

# *ICT in aging and dementia research: a European perspective*

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## The Health Challenge in the EU

- About 10% of people aged over 65 have Alzheimer's disease; worldwide, around 35 million people with dementia.
- Cost of dementia: estimated at >€170 billion in Europe in 2008; > \$172 billion in USA in 2010.
- Parkinson's disease: prevalence around 1.6% of people aged over 65 years; according to the WHO: > 5 million patients worldwide, > 2 million in Europe.
- Cost of Parkinson's disease in Europe: about €20 billion per year.
- More than 15 million people worldwide suffer each year from stroke.
- Cost of stroke in EU: > €38 billion in 2006.
- Worldwide mortality due to diseases related to liver: 1.5 million.
- Market for liver support: estimated to be > \$2 billion worldwide.



### Pillar VII: ICT-enabled benefits for EU society

Digital technologies have enormous potential to benefit our everyday lives and tackle social challenges. The Digital Agenda focuses on ICTs capability to reduce energy consumption,

**support ageing citizens' lives,  
revolutionises health services  
and deliver better public services**



## Three main Target Outcome areas:

- (a) **Personal Health Systems for remote management of diseases, treatment and rehabilitation**, outside hospitals and care centres. This target outcome addressed in turn 3 specific application domains: *(a1) Neurodegenerative diseases, (a2) Rehabilitation of stroke and neurological conditions and (a3) Liver failure.*
- (b) **Intelligent systems for the analysis of multi-parametric data**, with projects *focusing exclusively on the analysis of multi-parametric data*, in the context of Personal Health Systems for prevention or remote management of diseases.
- (c) **Coordination and Support Action**, to deliver *roadmaps* for research and support to wide use of mobile eHealth (*mHealth*) for lifestyle and disease management.

# ICT and Public Health Systems

- User perspective
  - Information: best available evidence
  - Access to services and resources
  - Delivery of services
  - Evaluation of performance
  - ...

- Operator perspectives
  - Physician
    - management of clinical data
    - access to services and resources
    - access to expert systems
    - care delivery and monitoring
  - Manager
    - Collection of extensive datasets
    - Monitoring of performances
    - Cost/effectiveness assessment

# Research support for e-infrastructures

## **Five Thematic Priorities for future research:**

The origins of neurodegenerative disease

Disease mechanisms and models

Disease definitions and diagnosis

Developing therapies, preventive strategies and interventions

Healthcare and social care





## THE GRAND VISION

A Worldwide e-Infrastructure for Computational Neuroscientists





## ARTICLE

# The use of grid computing to drive data-intensive genetic research

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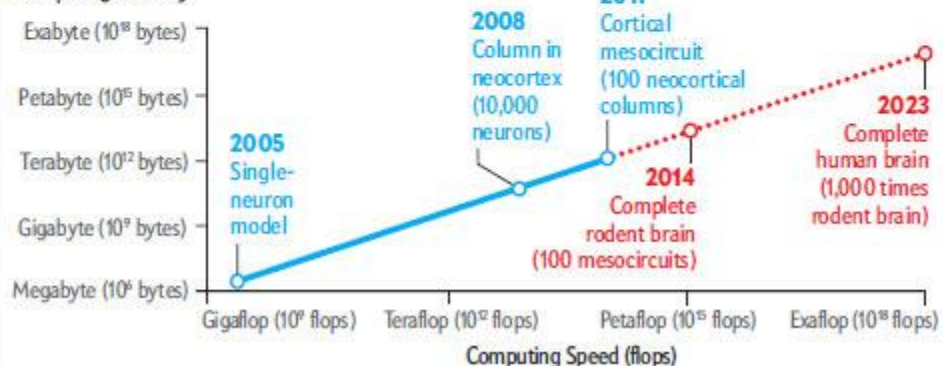


## POWER OF THE EXAFLOP

### More Computer = More Brain

The ability to simulate the brain in enough detail to carry out vital scientific research will grow with computer power. A digital facsimile of a cylindrical piece of tissue in the rat cortex became a reality in 2008, when speed was clocked in teraflops. As computers climb to the peta and exa scales, the Human Brain Project envisages full-brain simulations of a mouse and of the same species that conceived *Hamlet* and Einstein's general theory of relativity.

#### Computing Memory



February 17, 2013

# Obama Seeking to Boost Study of Human Brain

By JOHN MARKOFF

The Obama administration is planning a decade-long scientific effort to examine the workings of the human brain and build a comprehensive map of its activity, seeking to do for the brain what the Human Genome Project did for genetics.

The project, which the administration has been looking to unveil as early as March, will include federal agencies, private foundations and teams of neuroscientists and nanoscientists in a concerted effort to advance the knowledge of the brain's billions of neurons and gain greater insights into perception, actions and, ultimately, consciousness.

Scientists with the highest hopes for the project also see it as a way to develop the technology essential to understanding diseases like Alzheimer's and Parkinson's, as well as to find new therapies for a variety of mental illnesses.

Moreover, the project holds the potential of paving the way for advances in artificial intelligence.

The project, which could ultimately cost billions of dollars, is expected to be part of the president's budget proposal next month. And, four scientists and representatives of research institutions said they had participated in planning for what is being called the Brain Activity Map project.

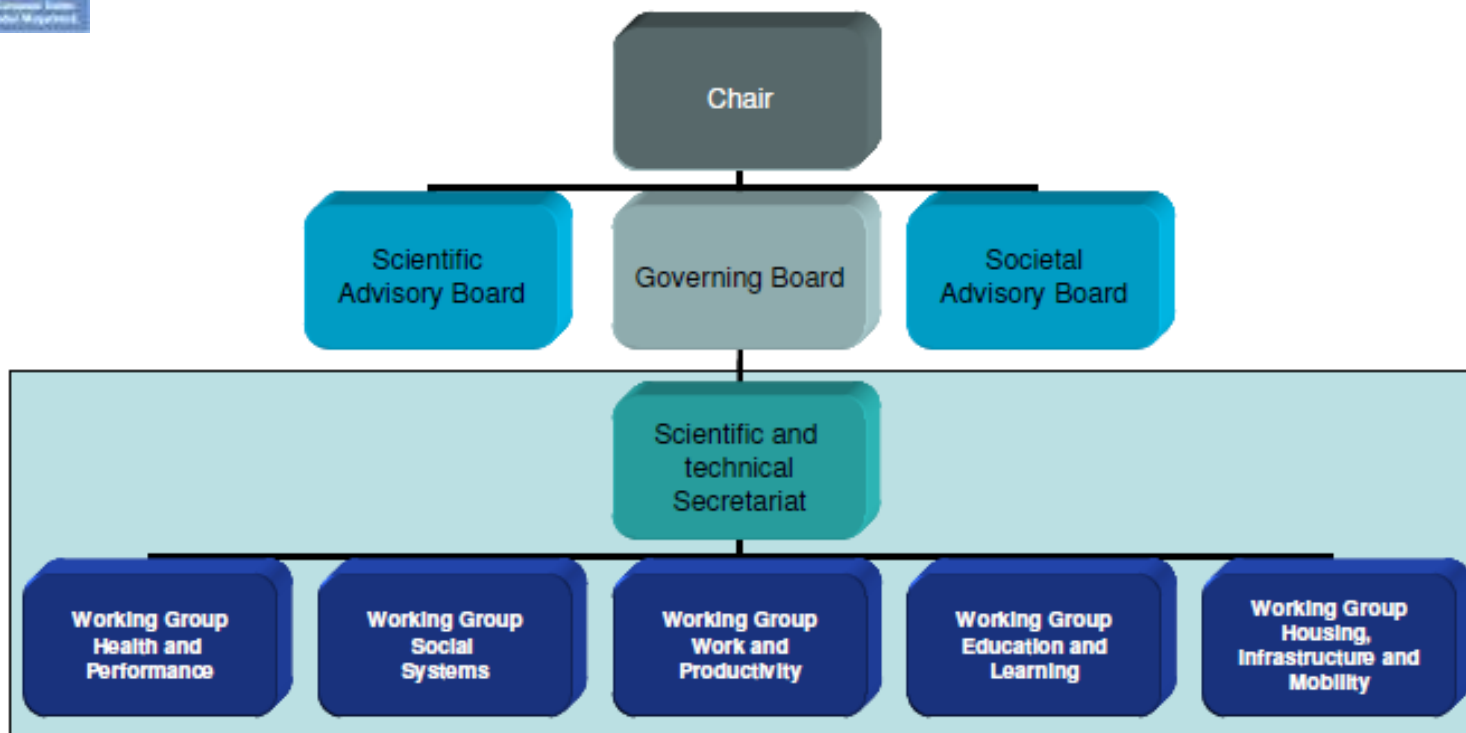


# **The Joint Programming Initiative “More Years, Better Lives” The Potential and Challenges of Demographic Change**

Christian Wehrmann

Secretariat of the JPI MYBL

**GPC Meeting, 15<sup>th</sup> of March 2011, Brussels**





# ICT and unmet needs

(Lauriks et al., 2007)

Needs areas	Specific themes
1. Need for general and personalized information	A. Information on dementia B. Information on service offerings C. Information on legal and financial issues and on care and support services D. Information on personal condition, care appointments and care planning
2. Need for support with regard to symptoms of dementia	A. ICT compensation for disabilities such as memory problems in daily life activities B. ICT supporting the carer, flexibly and personalized, in providing instrumental care to the person with dementia C. ICT-support for people with dementia and carers regarding behavioral and psychological changes and how to cope with them D. Emotional support for patients and carers
3. The need for social contact and company for the person with dementia	Ways to stay connected with family, friends and the social environment and to be useful
4. The need for health monitoring and perceived safety for the person with dementia	The need to be cared for and to be safe when the disease progresses



social care  
institute for excellence

## Using ICT in activities for people with dementia:

A short guide for social care providers



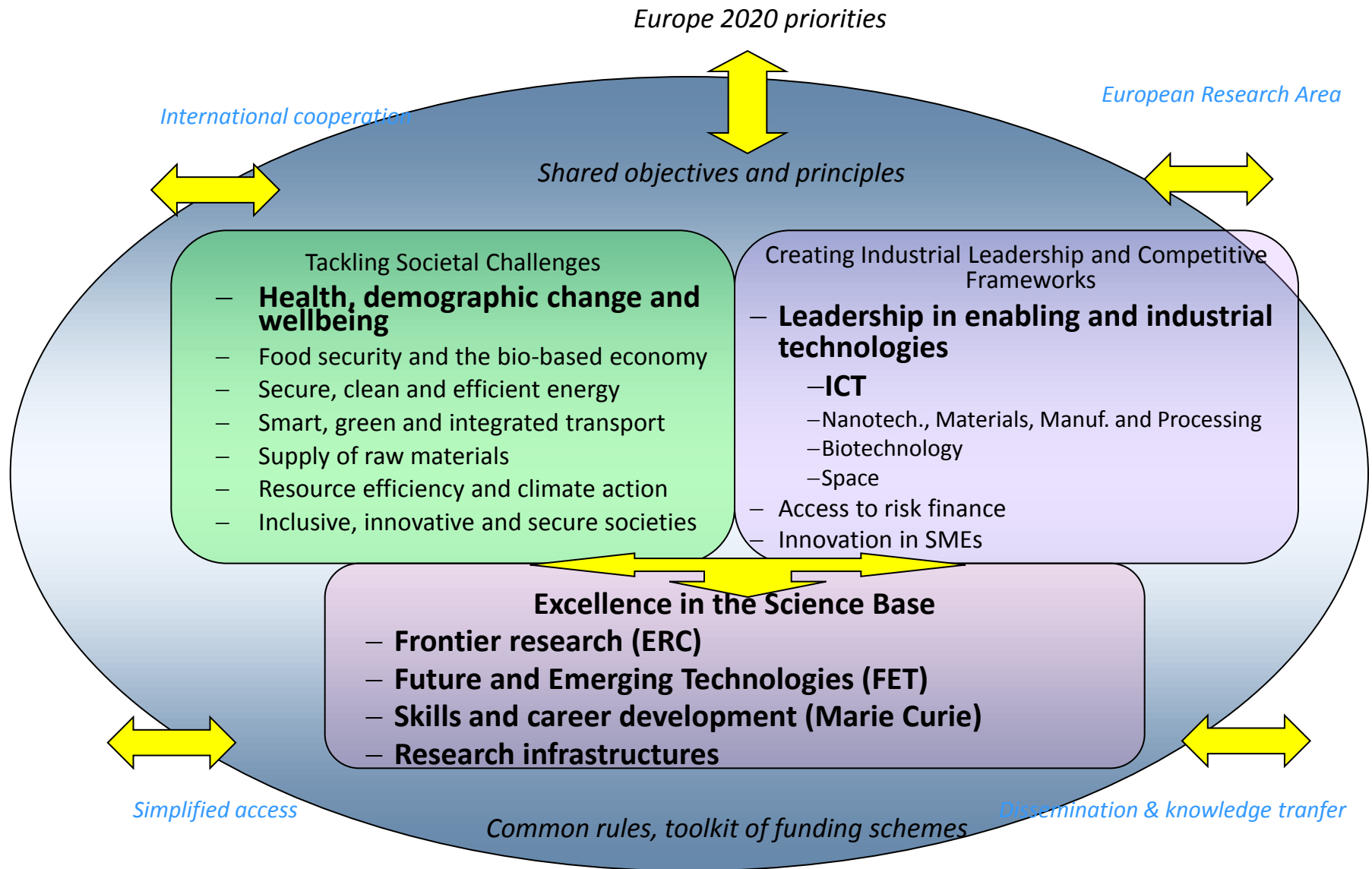


THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

# HORIZON 2020

The image is a promotional graphic for the Horizon 2020 research and innovation framework programme. It features a vibrant blue background with a view of the Earth's horizon from space. A bright sun or light source is positioned behind the horizon, creating a lens flare effect with rays of light. A small, transparent globe of the Earth is placed in the center, acting as the letter 'O' in the word 'HORIZON'. The text 'HORIZON 2020' is written in a clean, white, sans-serif font across the middle of the image. The overall composition is symmetrical and conveys a sense of global unity and forward-looking vision.

# Horizon 2020 – Objectives and structure



# •Societal challenge

## •Challenge 1: Health, demographic change and wellbeing (I)

- Using in-silico medicine for improving disease management and prediction.
  - Computer simulation using patient data
- Transferring knowledge to clinical practice and scalable innovation actions.
  - Transferring BMI knowledge to application
- Better use of health data
  - Data processing, KM, modelling and visualisation

- Individual empowerment for self-management of health

- Personalised health technologies and services

- Active aging, independent and assisted living

- User friendly solutions for ageing population

- Promoting integrated care

- Innovative solutions supporting the management of chronic disease

- Optimising the healthcare systems

- Disseminating innovative technologies and approaches

# Critical issues

- Usability
  - ICT literacy and inequalities
  - Individual, meso and macro availability
  - Customization
- Scalability
  - From pilot studies to real life applications
  - What is available and how it could develop

- Sustainability
  - Demographic challenges and cost/benefit
  - Individual, meso and macro sustainability
- Intellectual property
  - Beyond images...
  - The right of discovery
- Privacy and ethical issues
  - Brain reading
  - Pre-clinical diagnosis and risk profiling