

Overview of standards for Nanotechnologies

Co-Nanomet

Co-ordination of Nanometrology in Europe

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UK Nanotechnology
Knowledge Transfer
Network

Co-Nanomet workshop
EuroNanoForum 2009, Prague
2nd June 2009



What is the Co-Nanomet project?

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Co-Nanomet Programme:

Scientifically and economically nano-metrology is an indispensable part of nanotechnology which must develop hand-in-hand with it.

This EC FP 7 funded programme will *address the need within Europe to develop the required measurement frame to successfully support the development and economic exploitation of nanotechnology.*

Programme Focus:

- Bring together key stakeholders
- Co-ordinate ongoing activity
- Define needs and bring together the infrastructure, people and capability
- 2yr programme starting 1st Jan 2009.



Motivation:

To address the following issues:

- Low visibility and fragmentation of European metrology infrastructure
- Duplication of efforts across Europe
- Difficult connectivity in the supply chain
- Skills shortage in key areas
- Use of specialised equipment by non-specialists
- Underused fabrication capacities
- Increasing expense of capital equipment
- Need to define essential requirements for nanometrology to support regulations



Programme Aims:

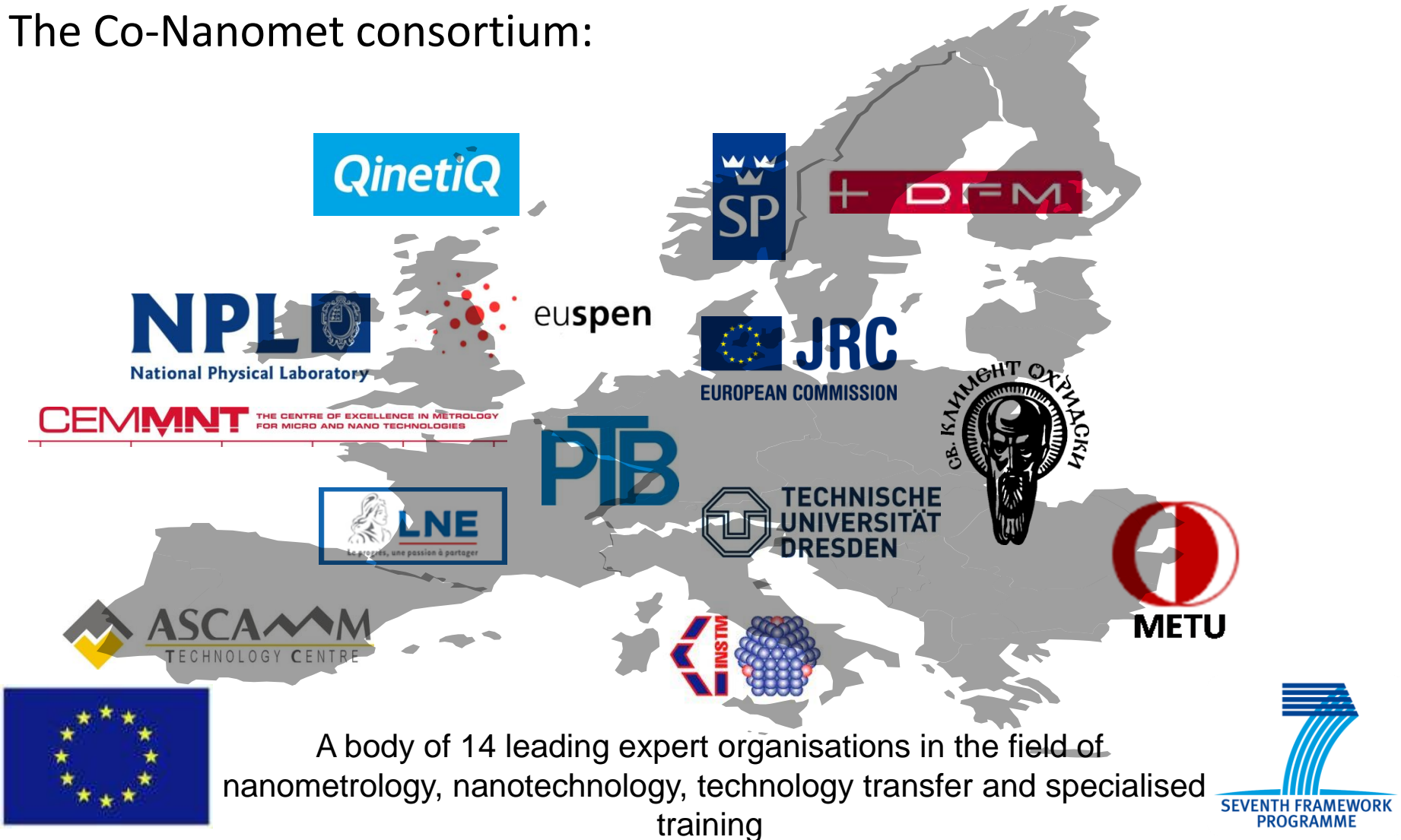
- To define a European Strategy for Nanometrology
- To identify and coordinate leading Nanometrology activity across Europe
- To coordinate European training and education of scientists, engineers and end-users in nanometrology
- To create a central hub that builds on, coordinates and provides visibility to new and existing activities across Europe
- To signpost, network and recommend the development of new nanometrology infrastructures across Europe



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The Co-Nanomet consortium:



A body of 14 leading expert organisations in the field of nanometrology, nanotechnology, technology transfer and specialised training

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Core Activities:



European
Strategy for
Nanometrology



Nanometrology
Action Groups



Coordination of
Education &
Skills



Exploitation &
Development of
Infrastructures



Core Activities:



European
Strategy for
Nanometrology

- Review of current and emerging needs for Nanometrology in support of the industrial transformation of nanotechnology.
- Issues and opportunities evaluated with key stakeholders.
- Strategy for future activities and developments defined.



Core Activities:



Nanometrology
Action Groups

- 5 European Action Groups established:
 - Engineered Nanoparticles
 - Nanobiotechnology
 - Thin Films and Structured Surfaces
 - Critical Dimension and Scanning Probe Techniques
 - Modelling and Simulation
- Address requirement for focussed activity, share key developments and best practice.
- Process chain put in place for the dissemination of metrology techniques.
- Traceability to national and international standards will be addressed.



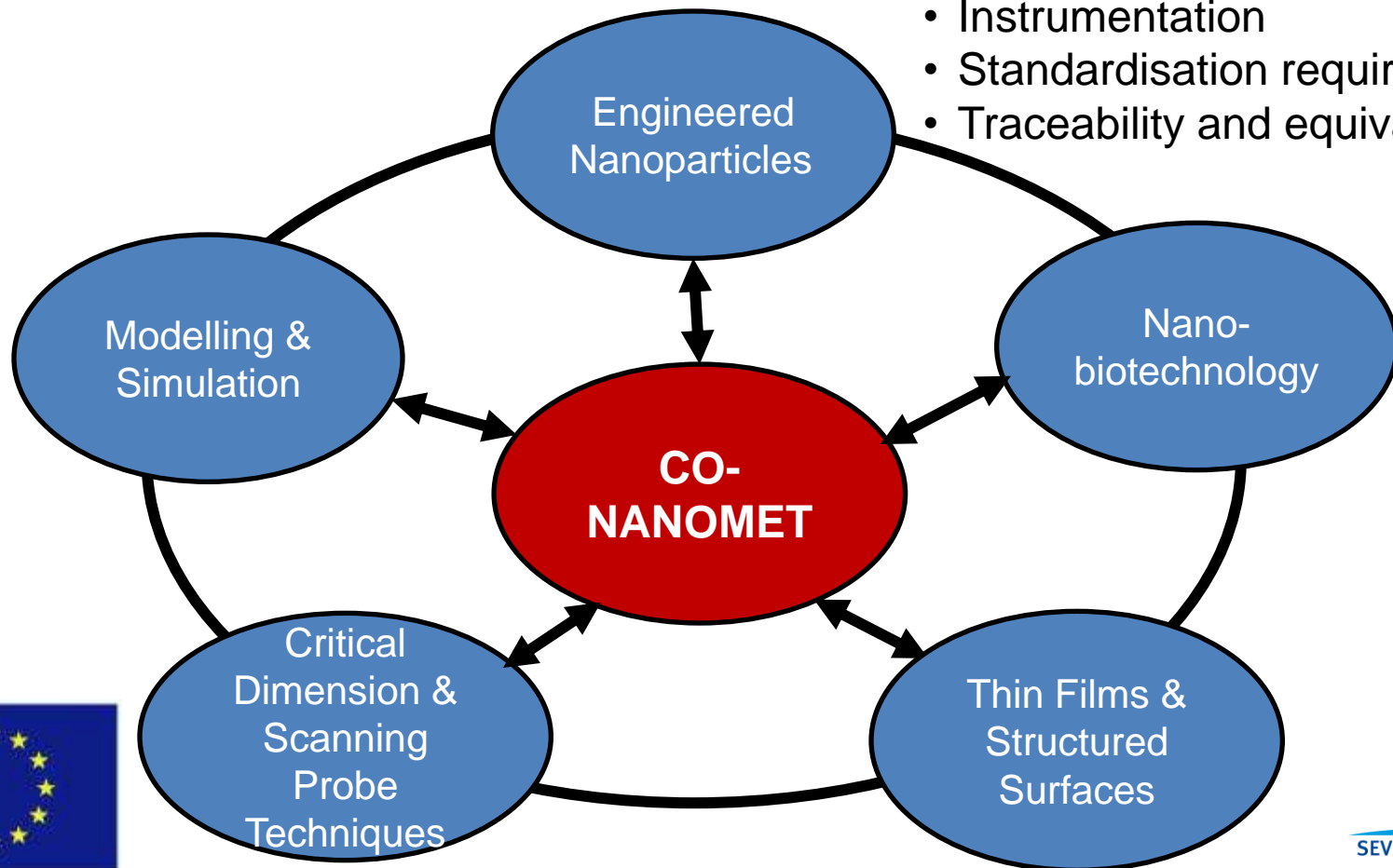
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European Nanometrology
Action Groups:

Groups will address:

- Measurement technologies
- Instrumentation
- Standardisation requirements
- Traceability and equivalence



Core Activities:



Coordination of Education & Skills

- Educational programmes that address nanometrology across Europe will be reviewed.
- A future training need analysis to be undertaken and recommendations for training curricula made.
- Training will be provided in basic nanometrology concepts and standardisation.
 - Introductory Guide to Nanometrology
 - Training workshop: Application of Standards Within Nanometrology (ENF 2009)



Core Activities:



Exploitation &
Development
of
Infrastructures

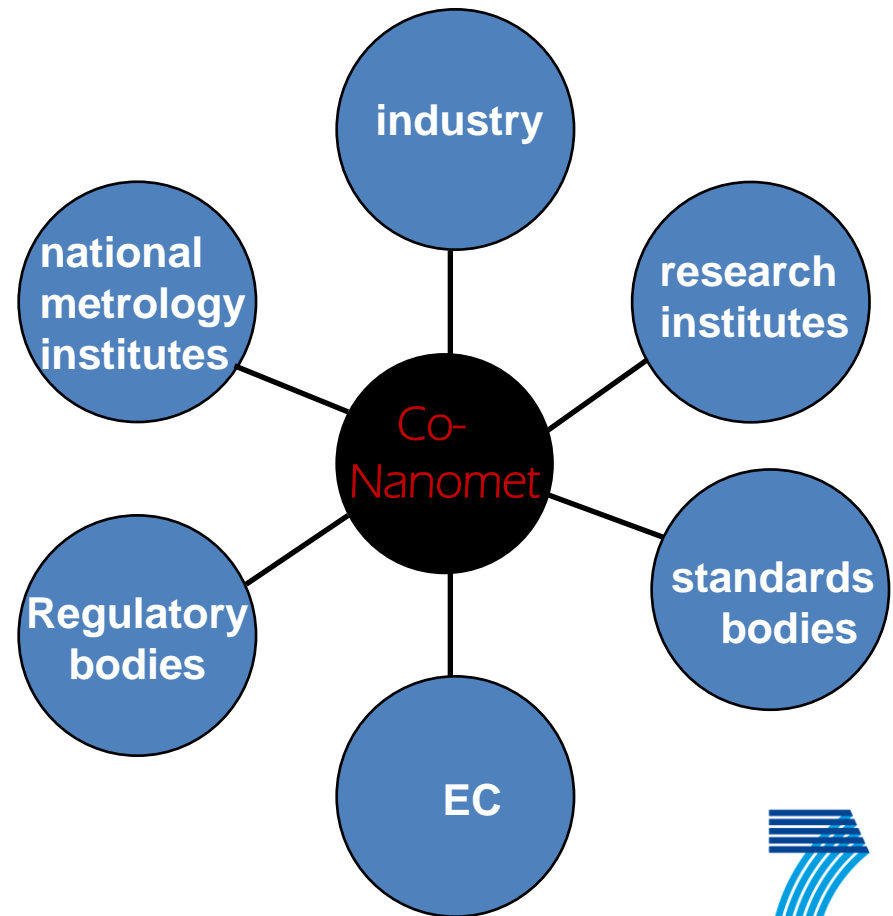
- Map of facilities and capabilities to be carried out to inform both providers and users of nanometrological services.
- Current and future requirements for large infrastructures and capability gaps will be assessed.
- Dissemination of traceable nanometrology to the workplace:
 - Traceability and industrial metrology requirements reviewed and developing approaches shared
 - Recommendations in regard to standards to be derived



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- European Nanometrology web portal is being established to provide a central contact point to highlight European capability and developments (www.co-nanomet.eu).
- European Nanometrology Workshop will be held in September 2009.
- European Nanometrology Action Groups will each hold annual stakeholder meetings –open to interested parties.
- Action Groups will each coordinate focussed workshop open to all stakeholders.



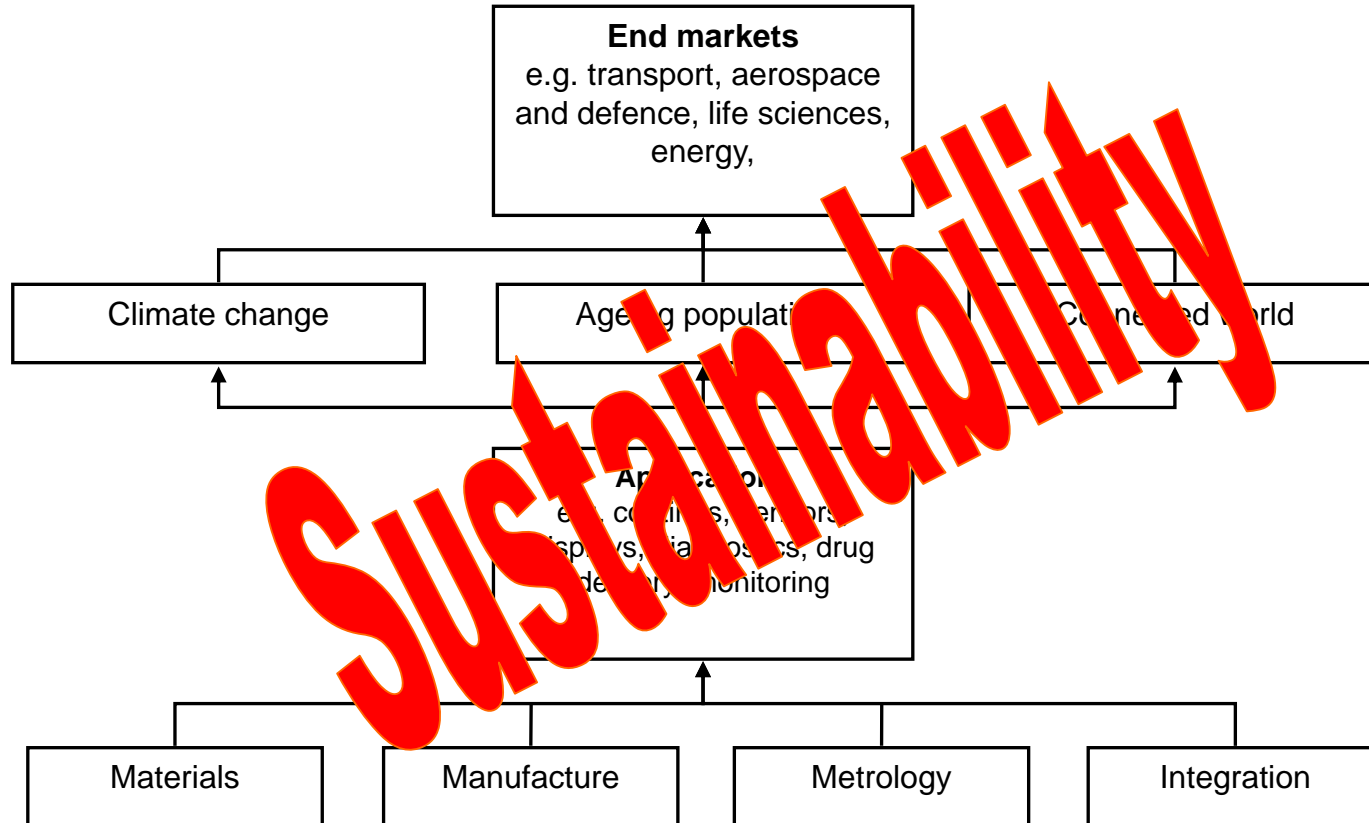
Participation and further information:

Contact Points			
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Website: www.co-nanomet.eu			

Drivers for Innovation

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Unique Selling Points of Nanotechnologies

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- Improved performance of products beyond conventional means using less materials
- Added functionality of products
- Closer engineering control
- Reduction in waste products
- Key to 'fossil fuel' problem
- New ways to key medicines
- Increased longevity of products
- Applicable to many sectors it is a 'generic' underpinning set of technologies



Evolution of advanced technologies

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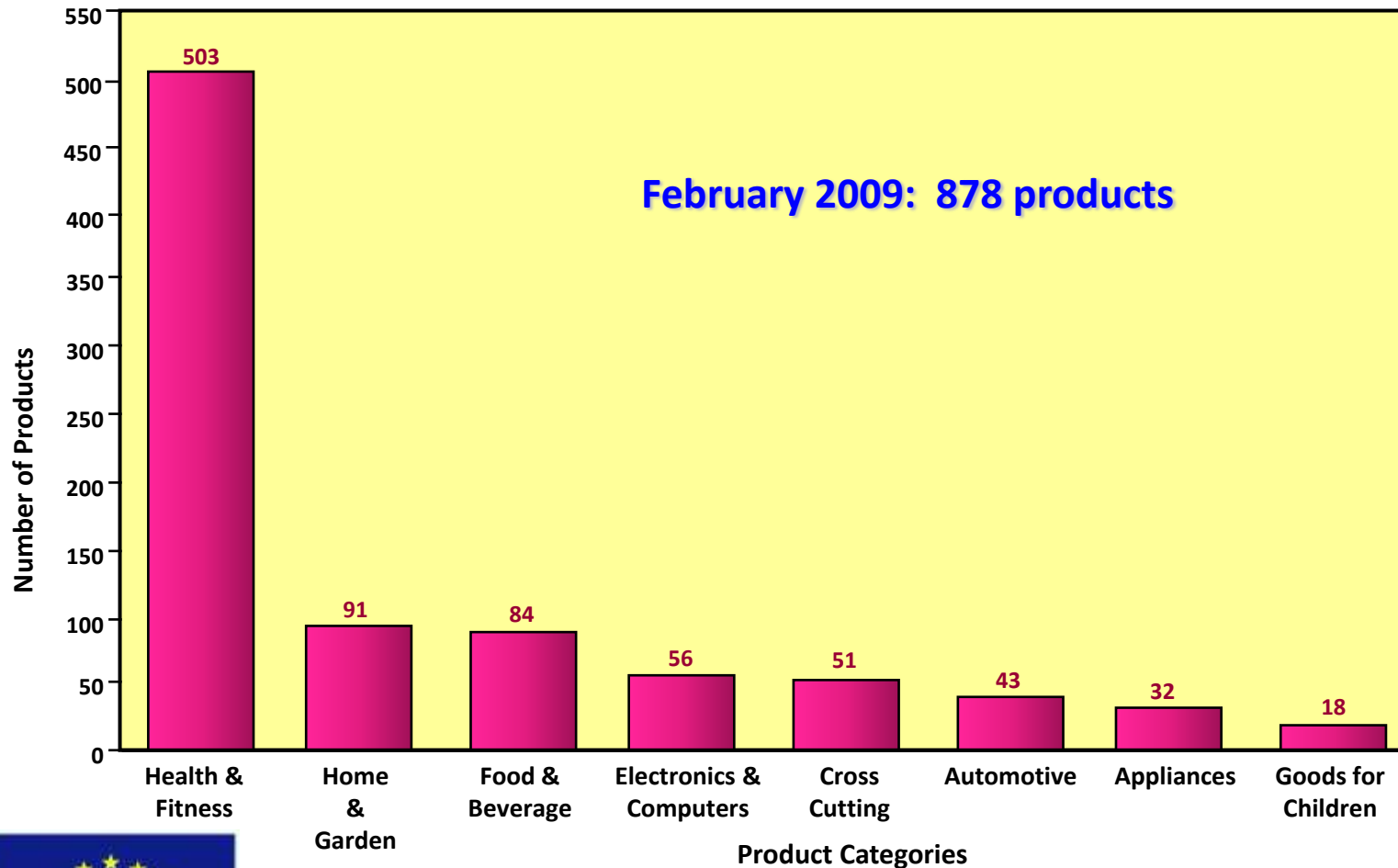
Source:Wikipedia



COMMERCIAL PRODUCTS USING NANOTECHNOLOGY

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Food Packaging



increased shelf-life

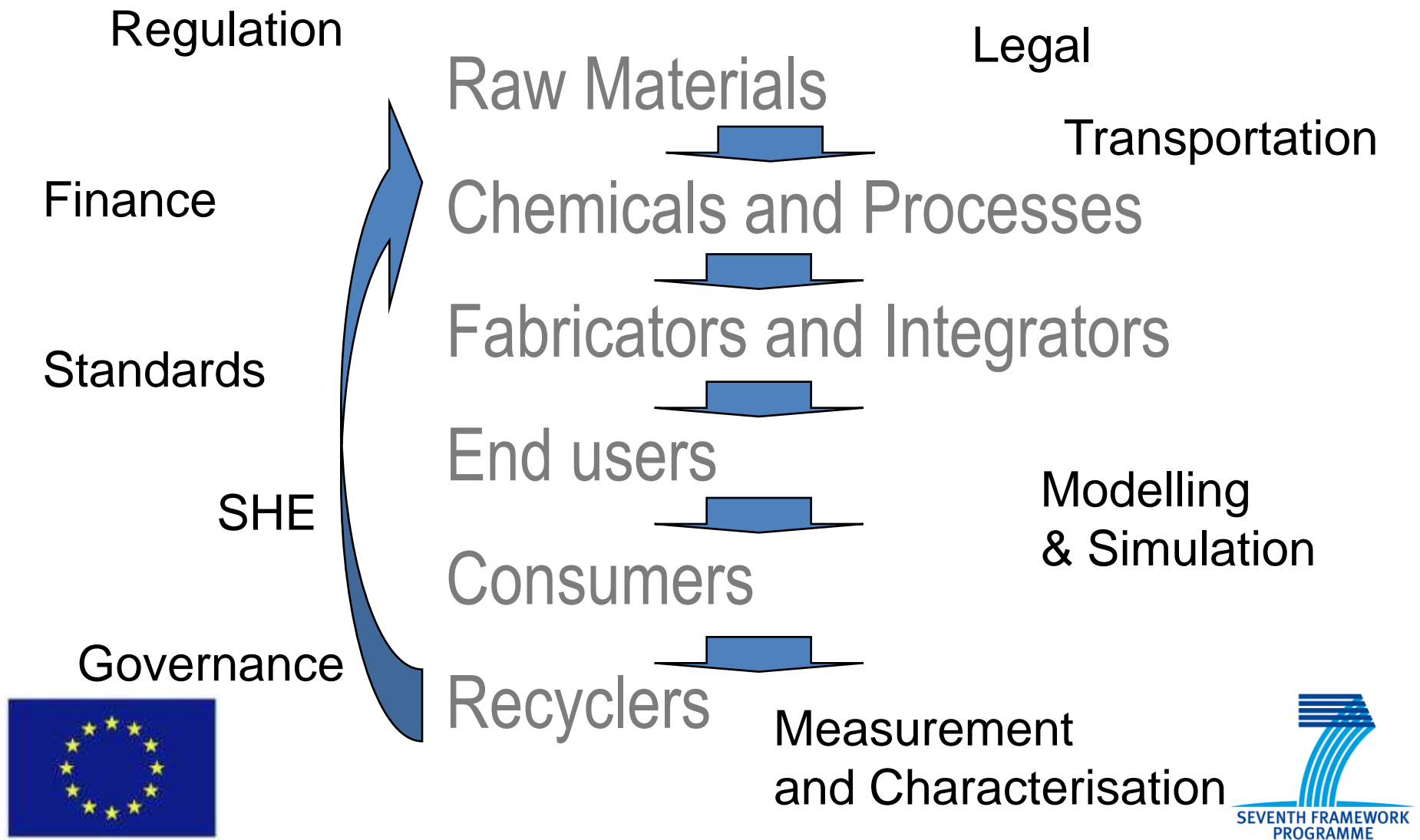
Top 3: *beer*
meat
soft drinks

Slide courtesy of Alan Smith (AZT Ltd.)

Nanotechnology supply chains

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What are standards?

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- Generally accepted ways of doing things
 - Altruistic – outside of ‘business’ interest
 - Definitions of repeatable practise
 - Resolves problems in the market
 - Not aspirational! More practical..
- Highly consulted documents
- Expensive and hard to develop
- Self Consistent – mostly with SI system and other ‘standards’
- ‘He who controls the standard controls the market’



What are they used for?

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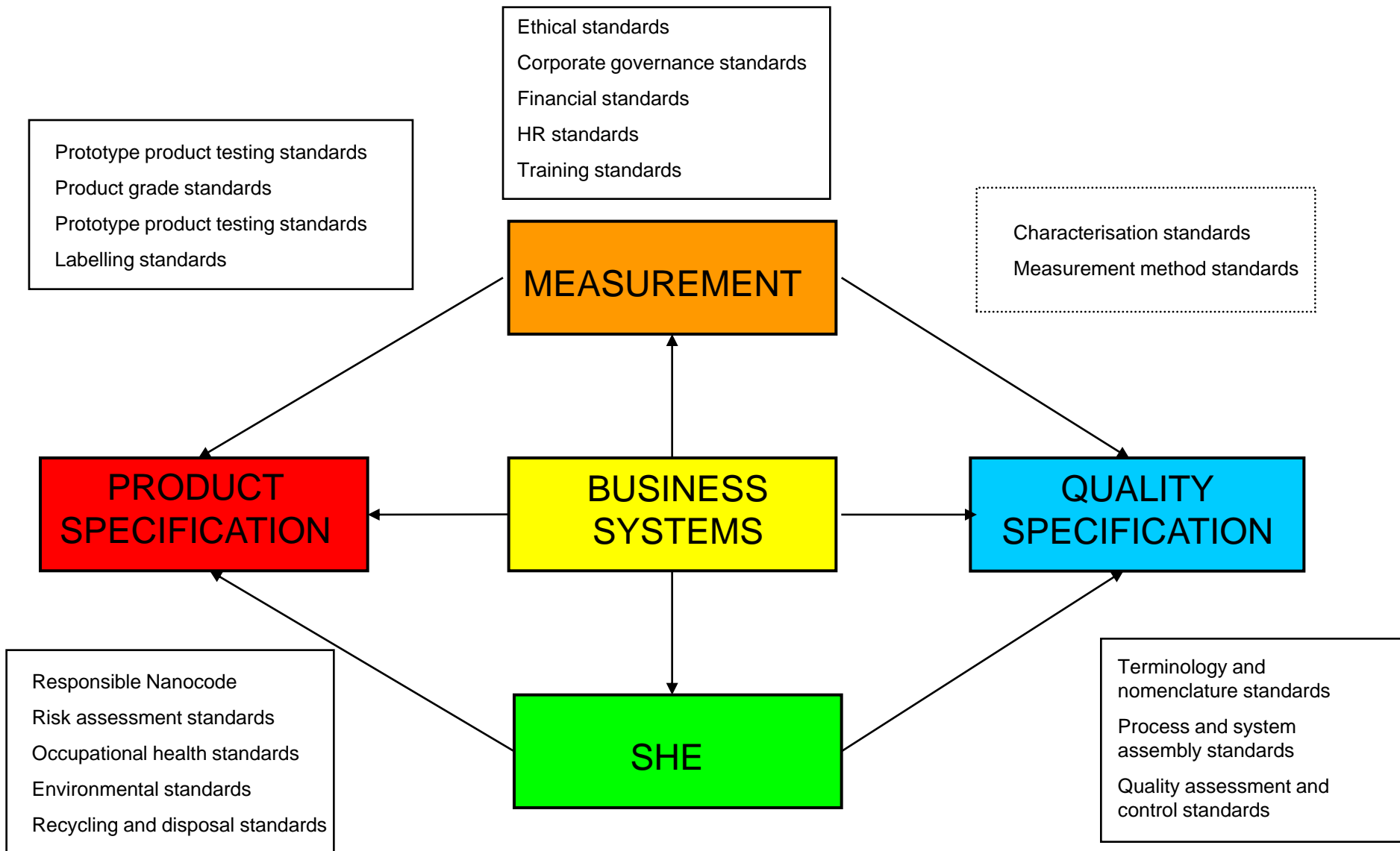
- Helps international trade
- Helps define the field
- Provision of market clarity and confidence
- Guidance on best practise
- Counterpoint to regulation
 - Underpins limits and defines measurement methods
- Support to REACH?
- Reduction of business risk (esp insurance)



General business standards

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Relevant committees and instruments

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- ISO TC 229 - Nanotechnologies
 - ISO TC 201- Surface Analysis (including SPM)
 - ISO TC 24 – Particle sizing
- CEN TC 352
- National Committees e.g. BSI NTI/1
- Formal Instruments - TS, TR, PAS (ISO), IWA etc.
- Informal Instruments – SOP's, recipes, protocols
- Defined processes for development
- See www.iso.org for further information



Realms of application

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- Nanoparticulates and thin films
- Nanoelectronics
- Nanobio
- Scanning Probe Microscopy
- Surface Analysis
- Nano Risk (Environment/Health/Safety)
- Carbon Nanotubes
- Societal Engagement



Areas of current interest

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- Terminologies & Nomenclature
- EHS standards
- Nanomaterial specifications
- Workplace best practise
- Reference materials and artefacts
- Testing protocols
- Measurement and Characterisation

