

**7th Framework Programme
2007-2013
Building the Europe of knowledge**



**Theme 4 :
N & N, Materials, Production**



**Improve the competitiveness of the
European Industry**

The content of this presentation is provisional and not legally binding.



FP7 2007 –2013 Specific Programmes

Cooperation – Collaborative research

Ideas – Frontier Research

People – Marie Curie Actions

Capacities – Research Capacity



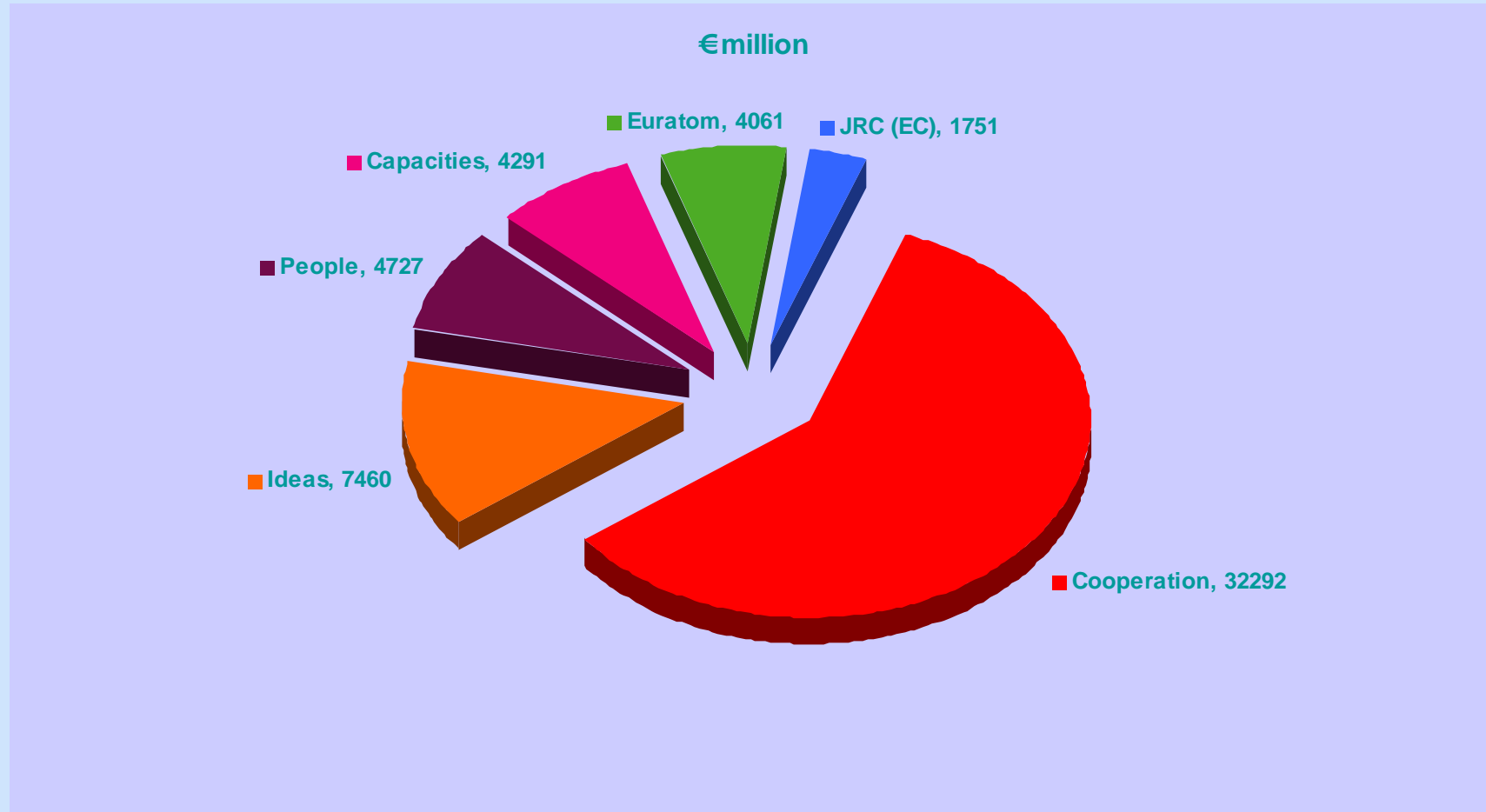
JRC non-nuclear research

Euratom direct actions – JRC nuclear research

Euratom indirect actions – nuclear fusion and fission research



FP7 budget € 54 582 million, current prices



Cooperation – Collaborative Research

Nine themes

1. Health
 2. Food, agriculture and biotechnology
 3. Information and communication technologies
 4. Nanosciences, nanotechnologies, materials and new production technologies
 5. Energy
 6. Environment (including climate change)
 7. Transport (including aeronautics)
 8. Socio-economic sciences and the humanities
 9. Security and space
- + Euratom: Fusion energy research, nuclear fission and radiation protection



FP7 2007-2013 'Cooperation' budget

I. Cooperation	Budget (€million, current prices)
1. Health	5 984
2. Food, agriculture and biotechnology	1 935
3. Information and communication technologies	9 110
4. Nanotechnologies, materials and production	3 467
5. Energy	2 265
6. Environment	1 886
7. Transport	4 180
8. Socio-economic research	607
9. Security and space	2 858

Total **32 292***

* Not including non-nuclear activities of the Joint Research Centre: €1 751 million

NMP Implementation approach

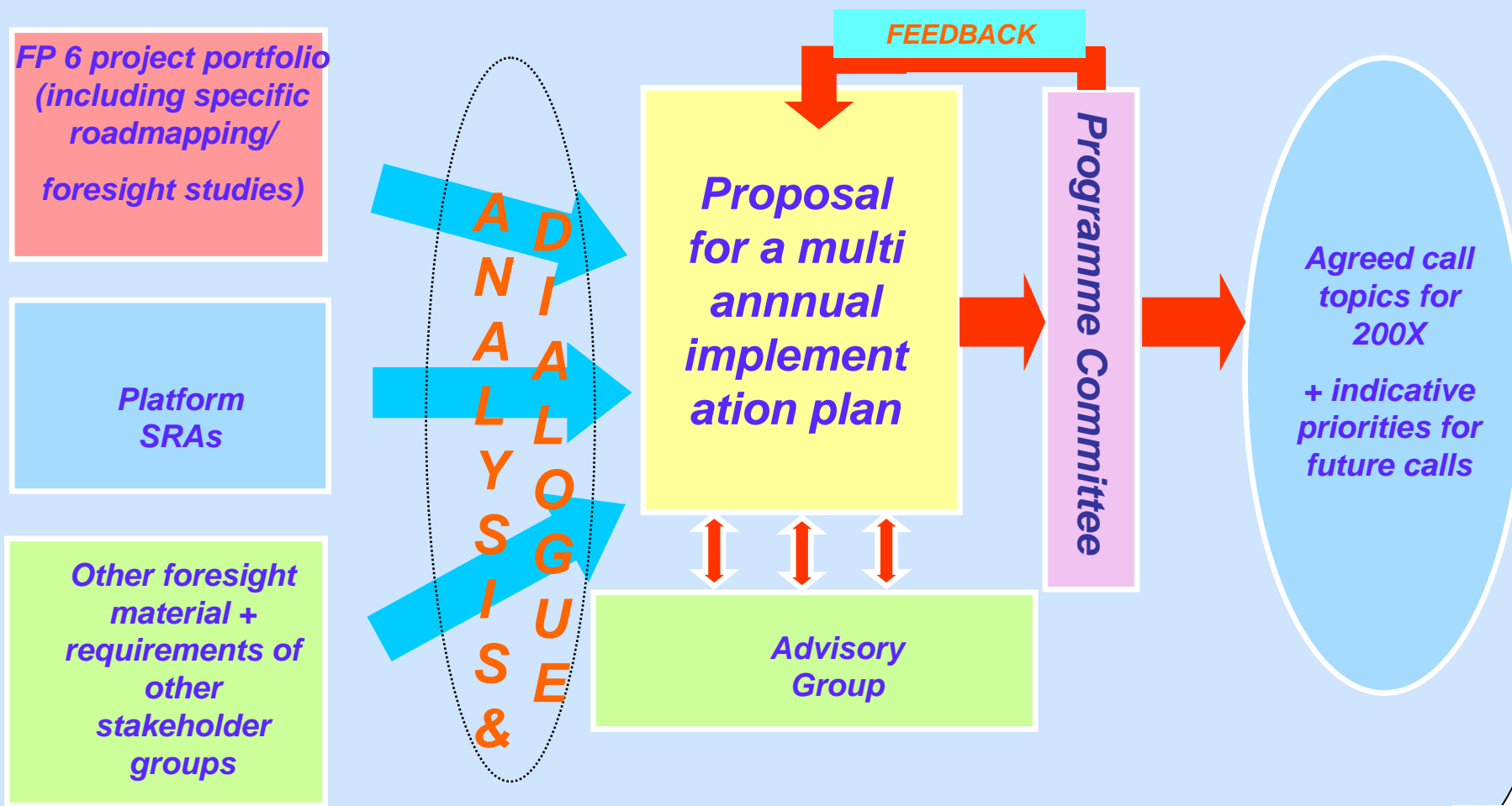
Overall objective :

improve the competitiveness of EU industry (including SMEs) and ensure its transformation through:

- transition to knowledge-based industry;
 - generation, applicable, knowledge of radical potential;
 - strengthening EU leadership in nano, materials and production technologies;
 - validated integration of different technologies and disciplines that demonstrates industrial change.
- *Importance of Technology Platforms to help establish common research priorities and targets.*



Development of NMP work programme



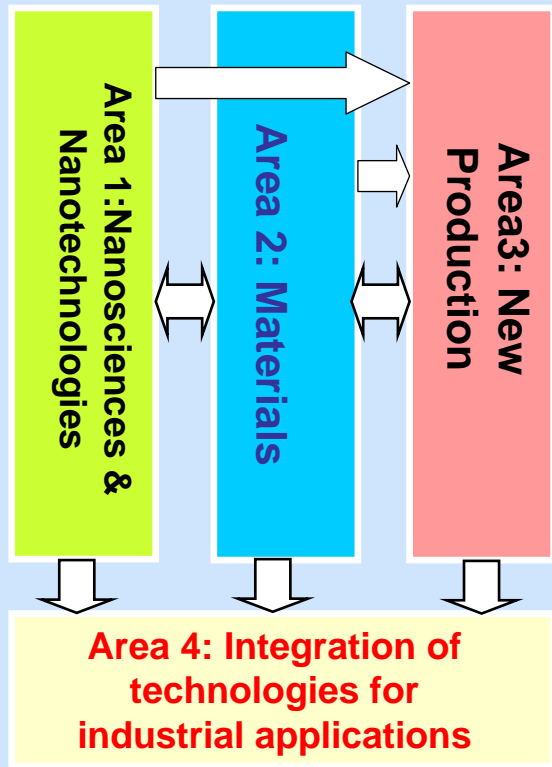
Theme 4: Nanosciences, nanotechnologies, materials and new production technologies

Four activities:

1. Nanosciences and nanotechnologies
2. Materials
3. New production
4. Integration of technologies for industrial applications

... continuity with « NMP » activities in FP 6 !!

STRUCTURE



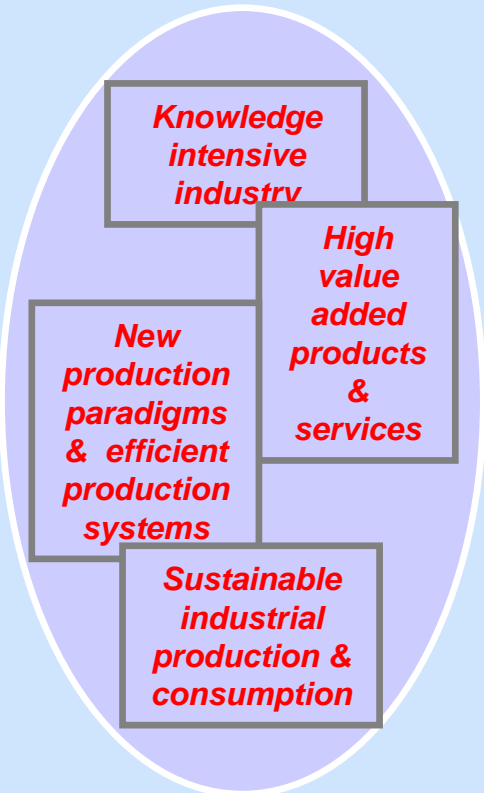
Strengthening of leadership fields & integration of knowledge

FUNDING SCHEMES DELIVERABLES

Collaborative projects
NoEs
Coordination actions
Supporting actions

ERANET
ERANET+
JTI
IMS

Strategic research topics implemented through a range of instruments

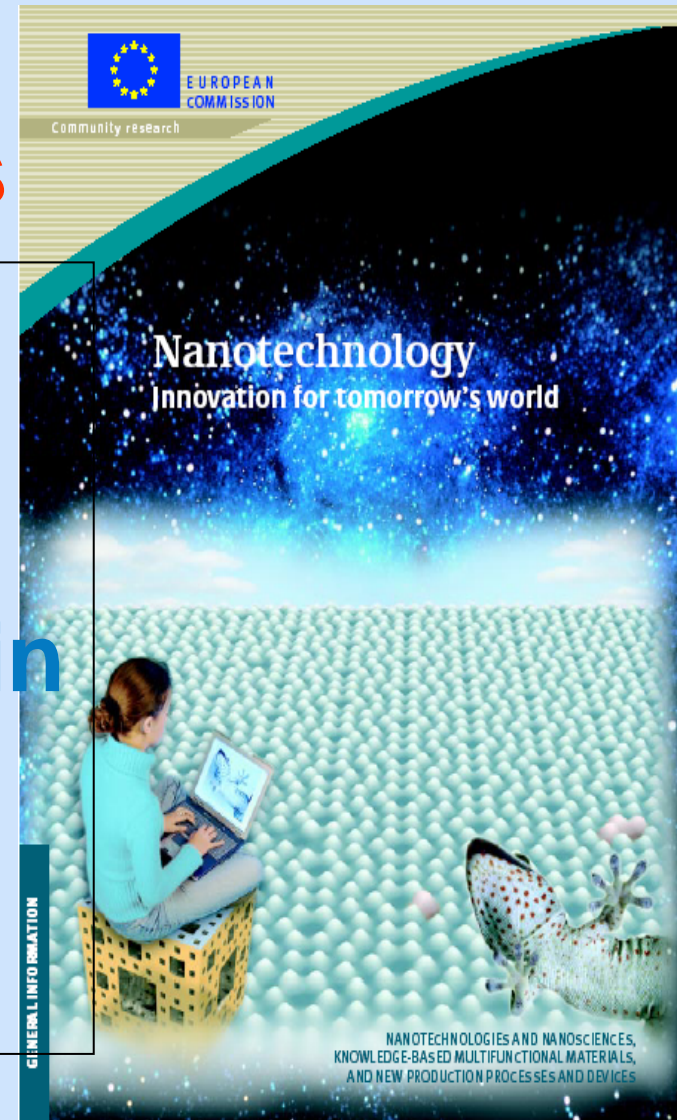


Aimed at delivering industrial transformation

1. Nanosciences & Nanotechnologies

Objective:

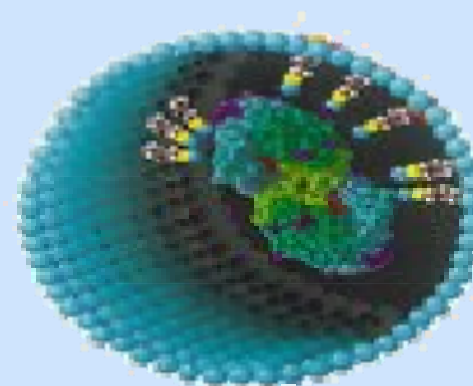
Increase and support
the take-up of
knowledge generated in
this revolutionary field
for all industrial
sectors;



Nanosciences & Nanotechnologies (i)

- **NANOSCIENCE**

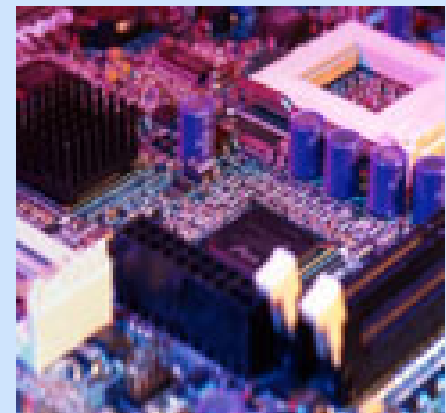
- Expanding knowledge of size, dimension and geometry dependent phenomena;
- Extending the limits of control and material properties for micro-,macro-applications;
- Study the integration of technologies for self-assembly etc...;
- Developing models, ... for characterisation and manipulation;



Nanosciences & Nanotechnologies (ii)

- **NANOTECHNOLOGIES**

- Nano- and high-precision technologies for chemistry;
- Impact of nano-scale entities on human safety, health and the environment, standards etc...
- Expanding knowledge to support new evolutions in medicine, electronics, transport...



Activity 4.1 Nanosciences and Nanotechnologies

Large

Small

Other

All topics of the Activity 4.1 are related to the Nano Action Plan

4.1.1 Nanosciences and converging sciences (5 topics)

4.1.1-1 Nano-scale mechanisms of bio/non-bio interactions - SM

4.1.1-2 Self assembling and self organisation - SM

4.1.1-3 Support to ICPC researchers in Nanotechnology and creation of a free and open European electronic archive of nanosciences and nanotechnologies scientific and technical publications - CSA

4.1.1-4 Development of methodology, collection and elaboration of scientific-technical and socio-economic data and studies on nanosciences and nanotechnologies, including risk assessment, and establishment of an observatory – CSA

4.1.1-5 Support to Member States' research programmes in nanosciences – ERAnet+

4.1.2 Nanotechnologies and converging technologies (5 topics)

4.1.2-1 Pilot lines to study and develop and up-scale nanotechnology-based processes from laboratory - LA

4.1.2-2 Equipment for nanotechnology - SME

SME

4.1.2-3 Analysis of the ethical, regulatory, social and economic environment of nanomedicine - CSA

4.1.2-4 Coordination in nano-metrology – CSA

4.1.2-5 Examining capacity building in nanobiotechnology - CSA

4.1.3 Health and Environmental Impacts (5 topics)

4.1.3-1 Specific, easy-to-use portable devices for measurement and analysis - LA

4.1.3-2 EU/USA coordinated call "impact of nanoparticles on health and environment" - SM

4.1.3-3 Critical review on the data and studies on the potential impact on environment and health of (i) "fullerenes", (ii) nanotubes and their derivatives, (iii) metals and (iv) nano-oxides – CSA

4.1.3-4 Realisation of a critical and commented database on the impact of nanoparticles – CSA

4.1.3-5 Coordination in studying the environmental and health impact of nanoparticles and nanotechnology based materials and products - CSA

4.1.1 Nanosciences and converging sciences (5 topics)

4.1.1-1 Nano-scale mechanisms of bio/non-bio interactions – SM

The objective will be to explore the **interaction** mechanisms at the nano-scale between **biological systems and nanostructures** (including surfaces).

4.1.1-2 Self assembling and self organisation – SM

The objective will be to deliver systems with **predictable and controllable properties** in particular composition and physico-chemical structure.

4.1.1-3 **Support to ICPC researchers** in Nanotechnology and creation of a **free and open European electronic archive of nanosciences** and nanotechnologies scientific and technical publications - CSA

4.1.1-4 Development of methodology, collection and elaboration of scientific-technical and socio-economic data and studies on nanosciences and nanotechnologies, including risk assessment, and establishment of an observatory – CSA

4.1.1-5 **Support to Member States'** research programmes in nanosciences – **ERAnet+**

4.1.2 Nanotechnologies and converging technologies (5 topics)

4.1.2-1 Pilot lines to study and develop and up-scale nanotechnology-based processes from laboratory – LA

The goal is thus to facilitate the transfer **from laboratory-scale** activities **to larger scale processes** that would open the way for industrial production lines thereby enhancing European competitiveness

4.1.2-2 Equipment for nanotechnology - SME

The research projects should focus on the development of **instrumentation and methods for measurement, analysis and operations** at the nanoscale, based on novel approaches or novel combinations of approaches.

4.1.2-3 Analysis of the **ethical, regulatory, social and economic** environment of **nanomedicine** - CSA

4.1.2-4 Coordination in nano-metrology – CSA

4.1.2-5 Examining **capacity building in nanobiotechnology** - CSA

4.1.3 Health and Environmental Impacts (5 topics)

4.1.3-1 Specific, easy-to-use portable devices for measurement and analysis – LA

The objective of the expected collaborative projects would be to develop and validate **affordable, portable, adequate sampling and measurement equipments for monitoring working environments** (i.e. quantification and characterization of airborne nanoparticles in particular).

4.1.3-2 EU/USA coordinated call “impact of nanoparticles on health and environment” – SM

Projects under this call should be related to engineered nanoparticless and should address one or more topics in the following areas: **toxicology** of nanoparticles; **monitoring/detection of engineered nanoparticles** in the various environments (excluding the development of equipment); environmental and biological fate, transport, and transformation of nanoparticles.

4.1.3-3 **Critical review** on the data and studies on the **potential impact on environment and health** of (i) "fullerenes", (ii) nanotubes and their derivates, (iii) metals and (iv) nano-oxides -CSA

4.1.3-4 Realisation of a critical and commented **database on the impact of nanoparticles** – CSA

4.1.3-5 Coordination in studying the **environmental and health impact of nanoparticles and nanotechnology based materials and products** - CSA

2. Materials

Objective:

Generate new knowledge to enable new industrial products and processes to be achieved, exploiting the potential of interdisciplinary approaches in materials research.



Materials

- **Knowledge-based materials with tailored properties and enhanced processability**
- **Reliable design and simulation for material engineering**
- **Integration at nano-molecular-macro levels in the chemical technology and materials processing industries**
- **New nano-,bio-,hybrid-,materials including their process design and control**

Activity 4.2 **Materials**

Large Small Other

4.2.1 Mastering nano-scale complexity in materials (3 topics)

4.2.1-1 Nano-structured composite materials - LA

4.2.1.2 Nanostructured coatings and thin films - SM

4.2.1-3 Characterisation of nano-structured materials - CSA

4.2.2 Knowledge-based smart materials with tailored properties (3 topics)

4.2.2-1 Organic materials for electronics and photonics - LA

4.2.2-2 Nano-structured materials with tailored magnetic properties - SM

4.2.2-3 Advanced material architectures for energy conversion - SM

4.2.3 Novel material and bio-inspired materials (1 topic)

4.2.3-1 Highly porous bioactive scaffolds favouring angiogenesis for tissue engineering - LA

4.2.4 Advances in chemical technologies and materials processing (3 topics)

4.2.4-1 Flexible efficient processing for polymers - SME

SME

4.2.4-2 Nano-structured catalysts with tailor-made functional surfaces – SM

4.2.4-3 Renewable materials for functional packaging applications - SM

4.2.5 Using engineering to develop high performance knowledge-base materials (2 topics)

4.2.5-1 Novel materials tailored for extreme conditions and environments - LA

4.2.5-2 Modelling of microstructural evolution under work conditions and in materials processing - SM

4.2.1 Mastering nano-scale complexity in materials (3 topics)

4.2.1-1 Nano-structured composite materials – LA

Approaches are expected to consider the combinations of matrices and potential **reinforcing nanoelements** with different chemistry, size, shape and properties, as well as the processing techniques, in order to obtain **radically enhanced mechanical and physical performance**, based on a thorough **understanding of the fundamental mechanisms**.

4.2.1-2 Nanostructured coatings and thin films – SM

The projects should consider the development of novel **nanostructured coatings and thin films** with markedly **enhanced properties** such as high hardness, chemical inertness (e.g. oxidation, corrosion), UV resistance, bioresistance and improved wear behaviour, as well as the study of novel structures, surface modification, multilayers, and a new generation of solid lubricants and tribological materials

4.2.1-3 Characterisation of nano-structured materials – CSA

European-wide efforts are needed to **compile the characterisation techniques** that are in use or should be developed to support further nanomaterial development.

4.2.2 Knowledge-based smart materials with tailored properties(3 topics)

4.2.2-1 Organic materials for electronics and photonics – LA

Projects should aim at the development of **nanostructured organic multifunctional materials** with tailored electronic, optical and sensing properties, to be used in applications such as flexible organic devices for electronic labels, electronic paper, optoelectronic devices, light emitting diodes, solar cells, displays and stimuli-responsive materials (sensors and actuators).

4.2.2-2 Nano-structured materials with tailored magnetic properties - SM

Research should deliver solutions beyond the current state-of-the-art in technology areas such as **spintronics, magnetic data storage/processing, photonics and sensors** for medical applications.

4.2.2-3 Advanced material architectures for energy conversion - SM

Research should aim at **radically new materials** and synthesis approaches based upon the control of **complex architectures**, e. g. made with quantum dots, nanocomposites, thin-films, mesoporous 3-D architectures, carbon and inorganic nanotubes, aerogels and ionogels.

4.2.3 Novel material and bio-inspired materials (1 topic)

4.2.3-1 Highly porous bioactive scaffolds favouring angiogenesis for tissue engineering – LA

The focus should be on **advanced bioactive scaffolds** enabling internal growth of tissue and the site specific delivery of bioactive signalling factors (temperature, pH, concentration, internal stimuli, etc). The approaches are expected to include issues such as delivery devices (e.g. injection), remodelling of large bone defects and improved tissue-biomaterial interfaces .

4.2.4 Advances in chemical technologies and materials processing(3 topics)

4.2.4-1 Flexible efficient processing for polymers - SME

The projects should focus on finding **flexible and energy-efficient processing** approaches with a **smart use of materials** (saving resources and tailored to the application) in an environmentally friendly manner.

4.2.4-2 Nano-structured catalysts with tailor-made functional surfaces – SM

Development of a **new generation of catalytic materials with tailored functionality** at the surface. Interdisciplinary efforts including from advanced characterisation and Modelling to reactivity and kinetics, are expected to enable the mastering of highly complex catalytic processes on the basis of a controlled sequence of surface reactions and of active sites.

4.2.4-3 Renewable materials for functional packaging applications – SM

The focus should be on the **design and processing of innovative, renewable packaging materials** as well as on the interactions between different types of renewable materials, e.g. in multilayer packaging, using the latest developments in nanotechnology.

4.2.5 Using engineering to develop high performance knowledge-base materials (2 topics)

4.2.5-1 Novel materials tailored for extreme conditions and environments – LA

Research should focus on radical innovations in the properties and processing of **bulk or surface treated materials** designed for **extreme environments**, based on an enhanced understanding of materials degradation.

4.2.5-2 Modelling of microstructural evolution under work conditions and in materials processing - SM

Modelling approaches are expected to build on the **link between microstructural evolution and specific macroscopic material properties** and take advantage of the new multi-scale approaches.

3. New Production

Objective:

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



Strategy of “New Production”



Knowledge Based Factories... Made in Europe

*...continuously innovating production capabilities
for achieving leadership in
industrial products & processes in the
global market place...*

Holistic approach to Knowledge Based Factories

Development and validation of new industrial models and strategies

is about...

*improving the operations efficiency of a **factory** through new production models and systems integration*

Adaptive production systems *is about...*

*enhancing the **production system** performance within a factory through holistic manufacturing engineering concepts*

Networked production *is about...*

*enabling customer-oriented and cost-efficient manufacturing operations within **dynamic networks** of companies*

Rapid transfer and integration of new technologies into the design and operation of manufacturing processes *is about...*

*development of **knowledge based engineering** capacities drawing on in-depth understanding of the behaviour of machines, processes and systems*

Exploitation of the convergence of technologies *is about...*

*stimulating the creation of **new industries** through application of basic research results in converging technologies*

Large

Small

Other

Activity 4.3

New Production

4.3.1 Development and validation of new industrial models and strategies (3 topics)

4.3.1-1 Beyond Lean Manufacturing – New industrial models for products and process life cycle - LA

4.3.1-2 New added-value user-centered products and product services – SME

4.3.1-3 Integrated risk management in (plants, industrial parks,) industrial systems (and networks) - LA

4.3.2 Adaptive production systems (2 topics)

4.3.2-1 Rapidly configurable machines and production systems - SM

4.3.2-2 Process intensification in chemicals production - SM

4.3.3 Networked production (1 topic)

4.3.3-1 Innovative custom-driven product-service design in a global environment - SM

4.3.4 Rapid transfer and integration of new technologies into the design and operation of manufacturing processes (2 topics)

4.3.4-1 Rapid manufacturing concepts for small series industrial production – SME

SME

4.3.4-2 Innovative pathways in Synthesis – improving efficiency by smart synthesis, design and reduction of the number of reaction steps - SM

4.3.5 Exploitation of the convergence of technologies (2 topics)

4.3.5-1 Processes and equipment for high quality industrial production of 3-dimensional nano-surfaces – LA

4.3.5-2 Production technologies and equipment for micro-manufacturing - LA

4.3.1-1 Beyond Lean Manufacturing – New industrial models for products and process life cycle - LA

Technical Content/Scope:

- ✓ Development of a **new European production model** taking it further from the **Lean Manufacturing** paradigm;
- ✓ Incorporating **local manufacturing** culture, standards and technology;
- ✓ Methodological support for a production model that balances **reactivity and efficiency**
- ✓ Solutions for **continuous adaptation** integrating **systems & processes of suppliers & customers**

Expected Impact:

- ✓ **Wide scale application** in the targeted sector(s) leading to increased **production capability, capacity & responsiveness**;
- ✓ **Improved manufacturability, quality, usability, reliability, life-cycle management and sustainability**

4.3.1-2 New added-value user-centered products and product services – SME

Technical Content/Scope:

- ✓ Targeting **Customisation in many ways**: technical functionality, emotional aspects, quality of life, health, environment.....
- ✓ **Shorter delivery times.**
- ✓ Increasing demand for products with **extended services.**
- ✓ Research focus on integration of **above** developments **into the production model.**
- ✓ New standards for product data allowing **customisation.** New manufacturing technologies allowing customisation etc.....

Special Features:

- Proposals only focusing on **product-service design are excluded** (topic 4.3.3.-1)
- The consortia should include all key players in the products supply chain (although it is an SME dedicated topic, OEMs falling outside the SME definition are welcome)
- Special orientation to « mature », SME dominated customer oriented sectors: Furniture, footwear etc.

Expected Impact:

- Maximum **added value** at **minimum time** through **knowledge management.**
- Capability to respond to the **increasing customisation** demands
- Capability to work within cooperative and strategic partnerships.
- Impact on sustainability by **avoiding overproduction** and wrong market assessments

4.3.1-3 Integrated risk management in (plants, industrial parks,) industrial systems (and networks) - LA

Technical Content/Scope: Development of **integrated risk assessment** and **risk management** methods. Integration of **new safety concepts** with the aim of reducing overall risks and **achieving total safety management** of industrial systems and networks

Special Features: Industrial leadership; demonstration elements; covering **multiple sectors**

Expected Impact: Directly supporting the successful implementation of the strategic research agenda of the **European Technology Platform on Industrial Safety**.

www.industrialsafety-tp.org

4.3.2-1 Rapidly configurable machines and production systems - SM

Technical Content/Scope: *The main objective is to achieve optimal production system performance under varying conditions through the creation of **radically new self-adaptive machine structures**. Key development targets are: (1) **“adaptronic” modules and interfaces** integrating sensors, actuators, control and mechanical structures; (2) **mechatronic modelling and simulation tools** for rapid and optimised system configuration.*

Special Features: *Industrial leadership; standardisation and interoperability*

Expected Impact: *Reduced set-up, reconfiguration and maintenance **time**; increased small batch production **productivity**; reduced resources consumption*

4.3.2-2 Process intensification in chemicals production - SM

Technical Content/Scope:

The main objective is to broaden the range of production scales & production applications in process industry – “**ultra**” **small-scale production of high added value products** or **precision engineering of product properties in high tonnage sectors**. Main development targets are: (1) high performance process equipment utilising e.g. **self-adapting materials** for intelligent valves; (2) **programmable chemical reactors** adapting automatically to changes in feed composition, operating conditions etc.; (3) methods for continuous **processing of highly viscous fluids and/or solid containing fluids**.

Special Features: Topic is a part of an intended multiannual call

Expected Impact: **Sustainability** of chemicals production; emergence of **new generation of equipment/manufacturers**; drop in capital expenditure

4.3.3-1 Innovative custom-driven product-service design in a global environment – SM (1)

Technical Content/Scope:

Intelligent customer driven innovation focuses on the integration of customer influence in the design and development process **and the related demands for manufacturing processes.** The expected deliverables are: tools and conditions for effective creation, management and use of knowledge-base product-services, collaborative design in temporary partnerships, new processes in virtual company networks around the world.

4.3.3-1 Innovative custom-driven product-service design in a global environment – SM (2)

Specific features: Proposals should take note of the available **de-facto** standard design tools and **avoid unnecessary re-development**. The consortia should **include lower tier suppliers**, the majority of which are SMEs. The topic is a precursor for future large-scale collaborative projects addressing **product creation and production in non-hierarchical company networks**. International collaboration, in particular within the IMS scheme, is encouraged.

Expected impact **Considerable reduction of time-to-market** for new products in the next 5-7 years, (e.g. in the machinery and white goods sectors), with a significant influence on product quality and expected improved business relations in a global context.

4.3.4-1 Rapid manufacturing concepts for small series industrial production – SME (1)

Technical Content/Scope:

- ... RM is a multidisciplinary field requiring **close interaction** between **material, technology and ICT** and will enable the transition from mass production to the personalised/customised,
- ... innovative RM processes with **integrated materials design and simulations** to be run prior to building the actual personalised part to guarantee functionality, process optimization, repeatability and “first time right” manufacturing.

4.3.4-1 Rapid manufacturing concepts for small series industrial production – SME (2)

Special Features:

... the proposals should address **diverse industrial sectors** and the consortia should include technology and service providers as well as end-users ranging from the individual to large OEMs. The proposals should include significant **demonstration elements**, showing the viability of this new technology in conventional production chains for more than one industrial sector.

Expected Impact:

It is expected that removal of technical barriers will open the way for wide-scale introduction and approval of rapid manufacturing technologies in the market place for high value added products (...), in a **wide range of sectors**, such as automotive, aerospace, instruments, spare parts, consumer goods and Micro-Electro-Mechanical Systems (MEMS), significantly shortening the processing time and time-to-market...

4.3.4-2 Innovative pathways in Synthesis – improving efficiency by smart synthesis, design and reduction of the number of reaction steps - SM

Technical Content/Scope:

Innovative pathways in synthesis cover the whole range of chemistry, including novel transformations, application and production of alternative feedstocks, new reaction media and reaction conditions (such as environmentally friendly solvents, supercritical conditions), and/or innovative cheaper, shorter or more benign pathways to known products. They should not be treated in isolation but **integrated in a holistic manner** with equally advanced reaction engineering concepts. Novel synthetic pathways could therefore benefit, especially from **advances in catalysis and process intensification**.

The development focus should be given to the **reduction of the number of intermediate reactions steps**

Special Features: Multiannual call « Innovative Pathways in Synthesis ». ... The area of **ionic liquids is not seen as a priority** in this call.

Expected Impact: The main impacts are at the level of environment and quality of life, with a significant reduction of wastes and energy consumption. In addition, traditional economy of scales and reduction in capital investment are expected in the long run. ...

4.3.5-1 Processes and equipment for high quality industrial production of 3-dimensional nano-surfaces – LA

Technical Content/Scope:

Up-scaling and stabilising "surface functionalization" processes for **high yield, reliability, quality and cost efficiency**

Convergence of top-down and bottom-up surface nanostructuring¹⁾ processes²⁾ may be envisaged,

Including **co-development of quality measures, characterization equipments and control systems³⁾**.

Special Features:

Demonstrate **nanosurface processes** in an **industrial application**.

Address the holistic, **clean manufacturing system**

Involve end-user groups in the nano-micro-manufacturing value chain

Expected Impact:

A clear strategic contribution to establishing a European high value added nano-manufacturing industry

Implementation of MANUFUTURE SRA (See μ -nano-manufacturing roadmaps)

- 1) **surface nanostructuring is the fabrication of surface structures with typical dimensions smaller than 100nm on various solid materials, e.g. metals, ceramics, glasses, semiconductors, polymers**
- 2) **(e.g. polymer self-assembly, sol-gel texturation, lithography and etching, moulding, hot embossing imprint, laser based coating, PVD, PE-CVD)**
- 3) **surface characterization equipments and procedures, online control and online control systems**

4.3.5-2 Production technologies and equipment for micro-manufacturing - LA

Technical Content/Scope:

Enable **high throughput processes** 1) for length scale integration and manufacture of components and devices with **complex 3D features**.

Extend microfabrication process capabilities for a wider range of materials and geometric forms,

Include methods for inspection and functional characterisation by on-line control systems.

Special Features:

Clear **industrial involvement**

Holistic process chain coverage

Adaptive applications to different types of products and industrial sectors²⁾

Expected Impact:

A clear strategic contribution to establishing a European high value added nano-manufacturing industry

Transfer of **laboratory scale** manufacturing processes **to an industrial scale**

Implementation of MANUFUTURE SRA (See μ -nano-manufacturing roadmaps)

1) direct- or rapid manufacturing; micro-injection moulding; micro-tooling production, single part manufacturing, energy assisted machining and micro-replication technologies

2) new emerging multi-material products in the medical/surgical, transport, biotechnology and consumer products sectors.

Integration of technologies for industrial applications

Objectives :

Several cross-cutting dimensions could be considered while handling the vast array of sectors and applications and could further inspire the emergence of topics:

- **Transforming traditional industry, which faces the challenge of low-cost competition. It should increase its productivity through new processes, high-added value products and new business models;**
- **Fostering scale-intensive and specialized suppliers industry through the adoption and integration of new advanced technologies thus enabling the improvement of its leadership in the global market;**
- **Promoting Science-based Industry which will play a key role in establishing a high-value European industry.**
- **Towards a sustainable supply industry is another key objective in supporting product & productivity innovation, especially for sectors with a large environmental footprint.**



Activity 4.4 Integration of technologies for industrial applications

- 4.4.-1 Advanced wood-based composites and their production - LA
- 4.4.-2 Application of new materials including bio-based fibres in high-added value textile products – SME 
- 4.4.-3 Multifunctional materials for the future vehicles – LA
- 4.4.-4 Substantial innovation in the European medical industry: Development of nanotechnology-based smart multi-tasking targeted agents for diagnosis and therapy (“theranostics”) – LA
- 4.4.-5 Resource efficient and clean buildings – LA
- 4.4.-6 Innovative added-value construction product-services – SME 

4.4.-7 ERA-Net on Construction – ERA-net

4.4.-1 Advanced wood-based composites and their production - LA

The ambitious research objectives include **adaptive production concepts** for new **composites based on wood fibres, cellulose, lignin, or hemicelluloses, and their derivatives**; manufacturing technologies such as moulding, shaping, compounding, melt blowing and electro-spinning; new manufacturing methods for sheet structures and converting operations that enable paper to **replace non-renewable materials**.

4.4.-2 Application of new materials including bio-based fibres in high-added value textile products – SME

The research should concentrate on bulk **fibres with new or significantly improved properties**, novel fibres with tailored functionalities for special applications, natural fibres and bio-based fibres; new processing and production concepts including the development of **environmentally friendly and energy-efficient processing** and surface modification of fibres, yarns and fabrics to enhance manufacturing of textile- and composite-based innovative products.

4.4.-3 Multifunctional materials for the future vehicles – LA

These **new multifunctional materials**, developed in particular with the help of **modelling methods**, would **combine classical with new properties**, such as self healing of damage caused by abrasion and wear, variable strength or sensor properties, may contain micro-encapsulated inclusions and would be able to **self-adapt their range of properties** depending on the requirements during application

4.4.-4 Development of nanotechnology-based smart multi-tasking targeted agents for diagnosis and therapy (“theranostics”) – LA

The aim of developing **nanotechnology-based** targeted **multi-purpose systems for diagnosis and therapy** for cardiovascular diseases, neurodegenerative conditions and/or cancer. They should demonstrate high specificity and efficacy, biocompatibility, and the capacity to cross biological barriers.

4.4.-5 Resource efficient and clean buildings – LA

The main development issues and targets are: new concepts, technologies, design tools and business models for “**intelligent buildings**”, able to significantly **reduce or even meet their own energy consumption**; improvement of the building energy performance (through cladding and ventilation technologies, sensors and pervasive computing systems, utilisation of embedded renewable energy sources...) at building and at district levels.

4.4.-6 Innovative added-value construction product-services – SME

The main development issues and targets are: development of **knowledge-based construction processes and products deployable by SMEs** (in terms of investment costs and human resources), especially for the retrofit, refurbishment and maintenance of buildings; new manufacturing systems (e.g. robots and automation) and ICT infrastructures and tools to develop ubiquitous SMEs access to competitive knowledge; development of new “full” services with a high added value for clients

4.4.-7 ERA-Net on Construction – ERA-net

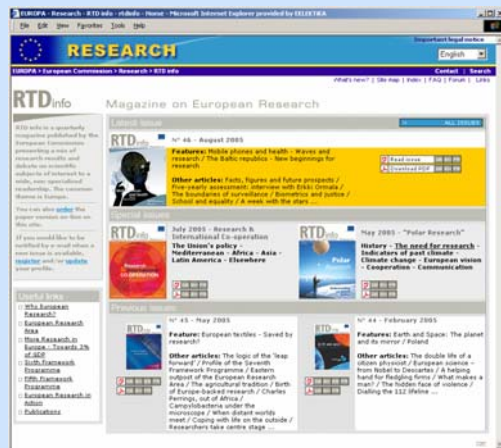
Provisional Implementation in 2007

Indicative budget: around 500 million Euros

Indicative timetable: *For Collaborative projects and SME dedicated projects*

- Publication: Dec 22
- Deadline 1st stage: Mid April 07 (LA, SM)
- Evaluation 1st stage: Mid May 07 (Remote)
- Deadline 2nd stage: Mid Sept 07 (SM)
Beg Oct 07 (LA)
- Evaluation 2nd stage: Beg Oct 07 (SM) (Local)
End Oct 07 (LA) (Local)
- Results : Mid Nov 07

Information



- EU research:
<http://ec.europa.eu/research>
- Seventh Framework Programme:
<http://ec.europa.eu/research/fp7>
- Information on research programmes and projects:
<http://cordis.europa.eu/>
- RTD *info* magazine:
<http://ec.europa.eu/research/rtdinfo/>
- Information requests:
<http://ec.europa.eu/research/enquiries/>
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