NMP Work Programme Overview

EUROPEAN COMMISSION - DG Research

Hans BRELEN

G2 « New Generation Products »

ToGEthe® SINCE 1957

SEVENTH FRAMEWORK PROGRAMME

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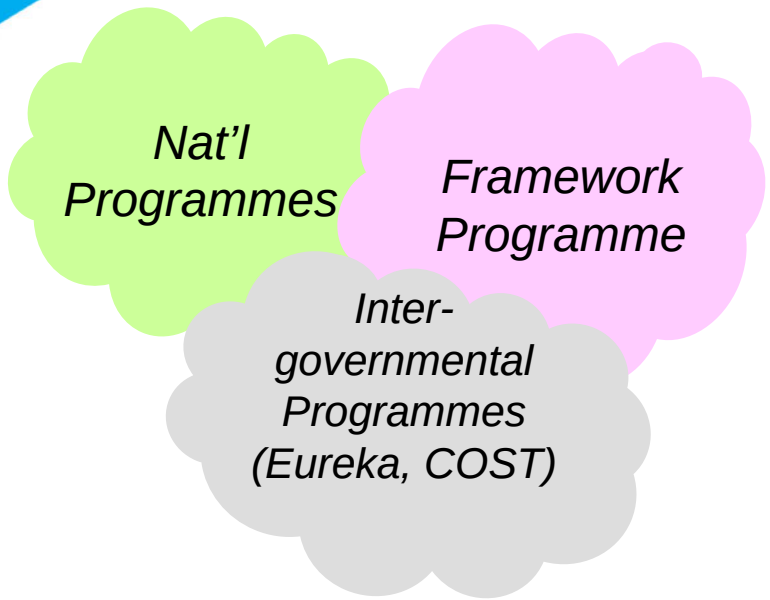
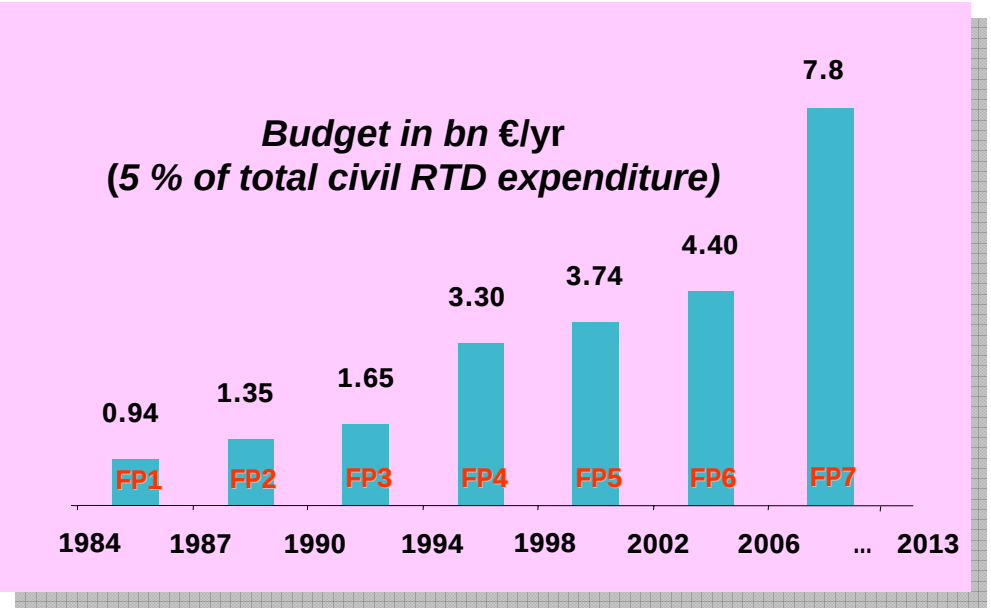
Vision and Aim: Building the European Research Area





A "single market" for research

- An area for the free movement of knowledge, researchers & technology
- Aiming to increase co-operation, aggregate fragmented efforts, achieve better allocation of resources

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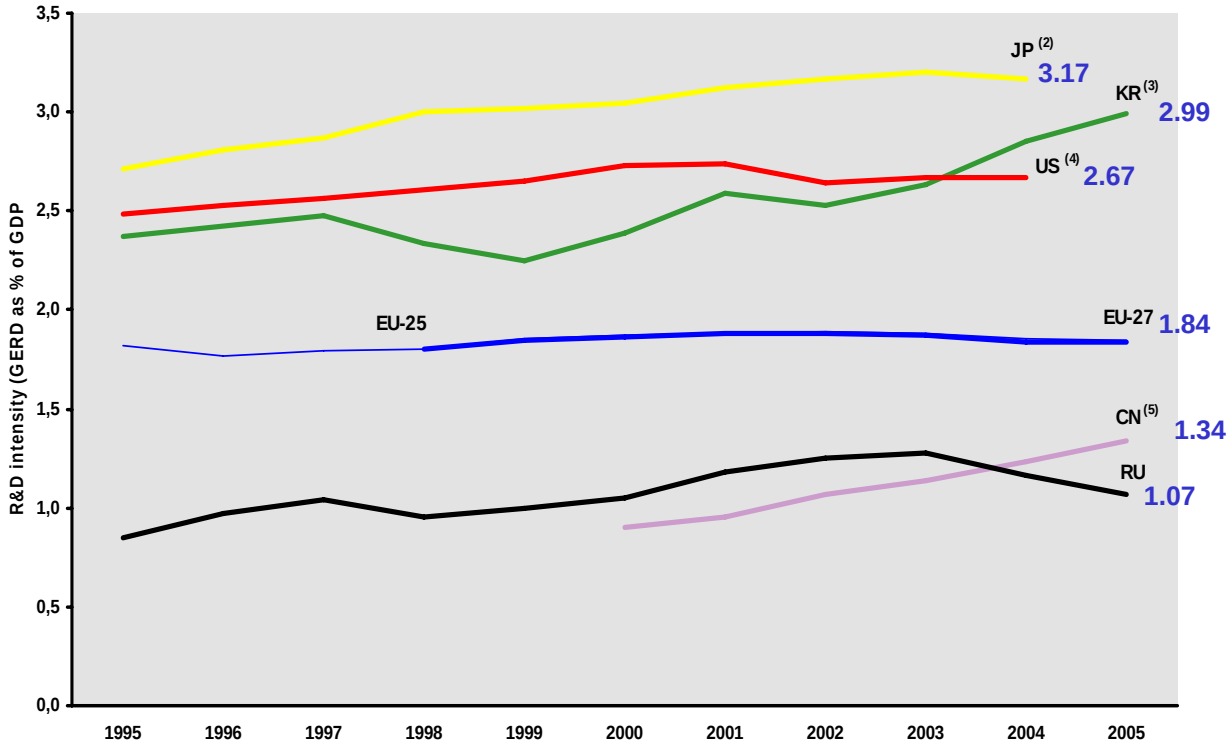
Europe's RTD intensity as world competitor

% GDP

Figure I.1.1 R&D ir

RTD intensity in world regions



Source: "Key RTD Figures 2007 on Science, Technology and Innovation" - Towards a European knowledge Area

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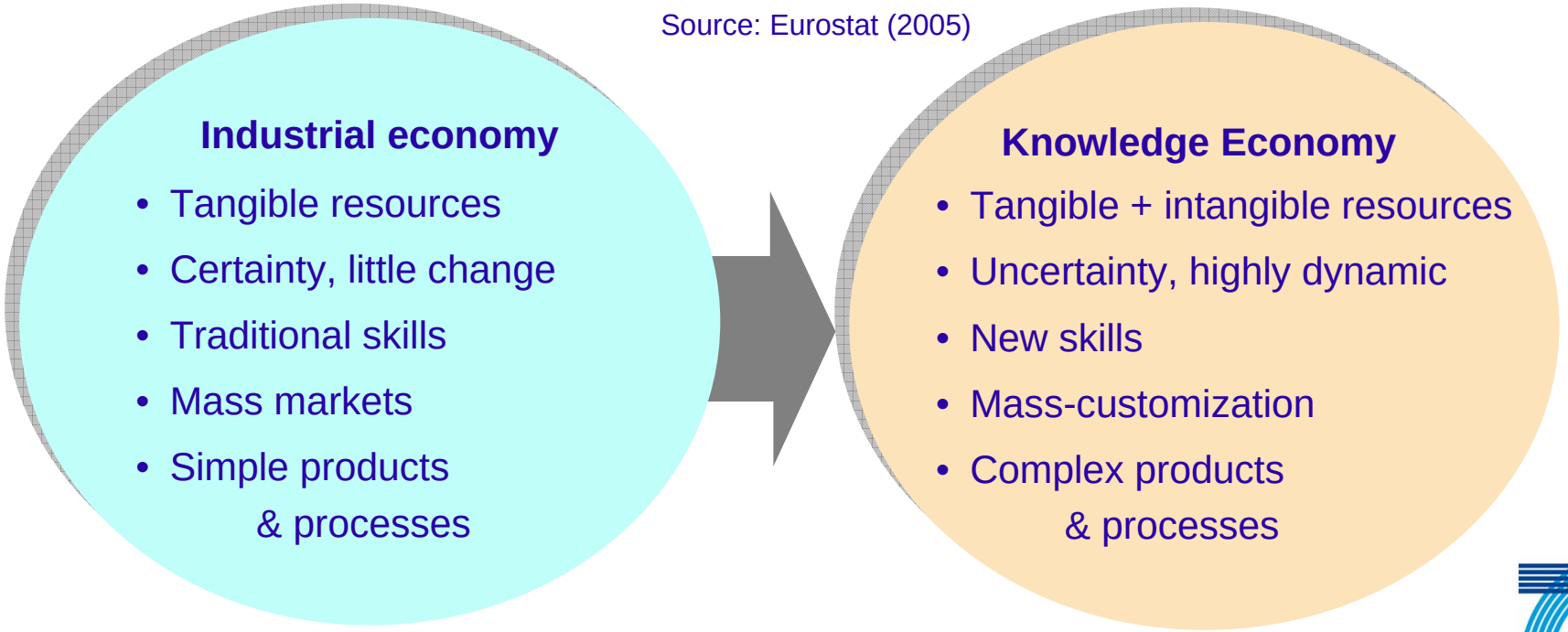
Manufacturing …
… still driving Europe's economy and it is HIGH TECH.

EU-25 manufacturing industries employ about 34 million (30.4%) people and generate annually €1,535 billion (41.5%) of value added

Source: Eurostat (2005)



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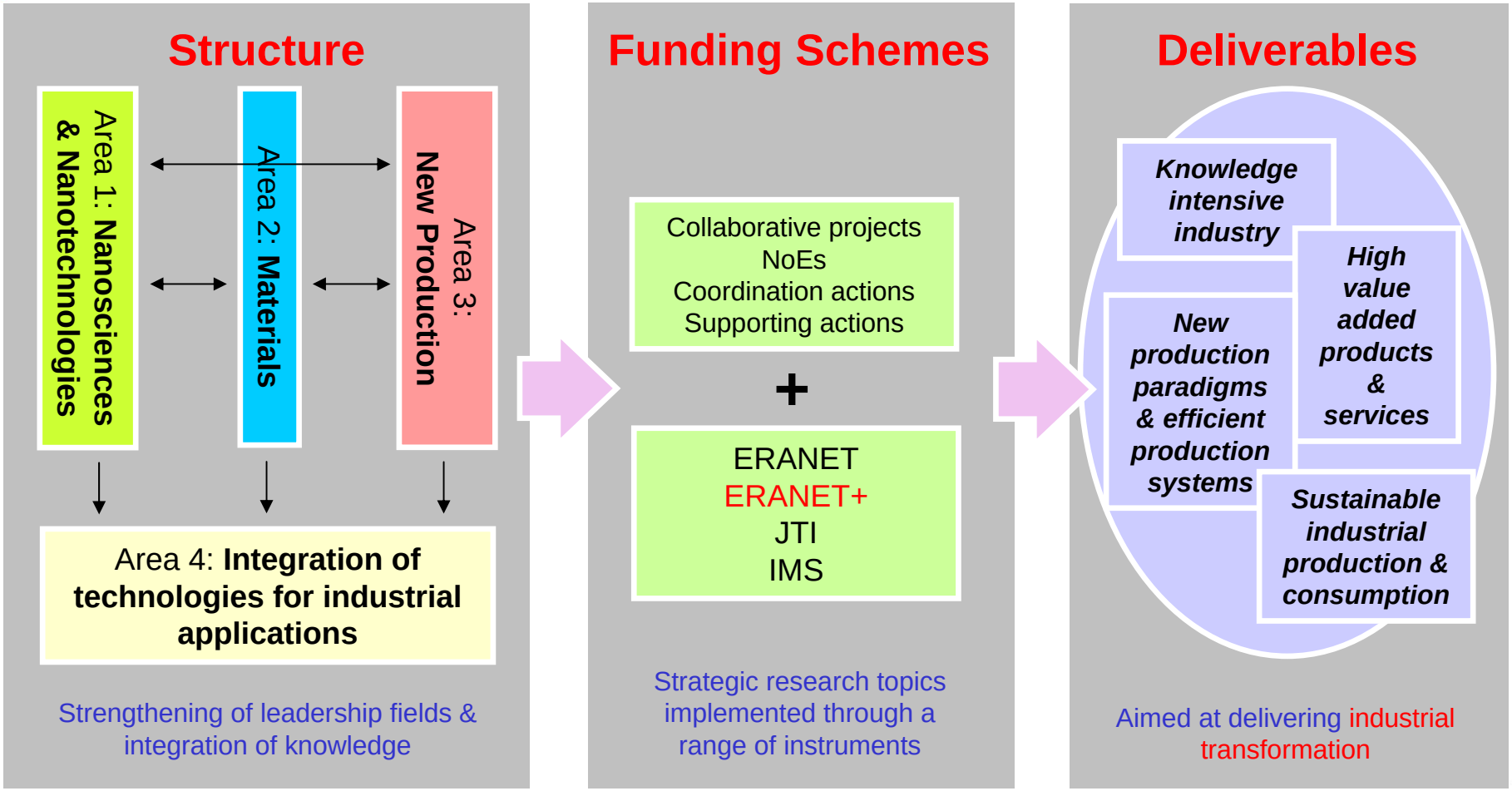
Theme 4: NMP Structure, Schemes and Deliverables



NMP Programme - Theme 4 - 2ND CALL - 2008

Outline of the FINAL DRAFT Work Programme for NMP

45 topics

	LArge Large scale cooperative projects	SME SME-focused cooperative projects	SMall Small or medium scale cooperative projects	Other Coordination & Support Actions (CSA)	Other ERA Net	Other ERA Net Plus
NANO (9)	2		4	3		
MATERIALS (13)	2		9	1		1
PRODUCTION (8)	3	2	2	1		
INTEGRATION (15)	6	3		3	3	
Totals (45)	***13***	***5***	***15***	***8***	***3***	***1***

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NMP Programme - Theme 4 - 2ND CALL - 2008

Indicative EC funding for the Second NMP Call

45 topics

500 M€

	LArge	SME	SMall	Other		
	Large scale cooperative projects	SME-focused cooperative projects	Small or medium scale cooperative projects	Coordination & Support Actions (CSA)	ERA Net	ERA Net Plus
TOTAL of topics (45)	***13***	***5***	***15***	***8***	***3***	***1***
TOTAL EC budget 500 M€ (indicative)	***240***	***65***	***170****	***15***	***4***	***6***

***including 1 Joint and 2 Coordinated Calls (20 M€)**

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Nanosciences and Nanotechnologies

- To **generate new knowledge** by studying **phenomena** and manipulation of matter at the **nanoscale**.
- Promote innovation by developing nanotechnologies that will **enable the manufacturing of new nanotechnology-based products** and/or innovative delivery of services.
- This will lead to a new generation of high added value, competitive products and services with superior performance across a range of applications.
- Emphasis on **healthcare and bioscience**.
- Impact of nanotechnology on society
- **Risk assessment** of nanomaterials and nanotechnologies

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Nanosciences and converging sciences

- The objective is to support the development of new knowledge by studying the phenomena and manipulation of matter at the nanoscale.
- Focus on new structures and systems with novel or pre-defined properties and behaviour with attention to possible applications.
- Interdisciplinary approach

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Nanosciences and converging sciences

NMP-2008-1.1-1

Converging sciences and technologies (nano, bio, info and/or cogni)

Small

- Convergence between **nano-, bio-, information and/or cognitive sciences** and technologies.
- Understanding and advance in design and construction of new components, devices, systems or products/services.
- Interaction and convergence between **physics, chemistry and/or biology**, and cognitive, nano-, bio- and/or information sciences and technologies.
- Example, new types of nanotransducers, nanobiosensors including isolated sensors, robotics developed at nanometre level or bio-NEMS.
- Nano-dynamic systems, molecular motors.

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Nanotechnologies and converging technologies

- **Strong position** in nanosciences that needs to be translated into a **real competitive advantage** for European industry.
- **Promote industrial innovation** by developing nanotechnologies that will enable both the manufacturing of new, higher performance "nano-enabled" services, products, components, devices and systems across a range of applications.
- Development of **totally new manufacturing** processes.
- Consider **health, safety and environmental** issues as well as nomenclature, metrology and standardisation.

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Nanotechnologies and converging technologies

NMP-2008-1.2-1

Pilot lines to introduce nanotechnology-based processes into the value chain of existing industries

Large

- The **transfer** of promising nanotechnology research results into **new industrial technologies** still represents a bottleneck.
- The expected projects must focus on the development or **scale-up** of innovative nanotechnology-based processes to a **pilot-line-scale** in order to improve industrial processes and production lines.
- The expected projects will also demonstrate how nanotechnology can **significantly improve** the **value-chain in industrial production** towards high-added value innovative products, thereby enhancing European competitiveness.

Nanotechnologies and converging technologies

NMP-2008-1.2-2

Nanotechnologies for water treatment

Small joint with Env

- **Water quality, availability**, and viability of water resources **through advance filtration**, water reuse, recycling or desalination.
- **Water treatment** by applying developed or adapted **nano-engineered materials** to promising separation, purification and/ or detoxification technologies.
- Proposals should focus on **process intensification** aiming at improving selectivity, robustness, stability and performance while **reducing energy** requirements and by-product generation.
- Monitoring, **safety, environmental and health** aspects.

Nanotechnologies and converging technologies

NMP-2008-1.2-3

Development of technologies for the controlled combustion of nano-particles

Small

- Potential of **nanoparticles** for the realisation of improved and/or novel **solid fuels**.
- **High oxidation and redox processes**, metallic nanoparticles have a great potential as a source of energy in the form of solid fuels.
- **Theoretical**, preliminary research into the **viability** is necessary
- Future use in various fields of **transportation**.
- How to control the burn rate; production of the most appropriate nanometal clusters; waste oxide recycling; etc.
- Use of metal oxides as combustion catalyser
- **Safety** (including possible explosion) and **sustainability** issues

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Health, Safety and Environmental Impacts

- Assessment of the **potential health, safety and environmental risks** associated with **nanotechnology-based materials and products**
- Generation of quantitative **data on toxicology and ecotoxicology** and **methodologies** for generating data.
- **Test methods**, exposure assessment and risk assessment methods
- Development of suitable devices and **instruments for measurement**.

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Health, Safety and Environmental Impacts

NMP-2008-1.3-1

Validation, adaptation and/or development of risk assessment methodology for engineered nano-particles

Large

- Scientifically valid assessment of the potential **risks from nanoparticles to human health and to the environment**.
- **Validating, adapting and/or developing risk assessments methodology** for engineered nanoparticles
- Adverse effects from nanoparticles to **human health**; acute and chronic toxicity (oral, inhalation, dermal), toxicokinetics, etc.
- Adverse effects from nanoparticles to the **environment**; eco-toxicity tests, bioaccumulation, persistence, etc including bioavailability and explosion characteristics as well as their likely environmental/health impacts.
- Relevant reference and/or certified reference materials.

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Health, Safety and Environmental Impacts

NMP-2008-1.3-2

Impact of engineered nanoparticles on health and the environment

Small

- Continuing on the first FP7 NMP call for proposals, **understanding of the safety, environmental and human health implications of nanotechnology-based materials** and products.

- **Hazard characterisation**, occupational, human and environmental exposure throughout the life cycle of nanomaterials, toxicology, main endpoints of and health effects of engineered nanoparticles; methodologies for testing; monitoring/detection of engineered nanoparticles in the various environments

- The **interdisciplinary** research should contribute to better understanding of toxicokinetics, cellular and molecular mechanisms, behaviour and fate, bio-persistence, biokinetics

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Materials

- **Added value** materials with **higher knowledge content**, new functionalities and improved performance are increasingly critical for industrial **competitiveness and sustainable development**.

- Research will focus on developing new knowledge-based multifunctional surfaces and materials with **tailored properties and predictable performance**, for new products and processes targeting a wide range of applications.

- Taking into account potential **impacts on health, safety and the environment** throughout their entire life-cycle.

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Mastering nano-scale complexity in materials

NMP-2008-2.1-1

Nanostructured membrane materials

Small

- **Tailor-made nanostructured membrane** materials show great potential in the area of waste **gas or fluid separation**
- The control of **nano-level phenomena** is very important in order to enhance the **performance** of porous materials for selective gas or fluid separation.
- Radically new **nanostructured membrane materials, organic and inorganic**, as well as on their characterisation and processing methods.
- Nanostructured membranes that are thermally stable and very **selective at high temperatures**

Mastering nano-scale complexity in materials

NMP-2008-2.1-2

Processing and upscaling of nanostructured materials

Small

- **Availability of large amounts** of specifically tailored **nanostructured materials** is crucial
- Research is needed to achieve technological breakthroughs in the knowledge-based processing methods that would allow the **production of nanostructured materials on a large scale**,
- **Cost effectiveness** and commercial potential

Knowledge-based smart materials with tailored properties

NMP-2008-2.2-1

Compound semiconductors for electronics and photonics

Large

- The semiconductor industry requires the development of new materials to meet the needs of, for example, rapid RF circuits, optical devices, data storage and energy saving solutions for lighting.
- **Scaling-down of electronic** and photonic devices.
- Focus on **novel compound semiconductors** with an emphasis on application in nanostructured components.
- Physical and chemical processes to be further developed also include epitaxial growth, soft (dry and wet) etching, functionalising by radicals, low temperature processes and new precursors.
- **Modelling** approaches, including validation.

Knowledge-based smart materials with tailored properties

NMP-2008-2.2-2

Nanostructured meta-materials

Small

- Design and processing of **artificial metamaterials**, mimicking nature with higher efficiency or exhibiting **radically new properties** such as negative or extreme electric permittivity or magnetic permeability, and leading, for instance, to such features as negative refractive index, artificial chiral materials, significant reduction in losses, or enhancement of magnetic responses in composites made out of non-magnetic components.

- The focus should be on the realisation of **optical, electronic or magnetic properties** of metamaterials with inclusions in the nano and molecular scale, which could result in innovative collective responses at elevated frequencies.

Novel biomaterials and bioinspired materials

NMP-2008-2.3-1

Advanced implants and bioactive materials for critical organs

Small

- The specific challenges for the different critical organs require diversified approaches in the case of cardiovascular, pancreatic and liver therapies.
- Research on **heart implants** and devices should focus on **bioactive materials** able to attract local cells to the site of injury and on new **biomimetic materials** for cardiac tissue and vascular replacement.
- Biomaterials development for **diabetes** treatment; biomaterials for delivery of **bioengineered pancreatic cells** and on strategies for artificial pancreas development.
- Reseach on biomaterials for **liver** diseases should focus on **biomimetic** materials for site specific cell therapy and on **bioactive** materials.

Advances in chemical technologies and materials processing

NMP-2008-2.4-1

Inorganic-Organic Hybrid Materials

Large

- Applications in energy conversion and storage, sensors, tissue engineering, environmentally friendly catalysis and information storage.
- Understanding and control of their properties, which combine **robustness with versatility**.
- The focus should be on radical innovation in **highly ordered organic-inorganic hybrids**, such as metal-organic frameworks (MOFs), ordered mesoporous materials, chemically- or physically-tailored ordered nanostructures and ordered arrays of inorganic and organic components.
- Projects should be based on **interdisciplinary** partnerships combining high level modelling, synthesis and characterisation of the proposed materials.
- Hybrid nanocomposites, tissue engineering and hydrogen or methane storage applications are excluded.

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Advances in chemical technologies and materials processing

NMP-2008-2.4-2

Radical advances in the processing of multifunctional films and tapes

Small

- Research should target radical advances in optimized, high yield processing and production technologies that allow **control of multifunctional materials at the nanoscale**, to obtain in particular large area multifunctional organic films, smart windows or long length coated superconducting wires and tapes, with improved performance at competitive costs.

- Conventional metallic tapes are excluded.

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NMP-2008-2.5-1

Functionally graded materials for improved mechanical performance

Small

- Composite materials which enable a more efficient use of existing homogeneous materials by introducing **gradual variations of their properties** (such as hardness, wear resistance, thermal and electrical conductivity, density and Young's modulus) through gradients of composition, structure, texture, phase distribution or particle content.

- A specific challenge is the necessary joint design of the functionally graded material and the component where it will be used, in order to create tailored solutions adapted to the specific working conditions envisaged.

- **Upscaling** from laboratory scale to industrial use, especially regarding the complexity of processing methods and final **component costs**.

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NMP-2008-2.5-2
Modelling of interfaces for high performance materials design

Small

- Understanding the **behaviour of interfaces at the boundary of two different materials** or material phases has become increasingly important for many material applications.
- Propose **advanced modelling** approaches addressing interfacial phenomena which are relevant to the study, design and processing of high performance materials with radically new properties, and in particular nanostructured materials.
- The focus should be on the **modelling** of realistic systems that can **predict material properties** and behaviour on a usable time scale and take advantage of the potential of multi-scale approaches. Validation of the models against experimental results should also be addressed.
- Surfaces and coatings are excluded.
- Suited for third country participation

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NMP-2008-2.6-1

Novel materials for energy applications

Small, joint call with Energy

- Research should focus on a wide spectrum of **novel materials and nanomaterials for energy applications** with an orientation towards long-term innovation.
- **Radical upgrade in the properties** of the materials, **multidisciplinary** approaches are of particular interest.
- Projects should contribute to establishment of strong strategic positions for Europe in emerging materials science.
- Important fields of application for energy technology are energy conversion and storage, photon capture, CO2 capture and storage.

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Coordinated activities and international cooperation

NMP-2008-2.6-2

Computational Material Science
Small, coordinated call with India

- A joint activitiy in materials research n the framework of the **EU-India** S&T Cooperation Agreement.
- Computational materials science at the frontier of knowledge. The **links between simulation, theory, experiment, validation** and use should be taken into account.
- Areas of computational materials science covered include, but are not limited to, modelling of nanomaterials, metallic materials, ferroic materials, ceramics, polymers, composites, nature-mimicking materials, biomaterials, green solvents, alloys, clusters, interfaces, size-dependent effects, dislocations, diffusion, electronic and optical properties, as well as different aspects of the thermal and mechanical behaviour of materials.
- An EU-India Materials Science partnership, supplemented by two-way mobility of researchers.

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New Generation Products

Objective:

Create continuously innovating production capabilities to achieve leadership in industrial products & processes in the global marketplace

Strategy

… based on a multi-annual implementation plan
.. in 2008 follow the already established structure and objectives

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Development and validation of new industrial models and strategies

- The key objective is the development of concepts for **“knowledge-based factories as products”**, which are capable of **adapting** themselves **continuously to the requirements and tasks** of changing market requirements or changing product- and production technologies.

- The scope includes **discrete** manufacturing and **process industries**, as well as **construction** and its associated industries.

NMP-2008-3.1-1

Transformation strategies for SMEs in turbulent global market environments SME

- The **business environment** of the enterprise in **global economy** is tough and turbulent. Many companies are **lacking** proper **production** and **transformation strategies**. Often the choice of production is dictated by the installed technology base and traditional competencies.
- These problems are particularly acute for **SMEs**, which **do not have the scale and resources** to address all the changes in their environment, and which are present in **traditional** as well as in **new technology manufacturing** sectors.
- The objective is to develop **competitive production and service concepts / strategies** for manufacturing SMEs.

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Adaptive production systems

- The key objective is to develop **production systems and elements for knowledge-based factories** through **holistic manufacturing engineering concepts**.

- The systems should **automatically and continuously adapt production resources and processes** in an optimal way with respect to **business** and **production** objectives as well as **market** and **technical** conditions.

- The scope includes **discrete manufacturing and process industries**, supporting also the trend towards **miniaturisation**, as well as **construction**.

Adaptive production systems
NMP-2008-3.2-1

Implementation of process intensification strategies in industrial scale Large Scale

- One of the major drivers for required changes in the **European manufacturing businesses** is **competition from emerging countries** where large quantity production is cheaper and sometimes even more flexible.
- A **European industrially** lead initiative involving **research and demonstration of new intensified chemical process and plant concepts**.
- The flexible integration of inherently **safe process** technologies with **small hold-up volumes** will be a key to success for future products.

Adaptive production systems
NMP-2008-3.2-2

Self-learning production systems Small Scale

- New philosophies in industrial **process measurement**, **control engineering** using **scalable** and **adaptive** control and **multi-sensor systems** are required, aiming at the realization of **self-learning production systems**.

- **Process control**, coupled with **quality control**, must be able to **react in time** to fluctuations **during the process**, to changes of process parameters and to disturbance variables.

- Equipment has to be designed to deal with **disruptive** or **not foreseen** events **without further human intervention**.

Networked production

- The key objective is to support highly **dynamic networked production** through the development of tools and methods for **co-operative** and **value-added operations** for global production capability.

- Collaborative design, **identification** and verification of **manufacturing requirements** of all involved parties, determination and specification of processes as well as **ICT** systems are among the required key competencies.

Networked production
NMP-2008-3.3-1
Supply chain integration and real-time decision making in non-hierarchical manufacturing networks
Small

- The **supply chain integration** and **production/operation** management of **non-hierarchical manufacturing networks** is characterised by non-centralised decision making.

- The main development issues and targets are **collaborative planning, management and optimisation of production resources** including production planning and capacity management in non-hierarchical company network as well as distributed planning/scheduling models and supporting tools.

Rapid transfer and integration of new technologies into the design and operation of manufacturing processes

- The key objective is the development of **knowledge-based** engineering capacities drawing on in-depth understanding of the **behaviour of machines, processes and systems**. This allows enterprises, in particular **SMEs**, to respond quickly to changes in a dynamic environment through **integration of knowledge from all fields of manufacturing**.

- Knowledge-based manufacturing aims at innate transfer and **protection of knowledge** as well as the utilisation of a wide range of **tools** for **integration of new technologies** into the design and operation of new manufacturing processes as quickly and efficiently as possible.

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Rapid transfer and integration of new technologies into the design and operation of manufacturing processes

NMP-2008-3.4-1

Rapid design and virtual prototyping of factories Large Scale

- Consumer needs and expectations of the future will require a **continuously and rapidly evolving production framework, production systems to be set up in shorter and shorter times**.

- This will require conception and development of new **methodologies** and **innovative tools**, which enable and support the rapid design and prototyping of the entire production system.

- The creation of a **holistic**, **integrable**, **up-gradable**, **scalable Virtual Factory** can foster high cost savings in the implementation of new manufacturing facilities.

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Rapid transfer and integration of new technologies into the design and operation of manufacturing processes

NMP-2008-3.4-2

Industrialisation through new integrated construction processes

Large

- Innovation to support the **transformation** of a supply-driven sector **into a sustainable knowledge based demand-driven sector** fulfilling users and clients demands.
- Re-engineer the construction process towards a **manufacturing process integrating the entire supply and value chain**, in order to transform a supply-driven sector into a sustainable demand-driven sector, which is creative, flexible, innovative, user-oriented, performance and knowledge-based.
- **Help an individual SMEs dominated** sector to become a fully efficient knowledge-based added value network with integrated actors mastering their process, capitalizing knowledge and responsible thereof.
- In order to industrialise construction production processes we should focus first on the initial phases for capturing and formalising **customer needs**, transforming requirements into formal sustainable specifications along the value chain to offer configurable / customisable life cycle performance based solutions for new construction products and services.
- **Rapid reliable on-site assembly** methods using **intelligent equipment** and **new materials**

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Exploitation of the convergence of technologies

- The key objective is to **stimulate the creation of new industries** by facilitating the **design**, **engineering** and **manufacturing** of the next generation of high value-added products, exploiting the opportunities, integration and convergence of, for example, **micro-** ,**nano-**, **bio-**, **info-** and **cognitive technologies**.

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Exploitation of the convergence of technologies

NMP-2008-3.5-1

Volume production process chains for high throughput micro-manufacturing SME

- The objective is to develop **integrated processes** for **micro-production** and **finishing** that combine innovative processes which enable highly performing manufacturing capabilities.

- The proposed work must significantly extend the range of **microfabrication process capabilities** by encompassing a wider range of **materials** and **geometric forms** and by defining processes and related process chains that can satisfy the specific functional and technical requirements of new emerging **multi-material micro-products** in sectors such as telecommunications, medical/surgical, transport, biotechnology and consumer products.

Integration of technologies for industrial applications

- The **integration of knowledge** and technologies of the three areas of research above is essential in order to speed up the **transformation of European** industry and its **economy**, while adopting a safe, socially responsible and **sustainable approach**.

- The research will focus on **new applications** and novel, step-change solutions responding to major challenges, including the RTD needs identified by the different **European Technology Platforms**.

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Integration of technologies for industrial applications

NMP-2008-4.0-1

Development of nanotechnology-based systems for diagnosis and/or therapy for diabetes, musculo-skeletal or inflammatory diseases

Large, in coordination with Theme HEALTH

- **Nanotechnology-based systems for diagnosis and/or therapy** for diabetes, muscolo-skeletal or inflammatory diseases.

- Where meaningful, should address the **combination of diagnosis and therapy** in multi purpose systems.

- Demonstrate high **specificity, efficacy** and where appropriate **biocompatibility**. Addresses only human healthcare.

Integration of technologies for industrial applications

NMP-2008-4.0-2

Catalysts and sustainable processes to produce liquid fuels from coal and natural gas

Large

- New processes based on natural gas or coal as raw materials will **reduce the dependence on raw oil** as well as improve the quality of the fuel.

- This would have benefits for our **environment, stability of energy resources, safety and health**.

- Innovative catalytic processes for the **sustainable and environmentally benign production of transportation fuels** and gasoline blending components.

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Integration of technologies for industrial applications
NMP-2008-4.0-3
Nano-technology enabled applications for integrated, cost-effective volume production
Large

- The aim is to develop **production systems** and associated assets derived from the most promising nano-technologies that can be **integrated** within **existing or new industrial manufacturing applications** for European industry.

- Priority is to be given to enabling nano-technologies that are **mature** enough to be integrated within existing or new production lines, with the **highest potential to promote industrial application of nano-engineered products**.

- Specific focus will be on **nano-structured surfaces** for the **equipment manufacturing industry** (both for the applications of nanosurfaces in their new equipment and for the production of nanosurfaces)

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Integration of technologies for industrial applications
NMP-2008-4.0-4
Expanding the limits of advanced materials processing applications through a new generation of high brilliance lasers
Large Scale

- Although Europe today is the leader in industrial laser processing, **continuous innovation** and adoption of novel technologies is required to **defend this position**.

- A closed development cycle consisting of **beam source**, **process and quality assurance** has to be established.

- Further improvement of existing and the development of **new laser beam sources** as well as related technologies (e.g. **beam delivery** and **beam manipulation**) must be pursued, leading to systems of **industrial grade** for tomorrow's demands.

Integration of technologies for industrial applications

NMP-2008-4.0-5

Innovative concepts and processes for strategic mineral supply and for new high added value mineral-based products

Large

- Sustainable mineral supply, new market opportunities through the development of **new eco-efficient, high value added mineral particle based products** with enhanced and diversified functional properties.
- European **mineral resource definition** based on geological potential modelling of strategic supply;
- Pioneering applications with new groups of materials for industrial and end consumer products in light of **new customer needs for tomorrow's markets**;
- New strategies and technologies underlying transformation of metallic or non-metallic mineral resources;
- New mineral **product functionality** by intelligent modification of material properties and surfaces within micro-, macro- and nanoscale range adding significant value to the new end products;
- New strategies and technologies **reducing the environmental footprint**

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Integration of technologies for industrial applications

NMP-2008-4.0-6

Sustainable new products and markets through bioproduction of green forest-based chemicals and materials

Large

- Forest-based industry is loosing in profitability. However, the **potential revenues** from using wood for production of green chemicals, fuels and polymers can be **many times higher than the revenues from the pulp** itself.
- New process technology for adaptable production of **side-stream chemicals** from wood based feed stocks.
- Development of more selective and milder separation conditions or reactions.
- Optimisation of thermo-chemical processes.
- Combinations of traditional technologies with bio- and nanotechnologies for the production of base chemicals.
- Development of new and selective isolation methods for various wood constituents based on high performance membrane technologies and chromatographic techniques.

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Integration of technologies for industrial applications
NMP-2008-4.0-7
Integration of new technologies and materials for differentiated consumer-centred product capability SME

- The topic addresses the development and demonstration of **new sustainable production capabilities** for high added value **consumer-centred** product concepts and the conception and definition of **industrial paradigms** and **infrastructures** which relate to the relevant industry characterised by large numbers of **SMEs** exposed to global competition (for example: **sporting goods** and **footwear**).

- It aims to capitalise on **new competitive strategies** that demand **product differentiation** and **personalisation** to deliver high quality to **individual consumers** over a range of industrial sectors.

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Integration of technologies for industrial applications

NMP-2008-4.0-8

Smart materials for applications in the sectors of construction and of machinery and production equipment

SME

- New **materials with improved physical or chemical properties**, new functionalities and enhanced end user related properties are essential for innovation in the construction and machine building sectors.
- In the **construction sector**, areas where progress is needed include thermal, electro-magnetic and acoustic isolation, heat storage and climatic functionality, resistance against an aggressive environment, and inherent surface functionalities
- In the **machinery sector**, features expected are high damping capacity, vibration and noise reduction with high stiffness/mass ratio, and extremely high inherent thermal and long-term geometrical stability properties, focus on smart and multifunctional materials
- Proposals should lead to **cost effective solutions** and should contribute to achieving a **reduced environmental impact** and **low energy and material resource consumption**. Efficiency of the related production processes. Take advantage of state-of–the-art knowledge from micro- and nano-technologies, biotechnologies, sensor and information technologies.
- Research projects which are only relevant to **aerospace, aeronautics, and/or automotive technologies are excluded**.

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Integration of technologies for industrial applications

NMP-2008-4.0-9

Reducing the risk of injury in complex systems through advanced personal protective equipment

SME

- A new generation of intelligent personal protective systems
- Projects should address entire system solutions for application areas such as **work safety, construction, fire fighting, emergency operations and civil protection** and be attuned to holistic industrial strategies of industrial risk minimisation and mitigation.
- Integration of **state of the art materials, components and ICT solutions** and the development of new speciality and **high-performance protective materials** and components such as technical textiles and smart materials, enhancing product multi-functionality.
- ICT solutions to be integrated include **real-time risk monitoring** systems for **early detection of hazardous situations**, soft computing and augmented reality techniques for training and for decision-supporting systems, data management, communication technologies and micro-electronic components (sensors, actuators).

SEVENTH FRAMEWORK PROGRAMME

EUROPEAN COMMISSION
Community research

Thank you for your kind attention

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EU research:
http://ec.europa.eu/research

Seventh Framework Programme:
http://ec.europa.eu/research/future/index_en.cfm

RTD info magazine:
http://ec.europa.eu/research/rtdinfo

Information on research programmes and projects:
http://cordis.europa.eu

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