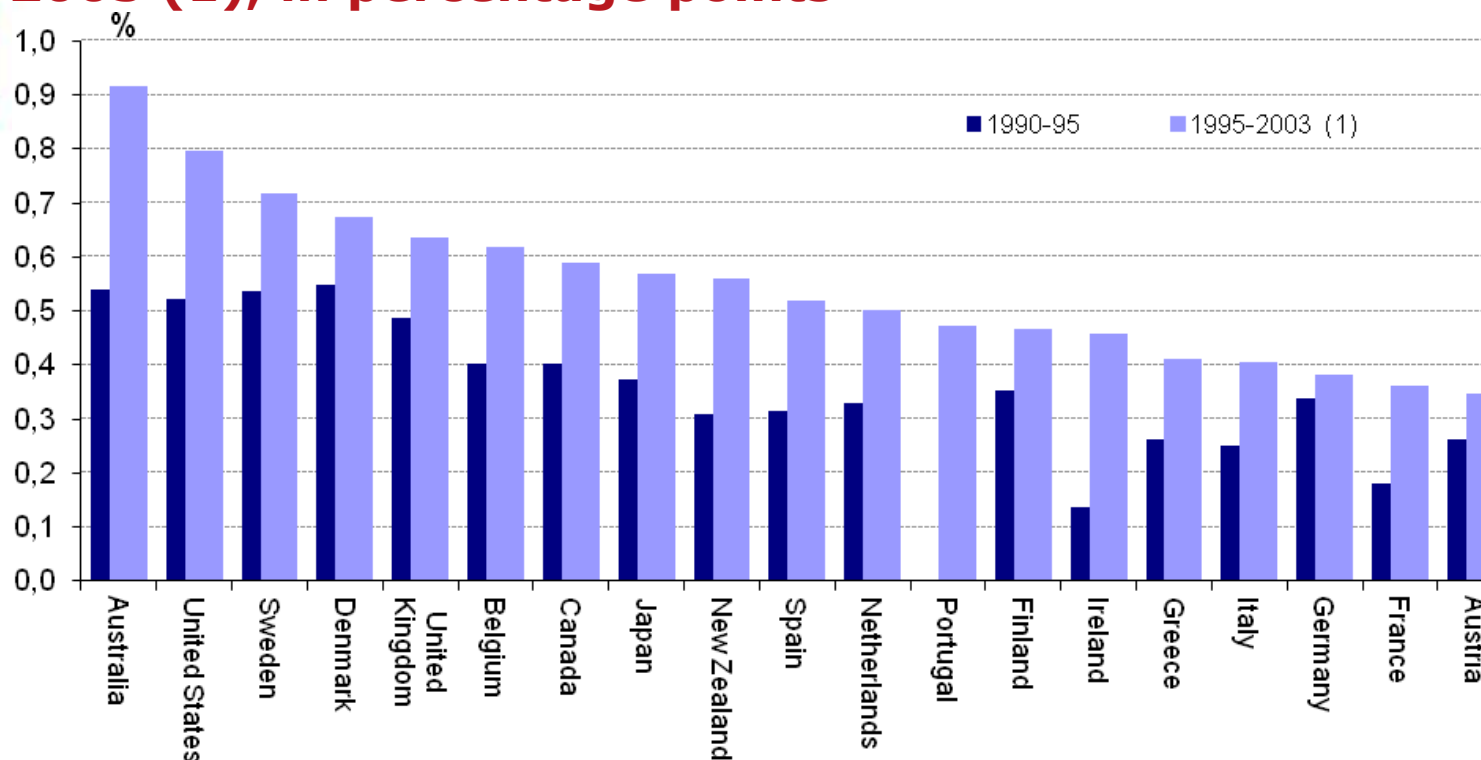

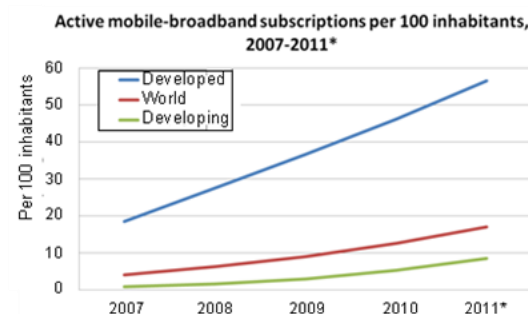1) 1995 – 2002 for Australia, France, Japan, New Zealand and Spain

Source: OECD Productivity Database, September 2005, http://www.oecd.org/statistics/productivity.

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Penetration rates for different networking technologies

- ITU is supporting these expectations, where the number of subscribers if growing globally

Global ICT developments, 2001-2011*
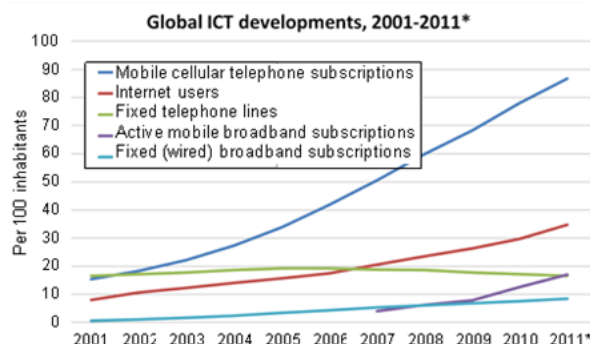
* Estimate
Source: ITU World Telecommunication / ICT Indicator database

Active mobile-broadband subscriptions per 100 inhabitants, 2007-2011*

* Estimates
The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html
Source: ITU World Telecommunication / ICT Indicator database

Active mobile-broadband subscriptions per 100 inhabitants, 2011*
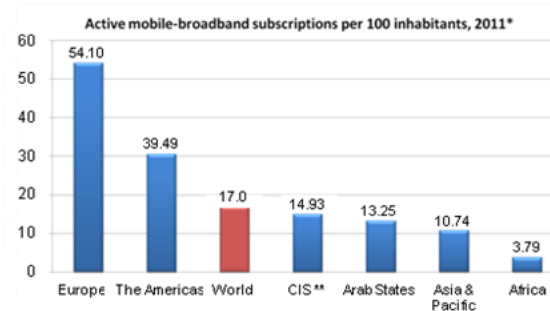
* Estimates
** Commenwealth of Independent States
Regions are based on the ITU BDT Regions, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html
Source: ITU World Telecommunication / ICT Indicator database

Source: ITU, http://www.itu.int/ITU-D/ict/statistics.

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Worldwide Internet audience Status: June 2012

- The global Internet with more than 2.4 billion users globally

North America:
273.8 million (11.4 %)

Europe:
518.5 million (21.5 %)

Asia Pacific:
1100.9 million (45.8 %)

Latin America:
254.9 million (10.6 %)

Middle East & Africa:
257.3 million (10.7 %)
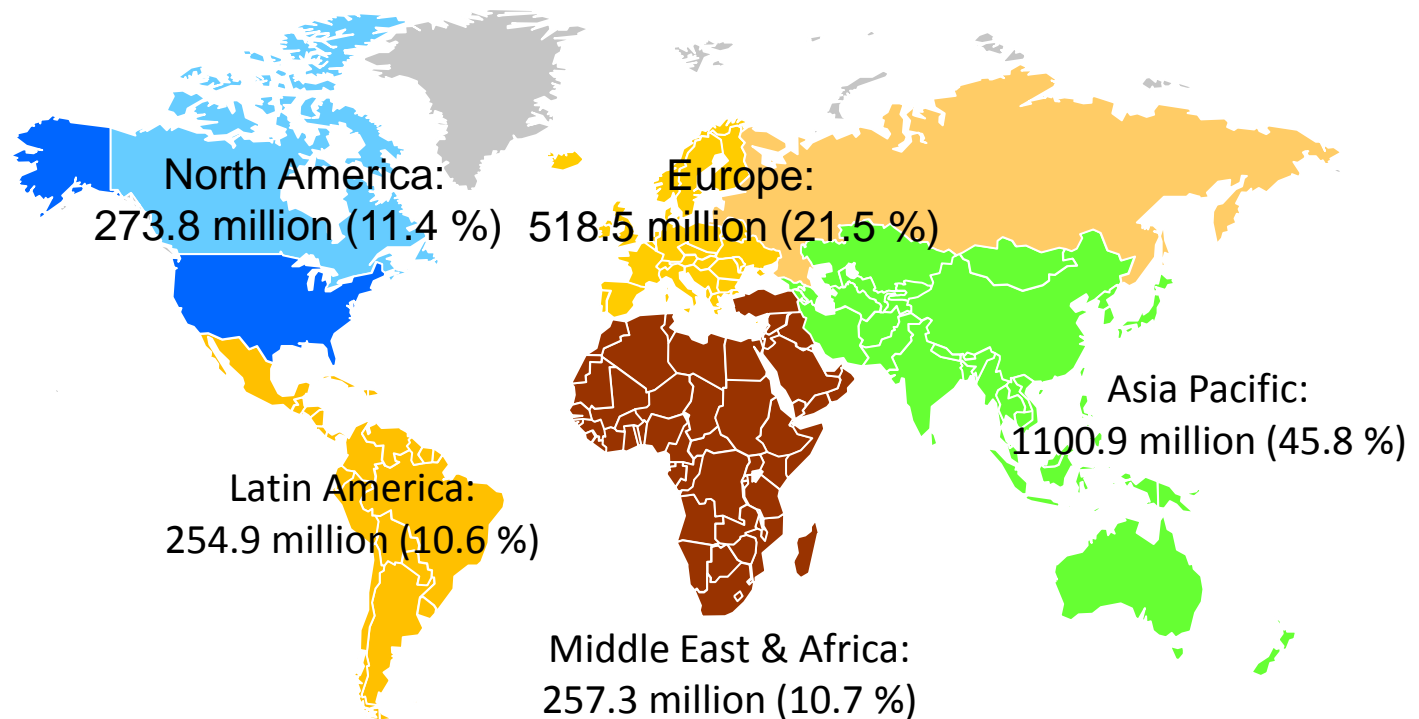
Source: Internet statistics: http://www.internetworldstats.com.

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Consumer Internet traffic growth forecast

Exabytes per Month

78% CAGR 2011–2016

Other Portable Devices (2.2%)
M2M (4.7%)
Home Gateways (4.8%)
Non-Smartphones (5.7%)
Tablets (10.0%)
Laptops and Netbooks (24.2%)
Smartphones (48.3%)
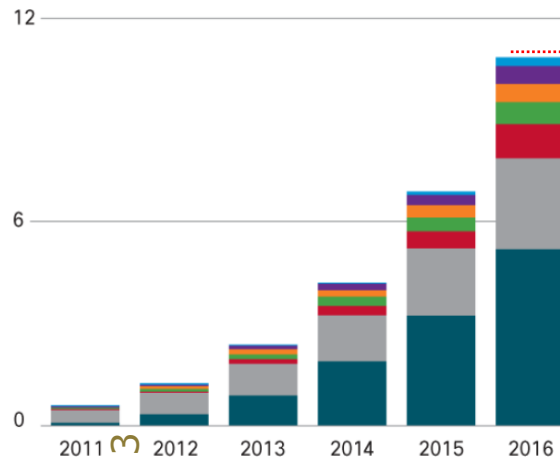
Figures in legend refer to traffic share in 2016.
Source: Cisco VNI Mobile, 2012

Exabytes per Month

22%

78%

Offload Traffic from Mobile Devices
Cellular Traffic from Mobile Devices
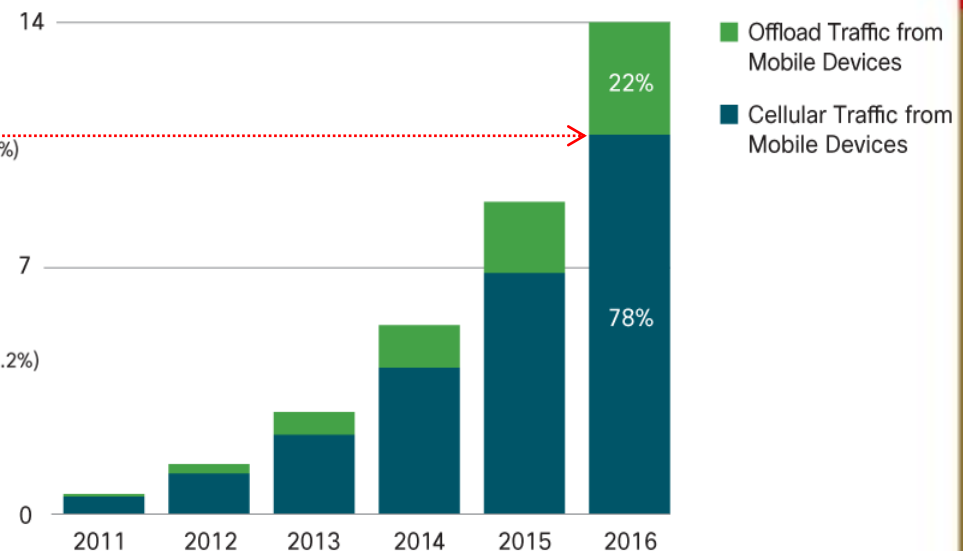
Source: Cisco VNI Mobile, 2012

Source: Cisco: Cisco Visual Networking Index: Forecast and Methodology, 2011–2016, February 2012, http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html#~forecast.

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LTE deployments and commitments

LteMaps shows all global LTE deployments commitments. It includes a variety of commitment levels including intentions to trial, deploy, migrate, etc. There is one ⬤ red marker per country for all operators to show commitments and one ⬤ blue marker to show actual deployments.

Source: Lte World: Global LTE Deployment Status, http://lteworld.org/blog/global-lte-deployment-status.

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Economic challenges for mobile broadband network deployment and operation

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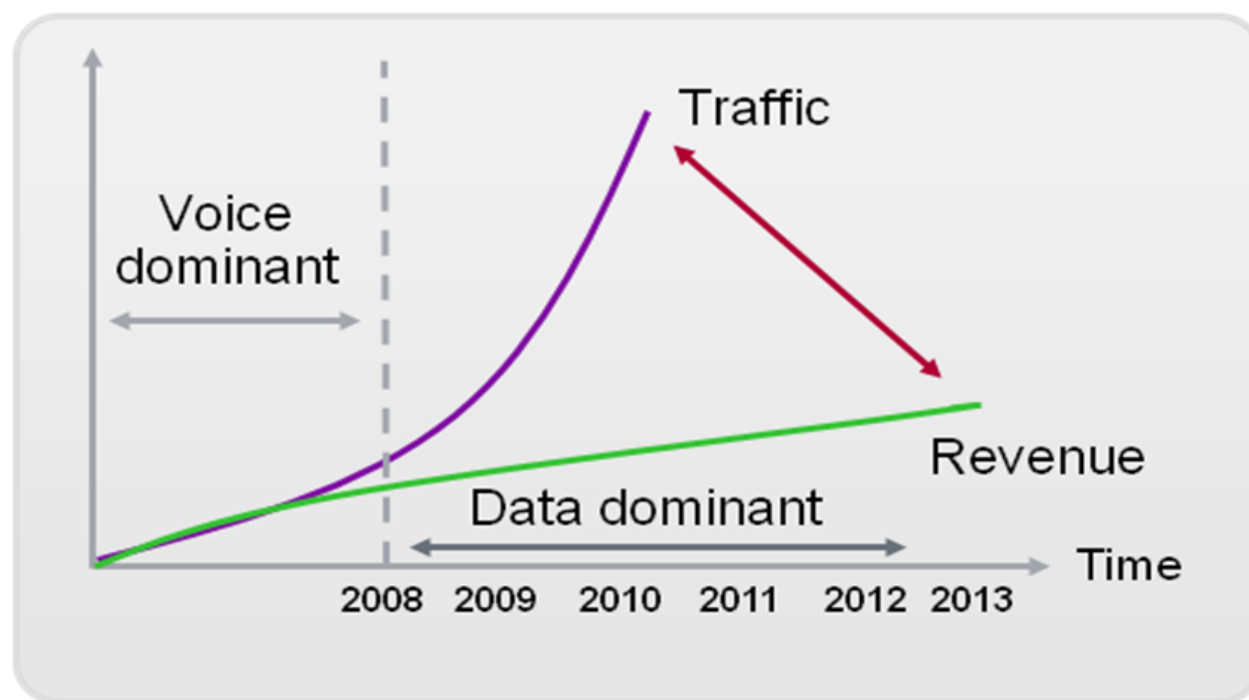
R&D intensities (R&D investment/net sales) in EU and US Scoreboard companies
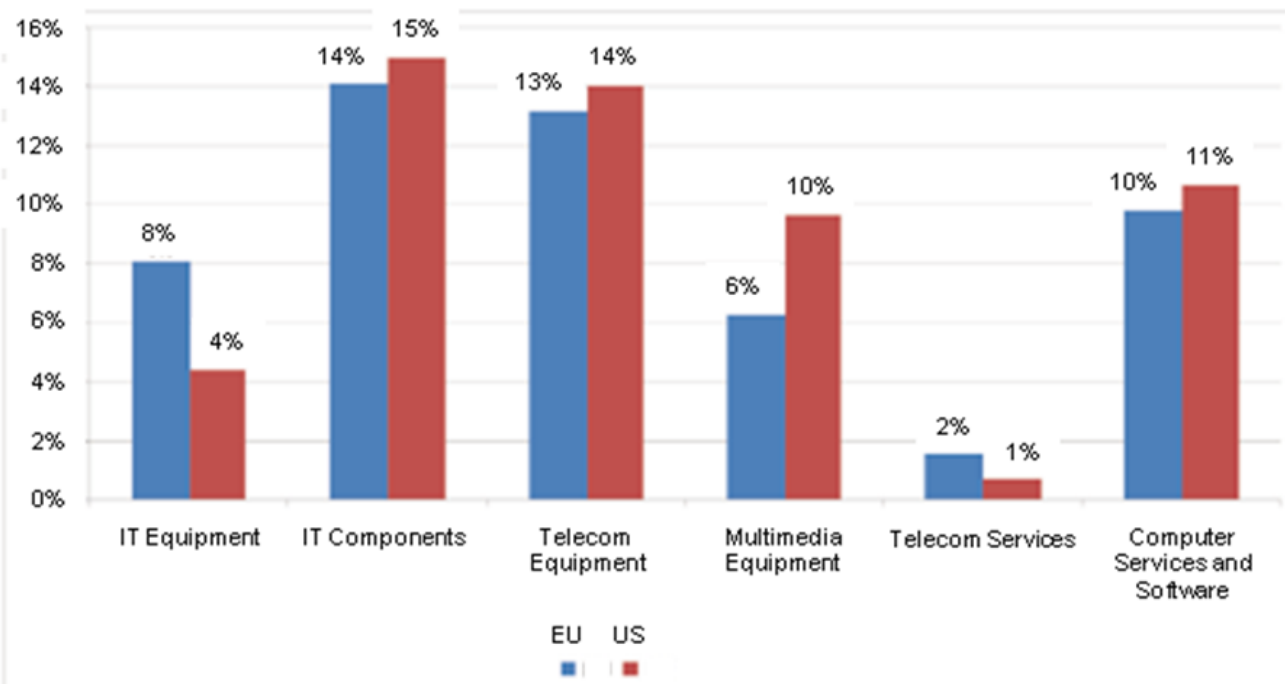
Note: the ICT Scoreboard is an extract of ICT companies from the 2009 EU Industrial R&D Investment Scoreboard.

Source: Joint Research Center of the European Commission: The 2011 Report on R&D in ICT in the European Union, 2011, http://ftp.jrc.es/EURdoc/JRC65175.pdf.

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Position paper on economic impact

Source: Net!Works ETP.

Communication networks R&I

Cooperation programme
STRENGTHEN

Basic Research

Industrial R&D

Invest into new research
PROMOTE

Link between cooperation and CIP
ESTABLISH

Commer-cialisation

Pilot Trials

Public procurement
DRIVE

Source: Net!Works ETP.

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Structure of Horizon 2020

- Horizon 2020 will address three priorities in one program
  - Excellent Science
  - Industrial Leadership
  - Societal Challenges

Excellent Science. This will raise the level of excellence in Europe's science base and ensure a steady stream of world-class research to secure Europe's long-term competitiveness. It will support the best ideas, develop talent within Europe, provide researchers with access to priority research infrastructure, and make Europe an attractive location for the world's best researchers.

Industrial Leadership. This will aim at making Europe a more attractive location to invest in research and innovation (including eco-innovation), by promoting activities where businesses set the agenda. It will provide major investment in key industrial technologies, maximise the growth potential of European companies by providing them with adequate levels of finance and help innovative SMEs to grow into worldleading companies.

Societal Challenges. This reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere. A challenge-based approach will bring together resources and knowledge across different fields, technologies and disciplines, including social sciences and the humanities. This will cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and support for public procurement and market uptake. It will include establishing links with the activities of the European Innovation Partnerships.

Source: Horizon 2020 Commission proposal, 2011 / Net!Works ETP.

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Excellent Science

- Support the most talented and creative individuals and their teams to carry out frontier research of the highest quality by building on the success of the *European Research Council*

- Fund collaborative research to open up new and promising fields of research and innovation through support for *Future and Emerging Technologies (FET)*

- Provide researchers with excellent training and career development opportunities through the *Marie Skłodowska-Curie actions15 ('Marie Curie actions')*

- Ensure Europe has world-class *research infrastructures (including einfrastructures)* accessible to all researchers in Europe and beyond

Source: Horizon 2020 Commission proposal, 2011.

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Societal Challenges

- Health, demographic change and wellbeing

- Food security, sustainable agriculture, marine and maritime research and the bio-economy

- Secure, clean and efficient energy

- Smart, green and integrated transport

- Climate action, resource efficiency and raw materials

- Inclusive, innovative and secure societies

- In this part ICT objectives for application domains

Source: Horizon 2020 Commission proposal, 2011.

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Industrial Leadership

- Build leadership in enabling and industrial technologies, with dedicated support for
  - **information and communication technologies**
  - Nanotechnologies
  - advanced materials
  - Biotechnology
  - advanced manufacturing and processing
  - Space
  - while also providing support for cross-cutting actions to capture the accumulated benefits from combining several Key Enabling Technologies
- Facilitate access to risk finance
- **Provide Union wide support for innovation in SMEs.**

Source: Horizon 2020 Commission proposal, 2011.

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Industrial Leadership

- An integrated approach to Key Enabling Technologies
    - ICT plays an important role as it embraces some of the KETs and provides the key basic infrastructures, technologies and systems for vital economic and social processes and new private and public products and services. European industry needs to remain at the cutting edge of technological developments in ICT, where many technologies are entering a new disruptive phase, opening up new opportunities.

- **Information and Communication Technologies (ICT)**
    - *A new generation of components and systems:* engineering of advanced and smart embedded components and systems
    - *Next generation computing:* Advanced computing systems and technologies
    - ***Future Internet:* Infrastructures, technologies and services**
    - *Content technologies and information management:* ICT for digital content and creativity
    - *Advanced interfaces and robots:* Robotics and smart spaces
    - *Micro- and nanoelectronics and photonics:* Key enabling technologies related to micro- and nanoelectronics and to photonics

Source: Horizon 2020 Commission proposal, 2011.

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SME support measures
Strengthening the participation of SMEs

- SMEs represent 85% of all actors in the creative industry sector

- SMEs have significant innovation potential and have the agility to bring revolutionary technological breakthroughs and service innovation to the market

- It is expected that around 15% of total budget will go to SMEs

- Access to risk finance will have a strong SME focus
    - For Debt facility
        - SME focus will be strengthened by working with financial intermediaries at national and regional levels to provide loans to single beneficiaries for investment in research and innovation
        - Guarantees to financial beneficiaries making loans to beneficiaries
    - The Equity facility
        - Focus on early-stage investments, while having the possibility to make expansion and growth-stage investments
        - Provide venture capital to individual enterprises in the early stage (start-up window)

Source: Horizon 2020 Commission proposal, 2011.

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Innovation in SMEs

- The SME instrument will cover all fields of science, technology and innovation

- Three phases will cover the whole innovation cycle

  - Phase 1: Concept and feasibility assessment
    SMEs will receive funding to explore the scientific or technical feasibility and the commercial potential of a new idea (proof of concept)

  - Phase 2: R&D, demonstration, market replication
    Research and development supported with particular focus on demonstration activities (testing, prototype, scale-up studies, design, piloting innovative processes, products and services, performance verification etc.) and market replication

  - Phase 3: Commercialisation
    This phase will provide support activities aiming to facilitate access to private capital and innovation enabling environments
    Measures promoting pre-commercial procurement and procurement of innovative solutions

Source: Horizon 2020 Commission proposal, 2011.

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Objectives for SME support

- Support for research intensive SMEs
  - Promotion of market-oriented innovation of R&D performing SMEs
  - Targets research intensive SMEs in high-technology sectors

- Enhancing innovation capacity of SMEs
  - Activities may include awareness raising, information and dissemination, training and mobility activities, networking and exchange of best practices, developing high quality innovation support mechanisms and services

- Supporting market-driven innovation
  - Enhancing innovation capacity of SMEs by improving framework conditions for innovation as well as tackling specific barriers preventing growth of innovative firms
  - Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design)

Source: Horizon 2020 Commission proposal, 2011.

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Horizon 2020 Regulation

Article 18

Small and medium-sized enterprises

1. Particular attention shall be paid to ensuring the adequate participation of, and innovation impact on, small and medium-sized enterprises (SME) in Horizon 2020. Quantitative and qualitative assessments of SME participation shall be undertaken as part of the evaluation and monitoring arrangements.

2. Specific actions shall be undertaken within the specific objective "Leadership in enabling and industrial technologies" set out in Point 1 of Part II of Annex I and each of the specific objectives under the priority "Societal challenges" set out in Points 1 to 6 of Part III of Annex I. These specific actions shall take the form of a dedicated SME instrument that is targeted at all types of SMEs with an innovation potential and shall be implemented in a consistent manner and tailored to the needs of SMEs as set out under the specific objective "Innovation in SMEs" in Point 3.3.(a) of Part II of Annex I.

3. The integrated approach set out in paragraphs 1 and 2 is expected to lead to around 15% of the total combined budget for the specific objective on "Leadership in enabling and industrial technologies" and the priority "Societal challenges" going to SMEs.

Source: Horizon 2020 Commission proposal, 2011.

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Net!Works

Horizon 2020 Work Program
2014: Support the growth of ICT innovative Creative Industries SMEs

- SMEs co-exist with global players and often face difficulties in adopting state of the art ICT technologies and accessing finance

- Operation on fragmented and localised target markets

- ICT tools and technological innovation fundamental for the creative industries and their competitiveness

- Goal to increase competitiveness of European creative industries by
    - stimulating ICT innovation in SMEs
    - effectively building up and expanding a vibrant EU technological ecosystem for creative industries' needs and
    - fostering exchanges between the creative industries SMEs and providers of ICT innovative solutions

- Scope to stimulate the adoption and deployment of innovative ICT solutions by creative industries SMEs

Source: Horizon 2020 Draft Work Program.

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Horizon 2020 Work Program
2014-15: Open Disruptive Innovation Scheme (ODI)

- Specific Challenge to provide support to a large set of early stage high risk innovative SMEs for fast prototyping and replication of innovative ideas

- Objective of ODI is threefold
  - Nurture promising innovative ideas and enable co-creativity in innovative solutions
  - Support their development and demonstration
  - Help for wider deployment or market uptake

- Scope: ODI scheme specifically designed to foster innovative bottom-up ideas to support validation, fast prototyping and demonstration of disruptive innovation

- Support actions to support exploitation and commercialisation

Source: Horizon 2020 Draft Work Program.

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Conclusions

- Europe has a long history of successful collaborative research framework programs

- Basic concepts of several globally accepted standards in the ICT domain were developed in collaborative research projects and exploited in global standardisation

- ICT and in particular access to broadband communication has positive impacts on economic growth and the creation of new businesses

- Europe is now launching a new framework program "Horizon 2020"

- Support of SMEs has special attention by means of specific measures like access to finance to support the different steps for research, development and market introduction

Source: Net!Works ETP.

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