



NANO futures EITP

**The EU scenario in
nanotechnology and new
perspective in cancer
therapy**



REGIONE VENETO
AZIENDA U.L.S.S. n. 9 di Treviso

Con il patrocinio di
SIE - Società Italiana di Ematologia

Unità Operativa di Ematologia
Responsabile Dott. F. Gherlinzoni

**NUOVE FRONTIERE
NELLA TERAPIA
DELLE MALATTIE
ONCOLOGICHE ED
ONCOEMATOLOGICHE**

20-21 NOVEMBRE 2015
TREVISO
Auditorium Santa Croce
Complesso San Leonardo

Treviso 20-21 Nov. 2015

What

Why

How

Example



NANO*future*s environment
it's an HUB for the
NANOtechnologies where
several actors can interact

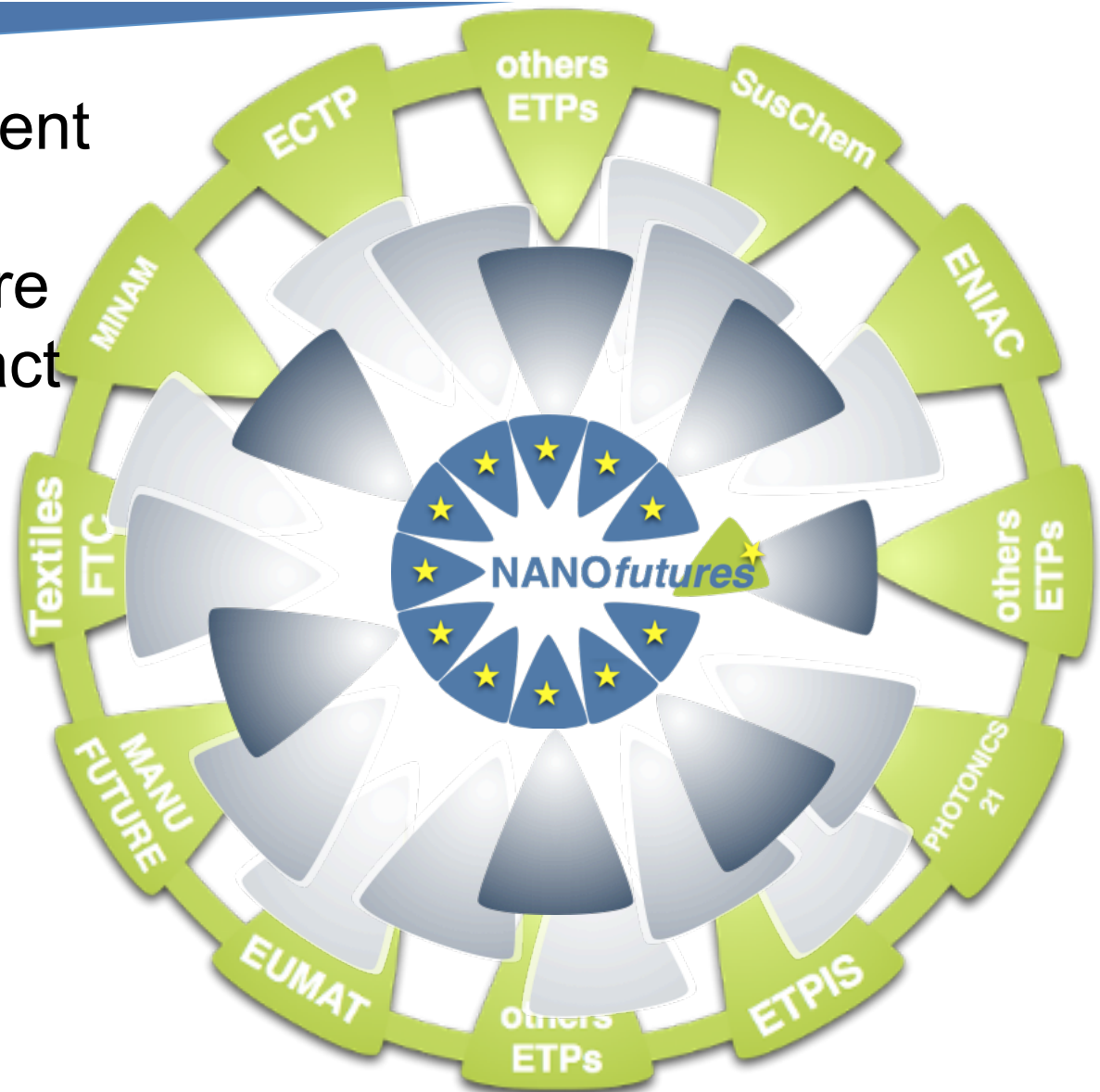
From **industrial** sectors,

From industrial
association and
networks

From **research**
institute and
universities

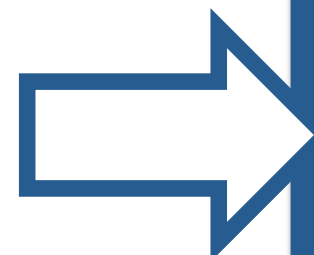
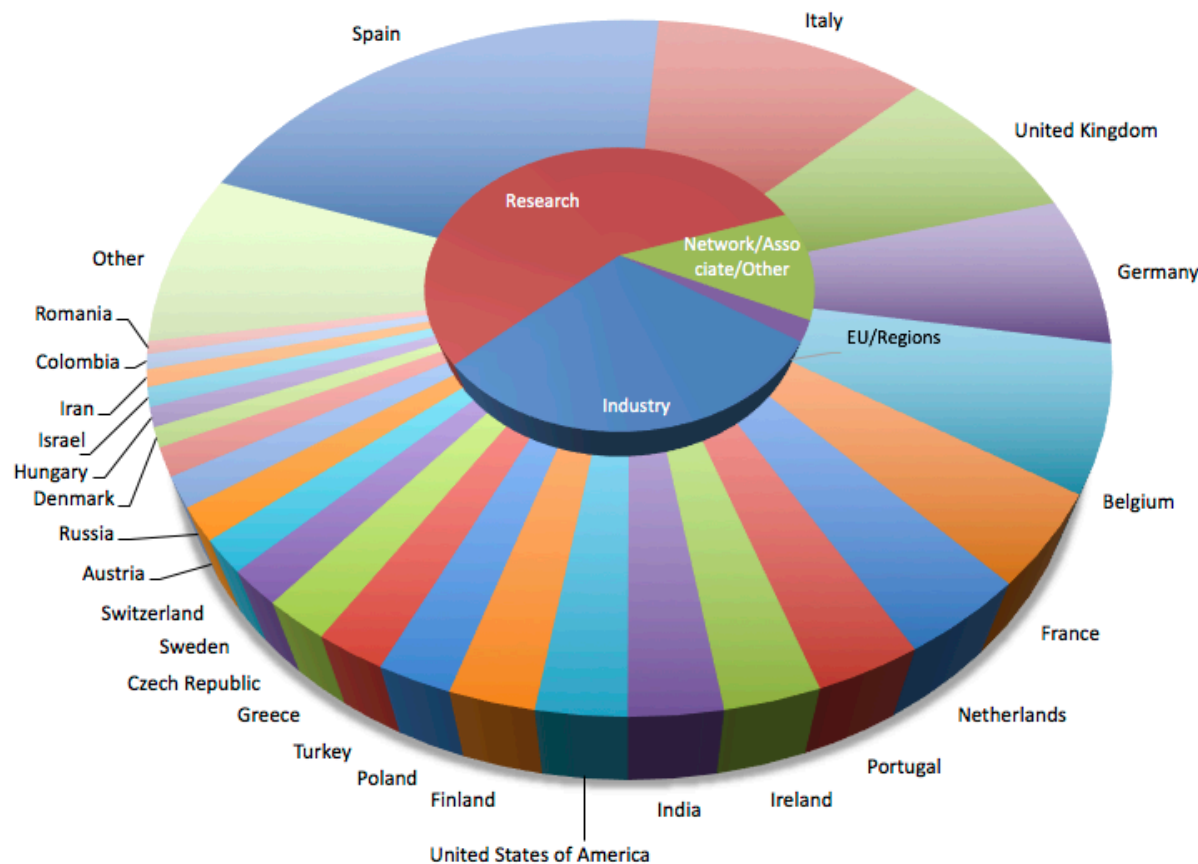
Plus close cooperation with

11 European Technology Platforms



Platform Members

The Platform structure guarantees a cross-cutting approach:
10+1 Horizontal Working Group



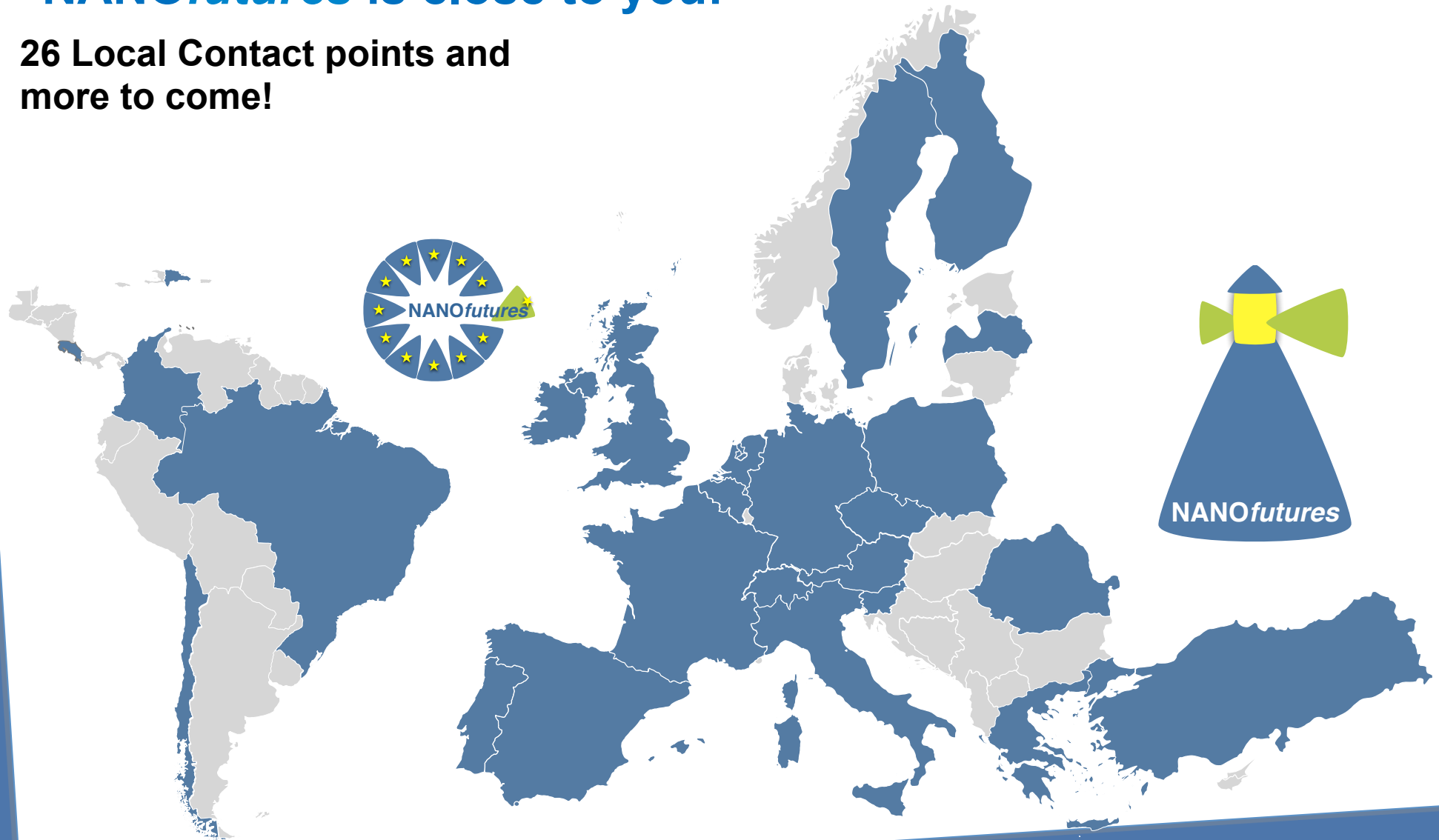
INDUSTRIALIZATION	495
RESEARCH and TECH.	645
SAFETY	349
STANDARDIZATION	268
REGULATION	235
COMMUNICATION	355
Tech. Transfer and Innovation Financing	459
NETWORKING	442
SKILLS AND EDUCATION	319
CRITICAL ROW MATERIALS	58
SOCIETAL ENGAGEMENT	NEW

Platform Network

NANO*futures* is close to you!

26 Local Contact points and more to come!

The lighthouse acts as a clear connection helping to translate activities/actions to the countries/regions and vice versa.



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WHY?



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NANO*fu*tures Vision

NANO*fu*tures is the **European Technology Integrating and Innovation Platform** on nanotechnology. Its main objective is to facilitate the **nanotechnology development and commercialization** by connecting all relevant nanotechnology

NANO*fu*tures fosters a responsible development of the Nanotechnologies by balancing:



All the main actors need to be involved in the process of tracing a Roadmap

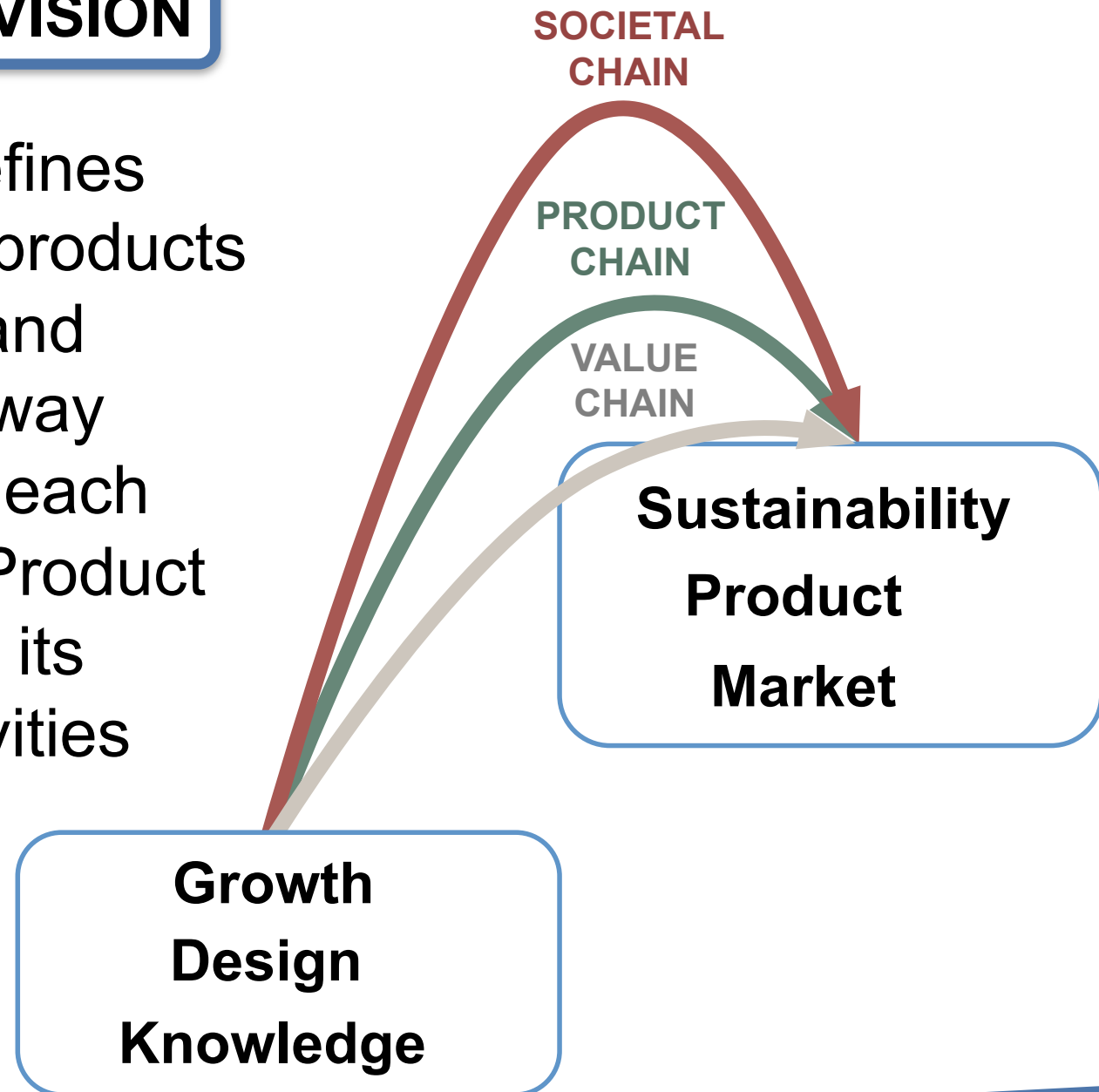
Companies
and Industrial
Clusters

Research
Institution and
HE

Policy Maker
and
Governments

Evolving VISION

NANO futures defines development of products in a systematic and comprehensive way considering that each major step of a Product Value Chain has its subchain of activities



HOW?



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Roadmapping Activity

Approach

- **Bottom-Up**
- **Open and Inclusive**
- **Cross-Sectorial**
- **Systematic**

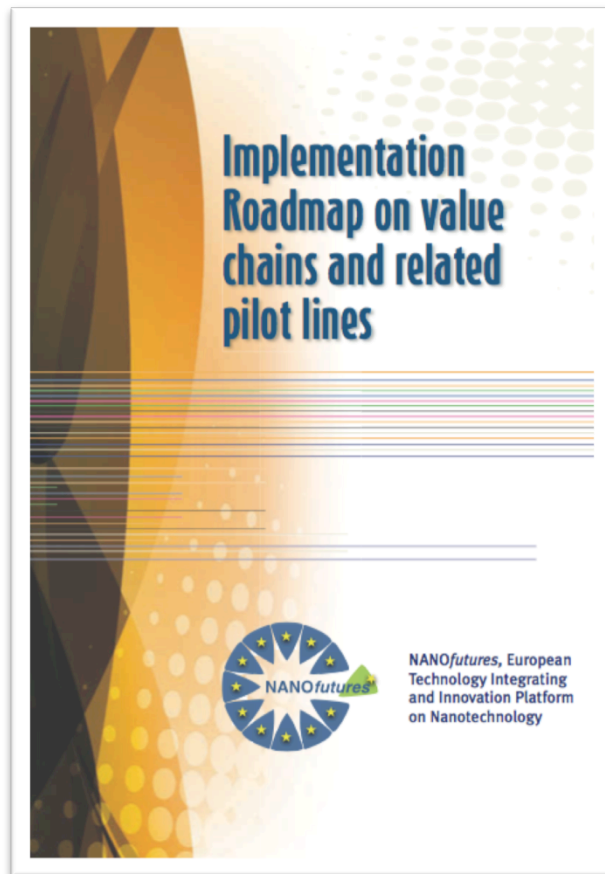
Structure

- **Market addressed Value Chains**
- **Actions Sequences in Short-Medium-Long Term**
- **TRL targets**



Roadmapping Activity

WHAT'S NEW IN THE IMPLEMENTATION ROADMAP



New Actions in the four VC

Examples of Pilot Lines

Market scenario of those Pilot Lines

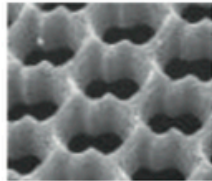
Consortia examples of those Pilot Lines

Roadmapping Activity

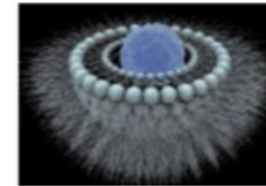
MEDICINE AND PHARMA IN THE ROADMAPS



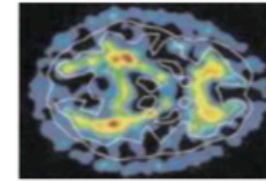
Nanostructured
Coating



Microfluidics,
Lab on chips



Nano-pharmaceutical and
contrast agent for theranostics

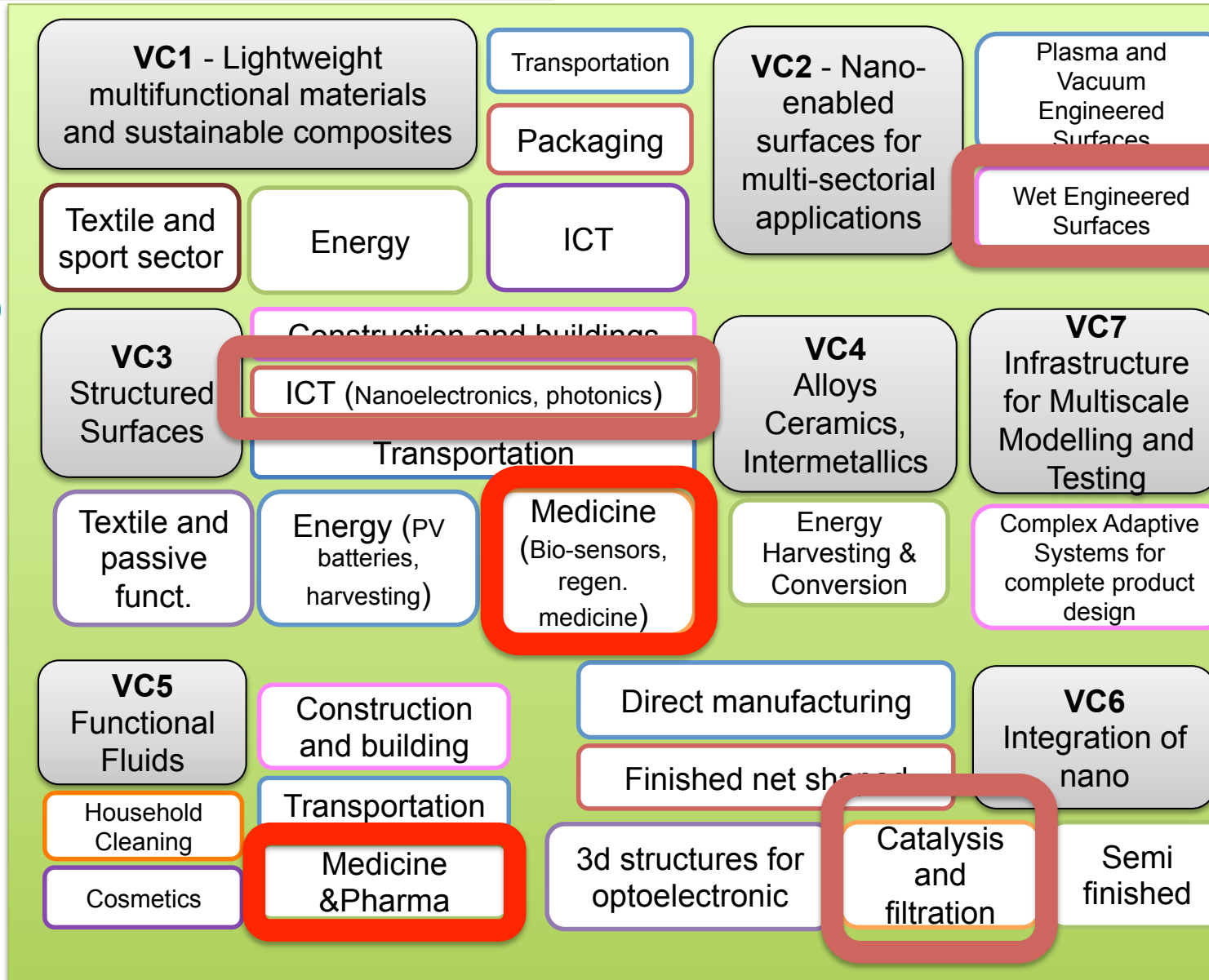
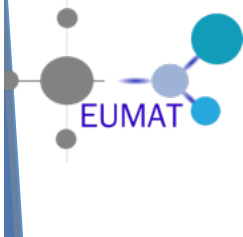


ACTIONS ARE DETAILED TOWARD:

- Regenerative medicine, diagnostics and drug delivery
- Nanoporous and nano-enabled textiles structures and surfaces for smart biomaterials
- Microfluidic advanced systems for in vitro diagnostics
- Smart chemical and bio sensors for multi-parameter measurements (multiplexing)
- Nano-particles/capsules/nanofluids for to be used as nanopharmaceuticals and/or contrast agents



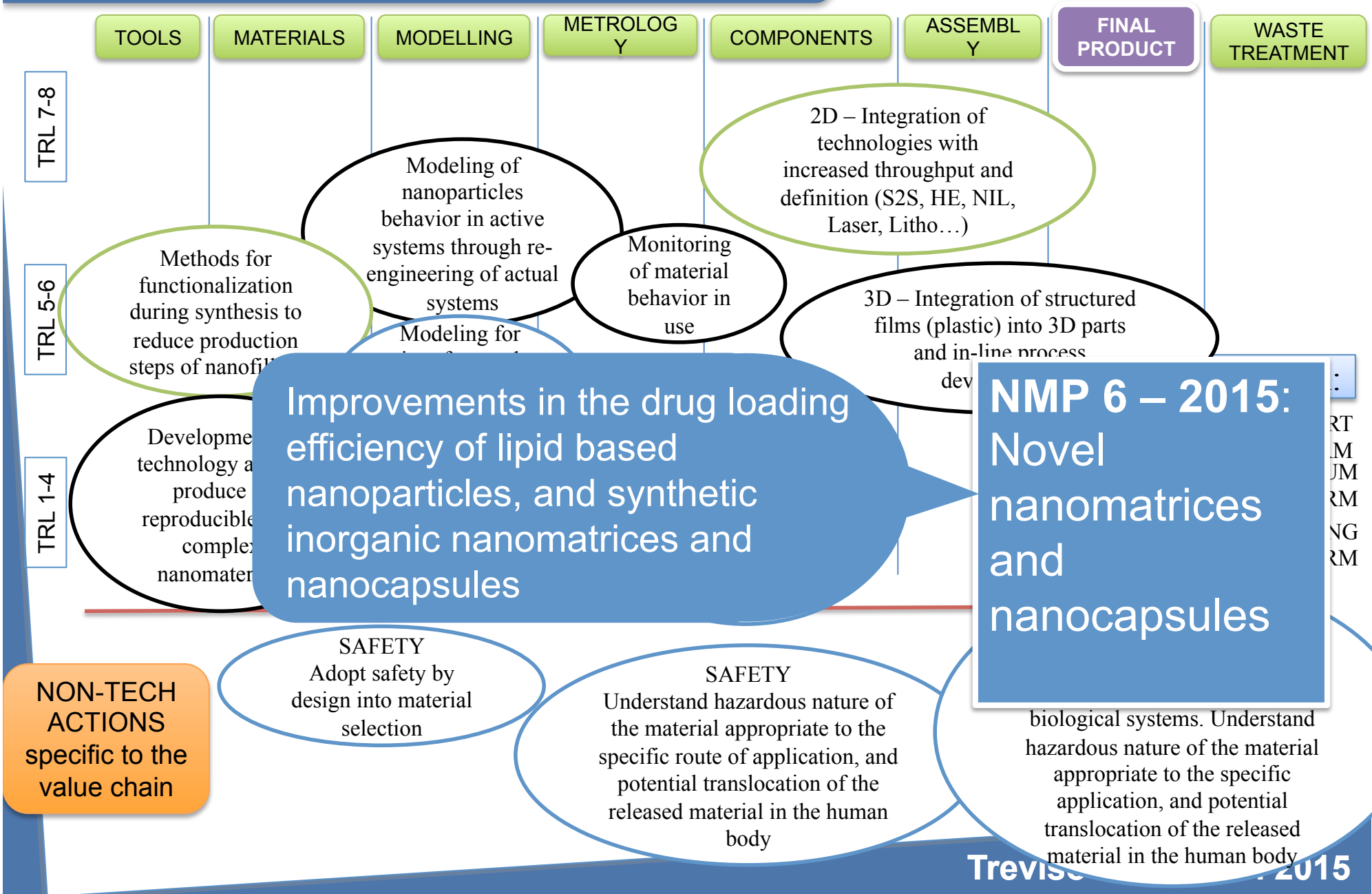
Roadmap Focus: VCs & Markets



Cross Sectorial Non-Technological Actions

Examples of Actions in Medicine

SHOT TERM

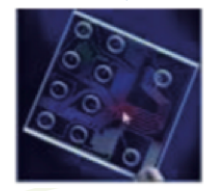


Examples of Actions in Medicine

MEDIUM TERM



TRL 7-8



2D – Integration of technologies with increased throughput and definition (S2S, HE, NIL, Laser, Litho...)

TRL 5-6

Methods for functionalization during synthesis to reduce production steps of nanofillers

engineering of actual systems

of material behavior in use

3D – Integration of structured films (plastic) into 3D parts and in-line process development

TRL 1-4

Development of technology able to produce in reproducible way complex nanomaterials

Modeling for interface and functionalization particles

Design of multifunctional materials tailored for different needs

Improvements in the drug loading efficiency of lipid based nanoparticles, and synthetic inorganic nanomatrices and nanocapsules

LEGENDA:

- SHORT TERM
- MEDIUM TERM
- LONG TERM

NON-TECH ACTIONS
specific to the value chain

SAFETY
Adopt safety by design into material selection

SAFETY
Understand hazardous nature of the material appropriate to the specific route of application, and potential translocation of the released material in the human body

SAFETY
Characterise and control mechanical release of nanoparticles to the surface in biological systems. Understand hazardous nature of the material appropriate to the specific application, and potential translocation of the released material in the human body

Examples of Actions in Medicine

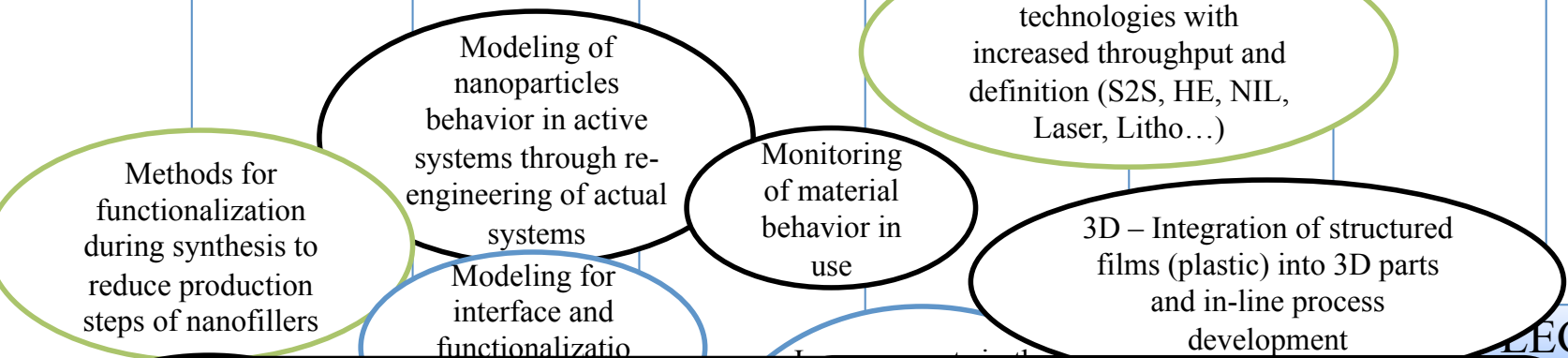
LONG TERM



TRL 7-8

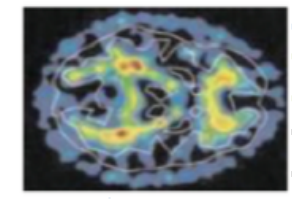
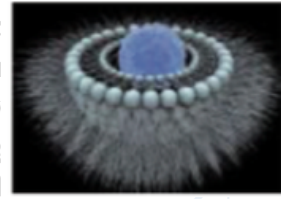
TRL 5-6

TRL 1-4



LEGENDA:

- SHORT TERM
- MEDIUM TERM
- LONG TERM



NON-TECH ACTIONS
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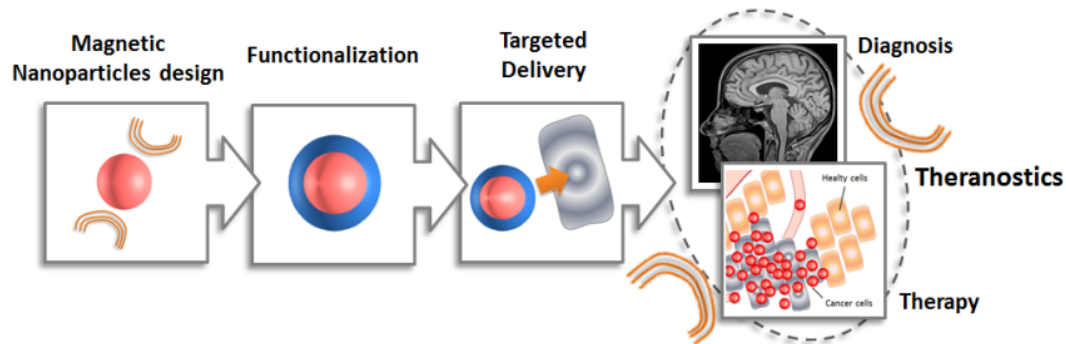
SAFETY
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EXAMPLE



Value Chain Example

Encapsulated Magnetic Nanoparticles for Self Regulating Hyperthermia in Theranostic Oncology



SOCIETAL CHAIN

PRODUCT CHAIN

VALUE CHAIN

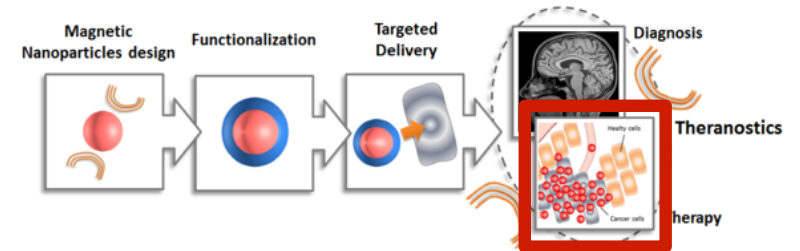
Sustainability
Product
Market



Patent
Gherlinzoni
Gottardi
Matteazzi

Growth
Design
Knowledge

THERANOSTIC APPROACH

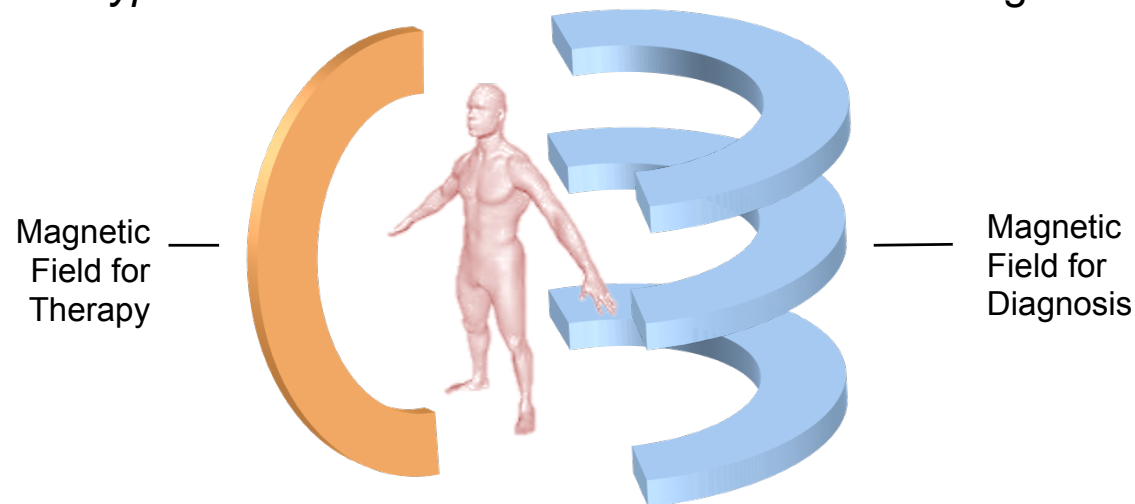


Theranostics = Therapy + Diagnosis

The **functional nanoparticles** are suitable for

Locally perform magnetic *hyperthermia*

Contrast agents for *MRI diagnosis*



allowing:

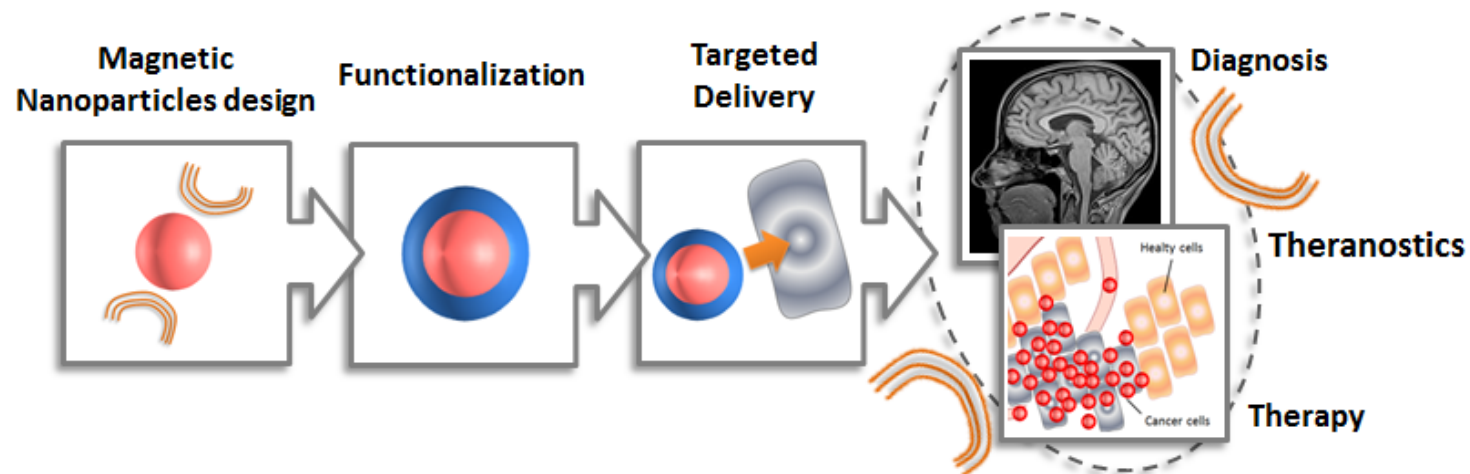
- «Real time» imaging
- Evaluation of therapy evolution
- Higher and safer control

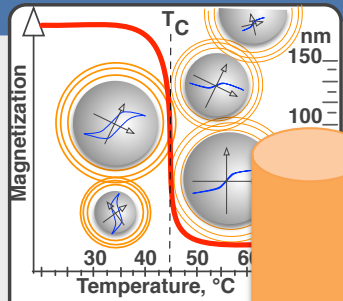
Encapsulated Magnetic Nanoparticles for Self Regulating Hyperthermia in Theranostic Oncology

Intrinsically safe, by magnetic nanoparticles with self regulating heating

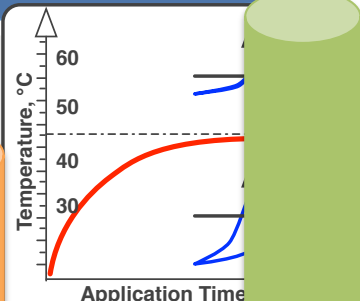
Selective effectiveness, by shell functionalization for targeted delivery

Powerful technique in Oncology, by theranostic approach

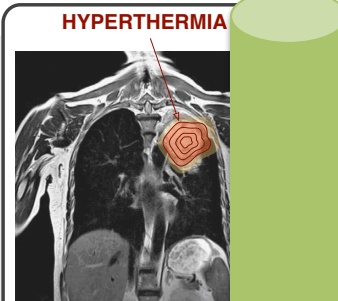




MAGNETIC NANO PAR



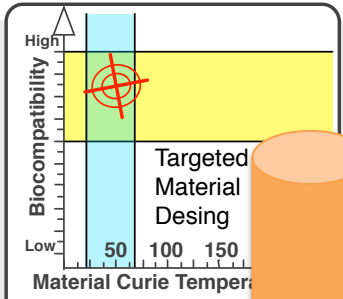
SELF REGULATING H



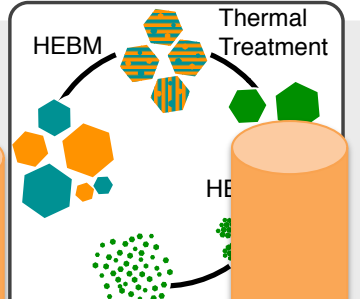
TARGETED HYPERT

CONCEPTS

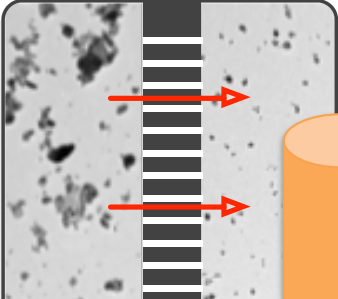
Development Status in the Value Chain



MNPs DESIGN

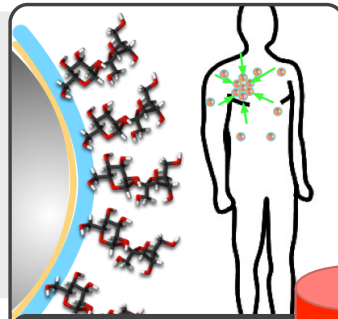


MNPs PRODUC

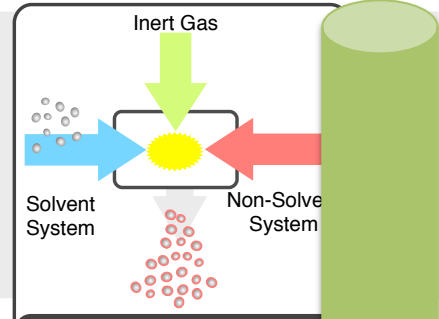


MNPs

DEVELOPMENT

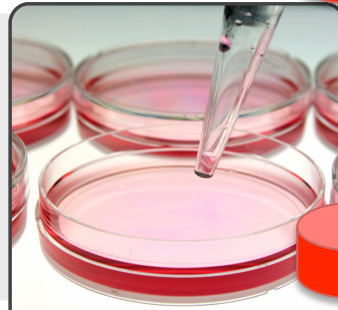
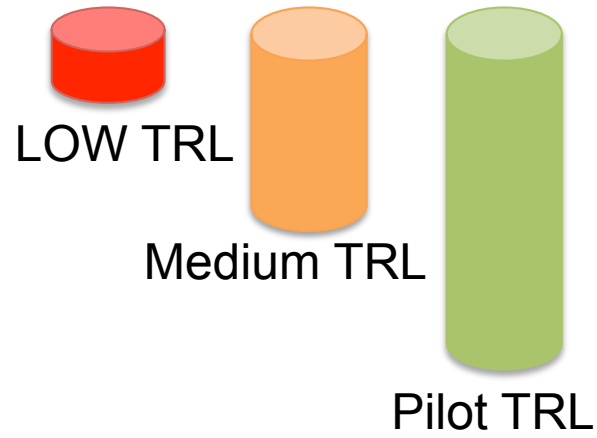


DESIGN OF TARGET DELIVER

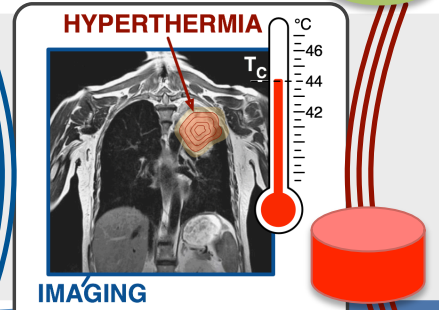


MNPs ENCAPSULATION

ENCAPSULATION



TOXICOLOGICAL PROFILE

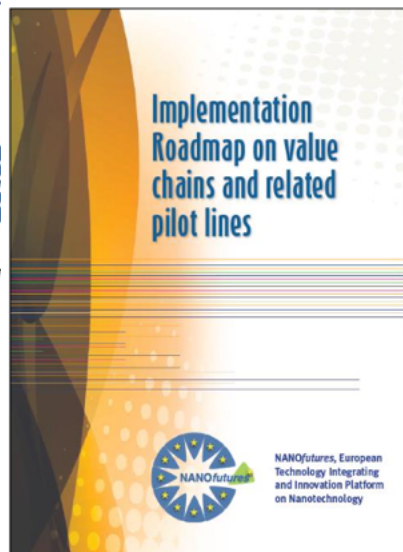


PROOF OF THERANOSTIC CONCEPT

THERANOSTIC FUNCTIONALITIES



THANK YOU FOR YOUR ATTENTION



FIND THE ON LINE ROADMAP DOCUMENTS:

-“Implementation Roadmap on value chains and related pilot lines”

-“Appendix to the Implementation Roadmap on value chains and related pilot lines” at:

<http://nanofutures.eu/documents>

Please, join our **Open Consultation** at:

<http://value4nano.eu>

GIVE A LOOK TO OUR VIDEO

You Tube NANOfuture channel



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