

WE
CAN DO
SO MUCH
TOGETHER

Role of pilot plants in our technology strategy

**Workshop "Nanotechnologies and Advanced Materials Pilot
Projects Test-beds for industry and private investments"**

8th March 2017

Index

SCIENTIFIC &
TECHNOLOGICAL
CHALLENGES

ROLE OF PILOT PLANTS

BASQUE INDUSTRY 4.0
IMPLEMENTATION STRATEGY

SUSTAINABLE
BUSINESS MODEL

TECHNOLOGICAL
EXCELLENCE:
FOCUSED AND ADDED
VALUE SPECIALISATION

PROXIMITY TO
THE MARKET

WE TRANSFORM TECHNOLOGY INTO GDP

BOOST TO THE
POTENTIAL OF
PEOPLE

OPEN AND INNOVATIVE
ORGANISATION

SCIENTIFIC & TECHNOLOGICAL CHALLENGES



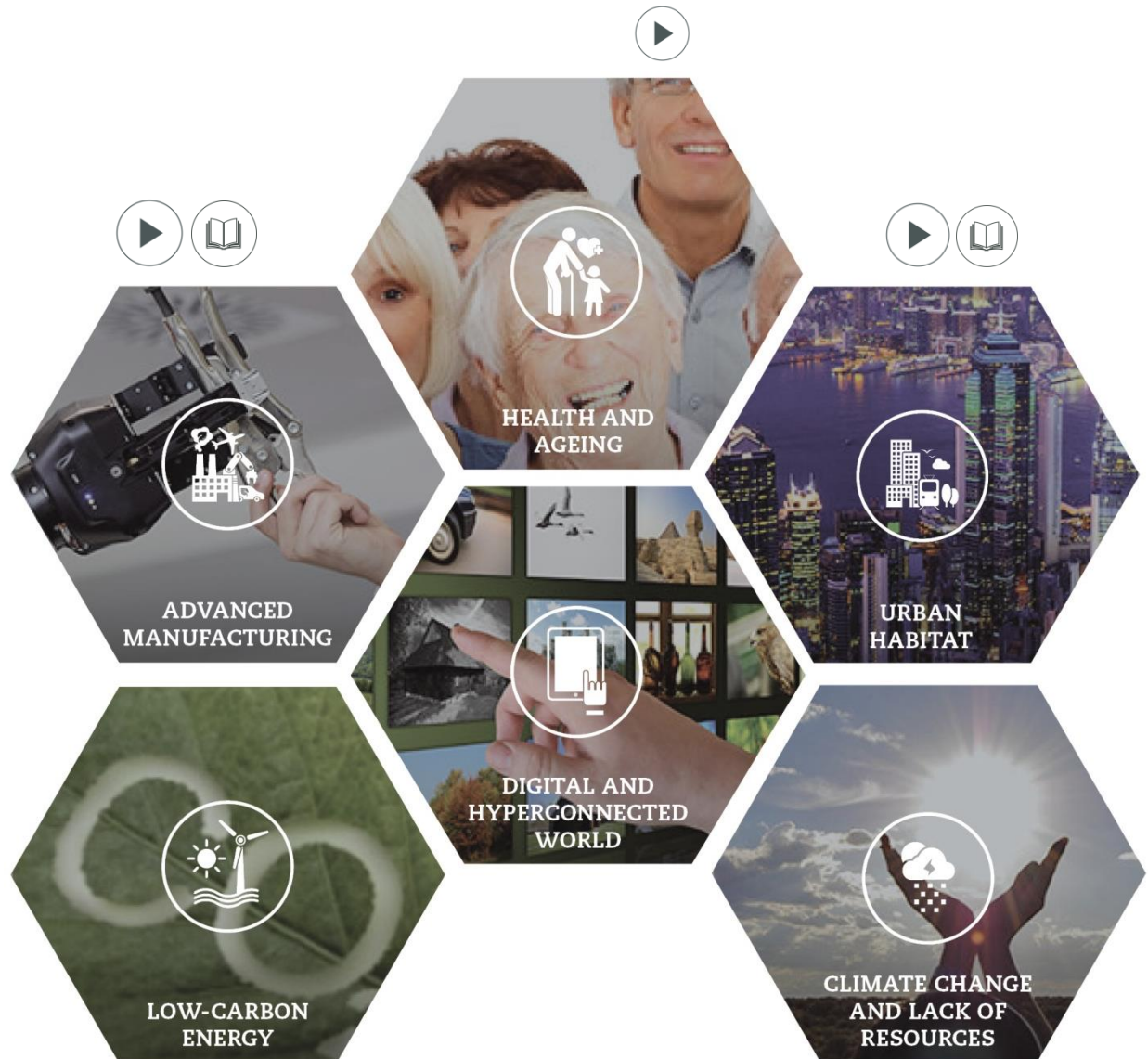
SCIENTIFIC &
TECHNOLOGICAL
CHALLENGES



EXCELLENCE:
NANOTECHNOLOGY
CLUSTER

6 global challenges
6 opportunities

WE RESEARCH TO OVERCOME CHALLENGES FACED BY MANKIND

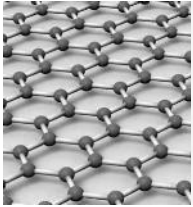


TECNALIA's

Nanotechnology Cluster aims to generate knowledge in nanoscience and nanotechnology, which can lead to **high added value materials and products**, ensuring economic impact and job creation coming from the resulting **nanotechnology-based industrial applications**.

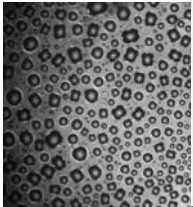
The CLUSTER has approx. **116 researchers, mainly PhDs (60%)** in different fields (chemistry, physics, biology, engineering, etc)

Novel nanomaterials ▼



Synthesis and functionalization of nanomaterials, such as nanoparticles (metallic, metal oxide, polymeric), nanofibres including nanocellulose, graphene and other carbon-based nanostructures, etc.

Nano-based materials and products ▼



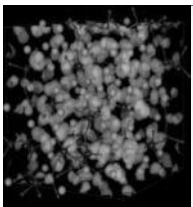
Nanomaterial dispersion and incorporation into different bulk materials, as well as coatings and nanostructured surfaces, for different uses in health, energy, construction, automotive, aerospace and other industrial applications.

EHS & REG ▼



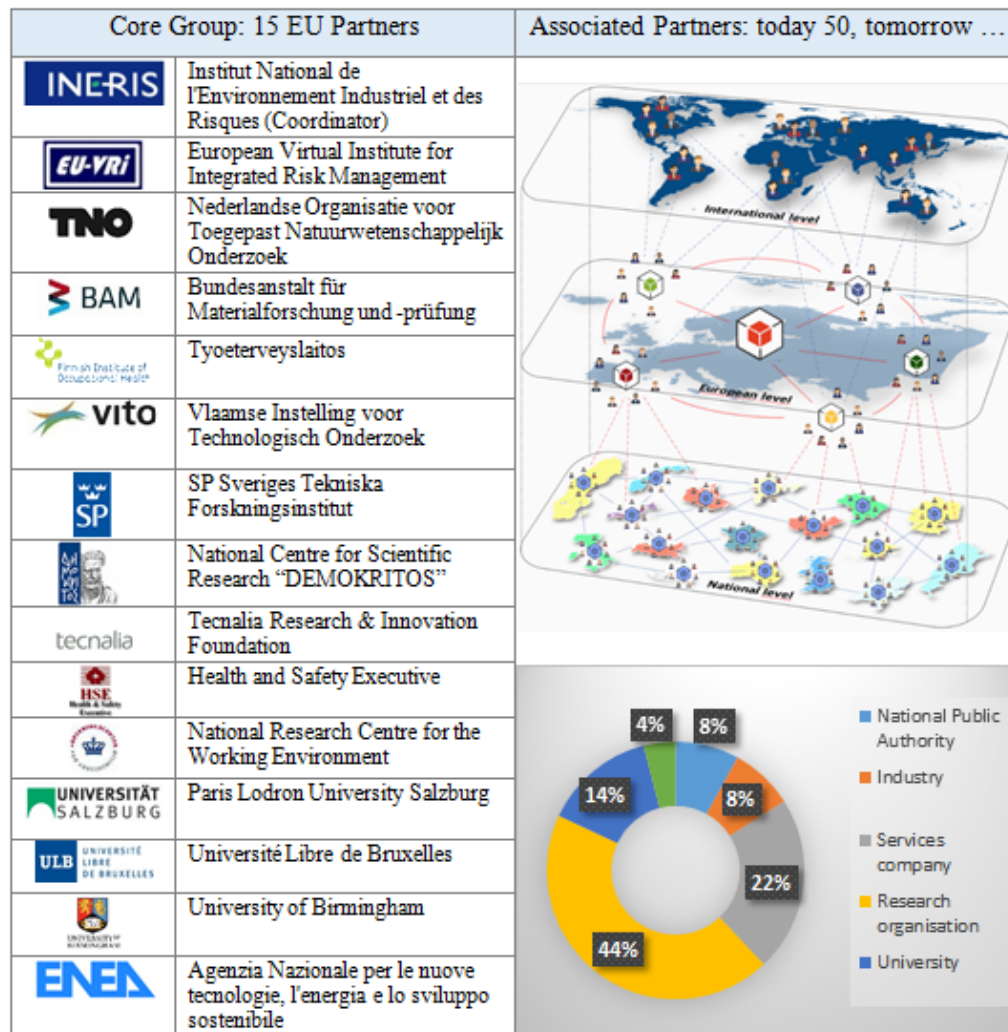
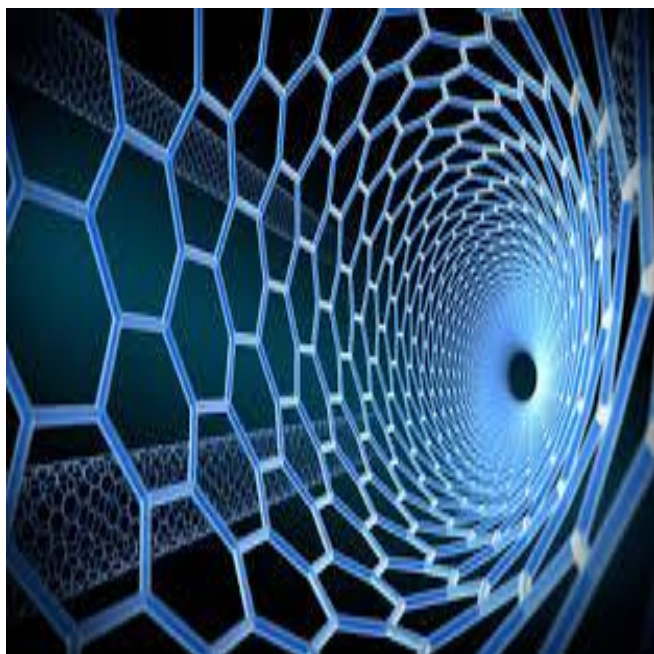
Health, safety & environmental impacts of nanotechnology. Regulations.

Multi-scale modeling ▼



Tools for predicting material properties. Mainly focused on green concrete design.

EC4SafeNano



Pilot Projects and Nanosafety

- Pilot plants are fundamental to ensure the growth of the nanotechnology-based industry.
- In the development of these new pilot plants, the **“SAFE-BY-DESIGN”** approach is a key element to ensure safe processes and products.


ROLE OF PILOT PLANTS



TECNALIA's
MODEL

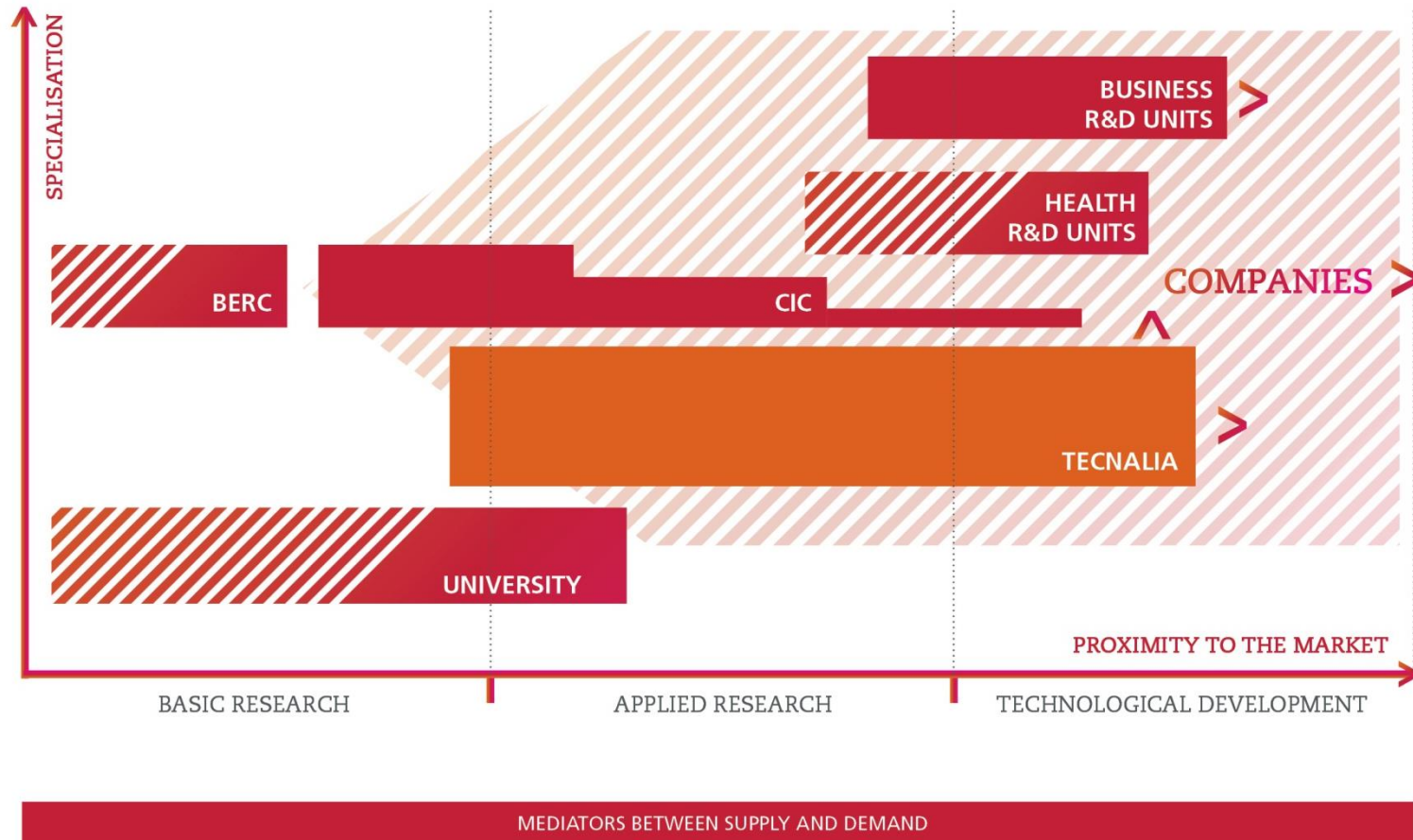


CROSSING
VALLEY OF DEATH



Nano & Advanced Materials
related PILOT PLANTS at
TECNALIA

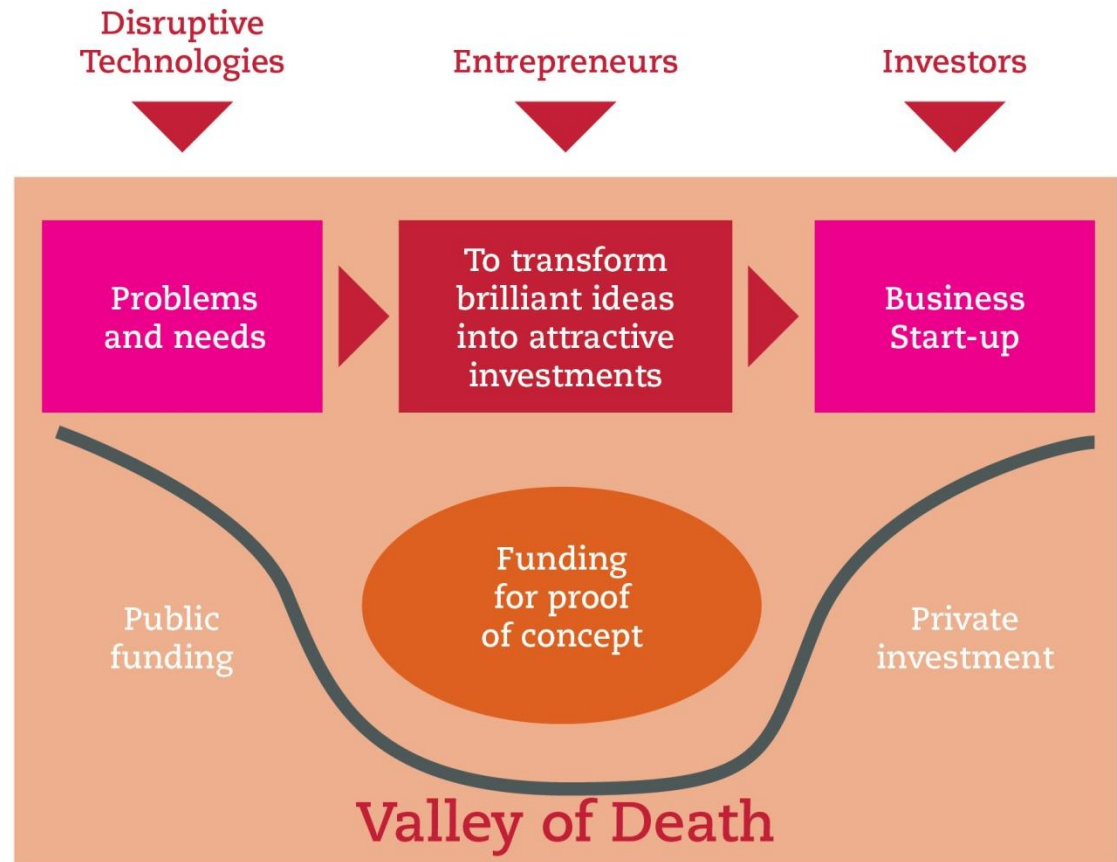
VALUE CHAIN



tecnalia ventures
Technology Value for Growth

— Is a 100%
TECNALIA-owned company
set up with the objective
of harnessing in-house R&D and
innovation and integrally managing
the life cycle of innovative
technological assets in order to
maximise their impact.

**It has an Incubation
Acceleration Programme
with the aim of turning
technologies into
technology-based business
opportunities.**



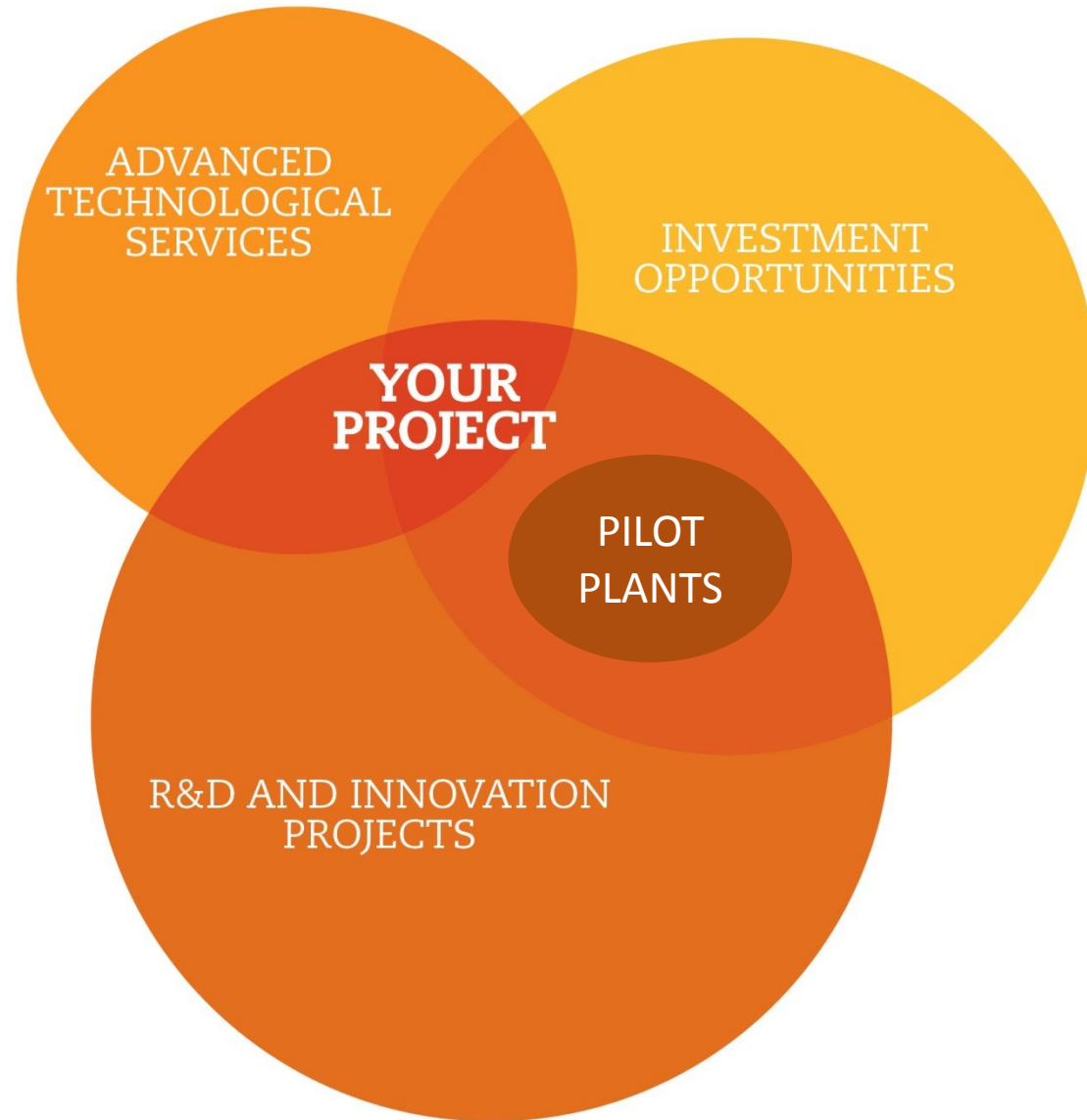
Acceleration of business opportunities incubation



Type of
Services

TECNALIA VALUE

Is our business offer,
oriented to the needs of
companies.



NANOTECHNOLOGY AND ADVANCED MATERIALS BASED PILOT PLANTS AT TECNALIA

IZADI ▼

Injection moulding, casting and coating PILOTS for the production of improved components with nano materials for automotive, construction and agricultural machinery

Consortium:

1. F.undación TECNALIA research and Innovation (Coordinator)
2. Warrant Group S.r.l. Italy
3. Danmarks Tekniske Universitet Denmark
4. NIL Technology ApS Denmark
5. MAIER S. Coop. Spain
6. BONFIGLIOLI RIDUTTORI SPA Italy
7. SEMATEC Spain
8. ICECHIM Romania
9. SISTEPLAN Spain
10. Cemecon Scandinavia A/S Denmark
11. ToolPartners A/S TOOL Denmark
12. MARION TECHNOLOGIES France
13. Fonderie Mora Gavardo Italy

TRL Range: 5-7

Abstract:

IZADI-NANO2INDUSTRY project proposes different solutions based on KETs such as nanotechnology, advanced materials and advanced manufacturing. The project aims to implement the master-batches, the master-pellets and the nanostructured powders in three innovative PILOTS, developed and installed at three existing production plants that will effectively manufacture real components (B-pillar, Swash plate and Valve plate) integrating safe-by-design approaches into the developments stages. The project follows to develop inherently safer production methods.



Pilot description:

COST-EFFECTIVE industrial process to **IMPROVE DURABILITY** and **INCREASE EFFICIENCY** in industrial machinery- TRIBONANO-

Partner Owner: BONFIGLIOLI

Europe Region: EMILIA ROMAGNA (Italy)

Location: FORNI

Access: PRIVATE



Pilot description:

Nano-reinforced metal castings (based on master-ingots) to improve the hardness and resistance to temperature of a Swash plate for Construction Agricultural machinery sector –HARDcast- (Gravity casting)

Partner Owner: FUNDICION DI MORA
GAVARDO

Europe Region: LOMBARDIA (Italy)

Location: BRECIA

Access: PRIVATE



Pilot description:

Nano-reinforced thermoplastic (based on master-batches) + Nanotextured surfaces in f B-pillar component for obtaining Anti-scratch and aesthetic properties for Automotive sector - ESTCRATCH (Injection moulding)

Partner Owner: MAIER

Europe Region: BASQUE(Spain)

Location: GERNIKA

Access: PRIVATE



PLATFORM ▼

Open access pilot plants for sustainable industrial scale nanocomposites manufacturing based on buckypapers, doped veils and preregs

Consortium:

- | | | | |
|----|--|--------|----------------|
| 1 | Fundación TECNALIA Research & Innovation | | |
| | (Coordinator) | | |
| 2 | University of Patras | UoP | Greece |
| 3 | Technology partners | TECPAR | Poland |
| 4 | Adamant Composites Ltd | ADA | Greece |
| 5 | Centro Ricerche Fiat | CRF | Italy |
| 6 | FIDAMC | FIDA | Spain |
| 7 | NANOCYL | NCYL | Belgium |
| 8 | CARBURES | | Spain |
| 9 | AENOR | AENOR | Spain |
| 10 | SISTEPLANT | SISTE | Spain |
| 11 | TMBK partners | TMBK | Poland |
| 12 | ELEMENT | ELE | United Kingdom |

Abstract:

PLATFORM aims to develop **open access pilot lines for the industrial production of buckypapers, CNT treated prepreg and CNT doped non-woven veils for composite applications** in sectors such as Aeronautic and Automotive. The purpose is to efficiently and economically manufacture components using novel nano-enabled products developed by the Consortium and **at a scale suitable for industrial uptake**. The developed facilities will not only provide increased capabilities to the operating company but also offer a network of nanorelated manufacturing facilities suited to the needs of related SMEs.

TRL Range:



Pilot description:

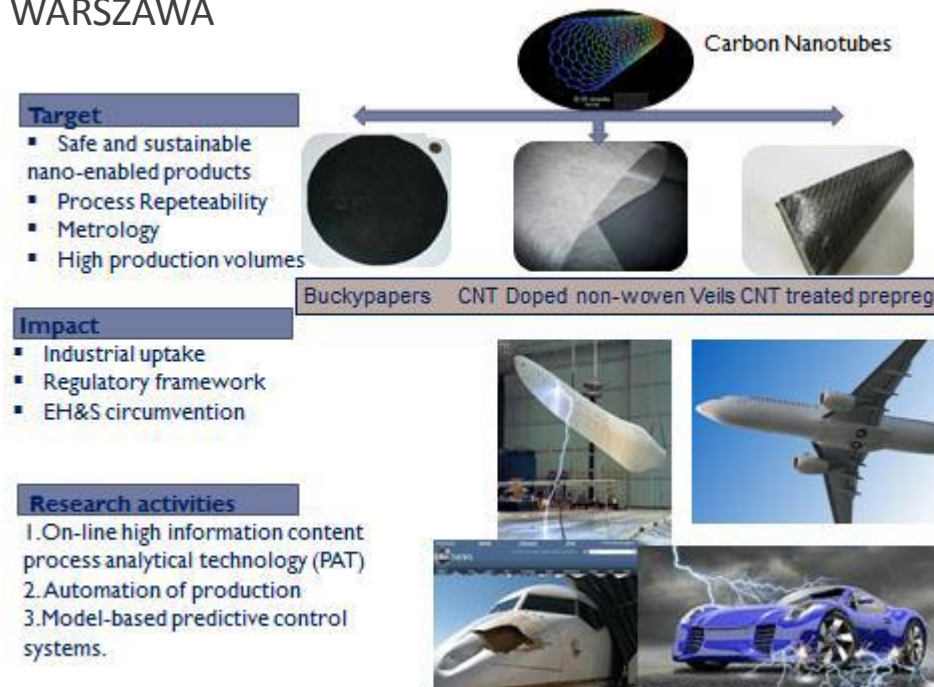
To develop open access pilot lines for the industrial production of nano-enabled products. (Buckypapers, CNT Doped non-woven veils, CNT treated Pre-pregs). Define, design and develop **safe by design manufacturing** methods based on the lean manufacturing principles trying to obtain the best lay-out of the plant and the best methods of processing and handling the products.

Partner Owner: TECNALIA, U.PATRAS, TECPAR

Europe Region: BASQUE, PATRAS, Warszawa

Location: SAN SEBASTIAN, PATRAS, WARSZAWA

Access: OPEN



FAST ▼

Functionally graded Additive Manufacturing (AM) scaffolds by hybrid manufacturing.

Consortium:

1. UNIVERSITEIT MAASTRICHT
2. FRAUNHOFER IST
3. NADIR SRL
4. GESIM GESELLSCHAFT FUR SILIZIUM-MIKROSYSTEME MBH
5. PROLABIN & TEFARM SRL
6. ABALONYX AS
7. POLYVATION BV
8. FUNDACION TECNALIA RESEARCH & INNOVATION

Abstract:

The FAST project aims to integrate all the “Functions” (mechanics, geometry, biomaterial, bio-active molecules and surface chemical groups) in the single Additive Manufacturing (AM) process. This integration will be obtained by the hybridisation of the 3D polymer printing with melt compounding of nanocomposites with bio-functionalised fillers directly in the printing head and atmospheric plasma technologies during the printing process itself. Final objective of the project is to realize a demonstrator of the proposed hybrid AM technology.

TRL Range:

Pilot description:

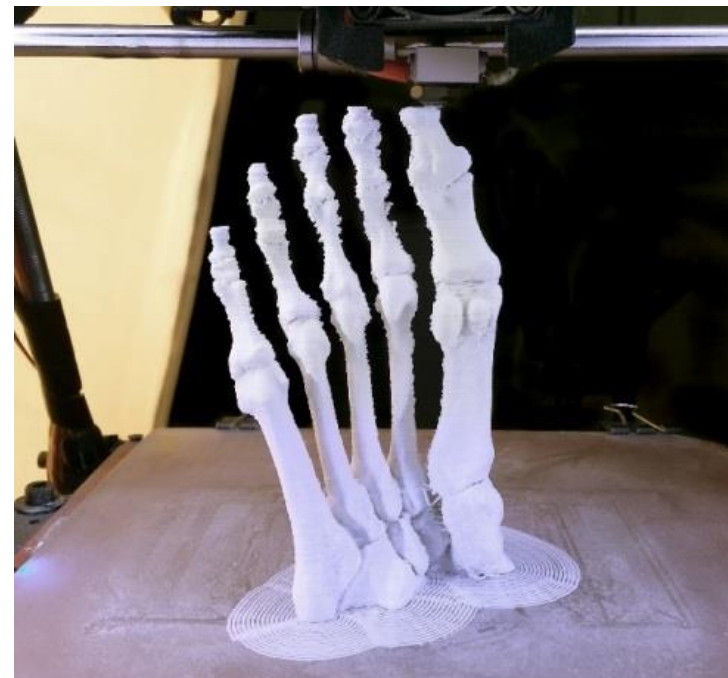
New 3D printing technology.

Partner Owner: GeSIM Gesellschaft für
Silizium-Mikrosysteme mbH

Location: Industry

Europe Region: Germany

Access: Private Access



R2R Biofluidics ▼

Large scale micro-and nanofabrication technologies for bioanalytical devices based on R2R imprinting.

Consortium:

1. Joanneum Research Materials – Coordinator
2. Fundación TECNALIA Research & Innovation
3. Greiner Bio-One Diagnostics GmbH
4. Inmold Biosystems A/S
5. BiFlow Systems GmbH
6. BioNanoNet Forschungsgesellschaft mbH
7. Innovative Technologies in Biological Systems S.L.
8. EV Group
9. bionic surface technologies GmbH
10. Micro resist technology GmbH.

TRL Range:



Abstract:

The project R2R Biofluidics aims on the development of a complete process chain for first-time realization of production lines for two selected bioanalytical **lab-on-chip** devices based on **high throughput R2R nanoimprinting in combination with complementary printing and manufacturing technologies**. Two types of demonstrators will be fabricated targeting application areas, which would clearly benefit from technology advancement in high volume manufacturing, show large potential for commercial exploitation and adopt current standard formats (microtiter plate and microscope slides).

Pilot description:

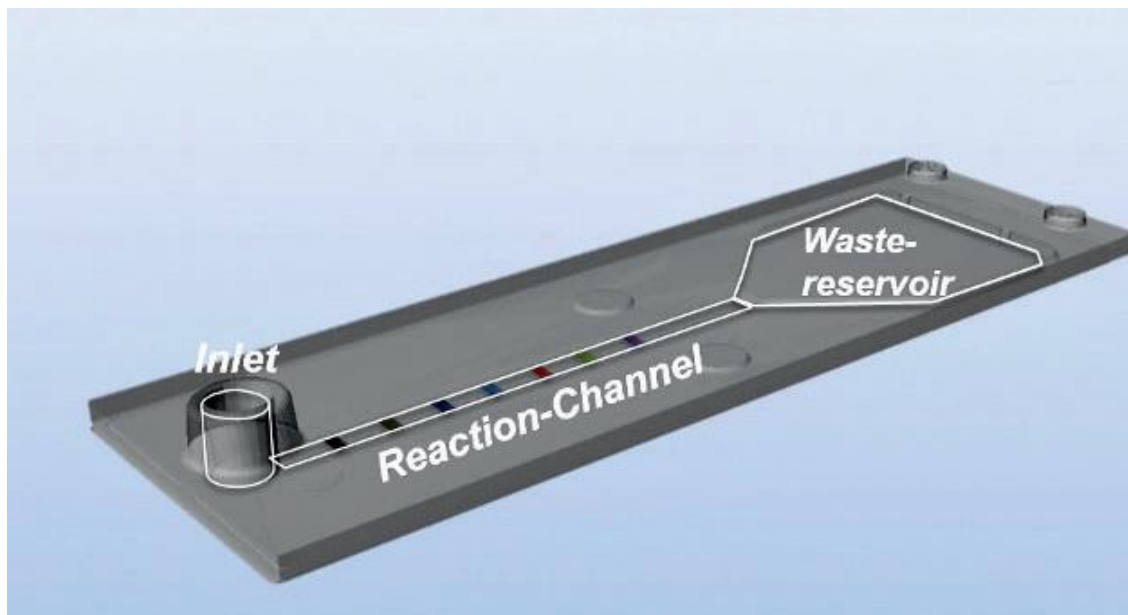
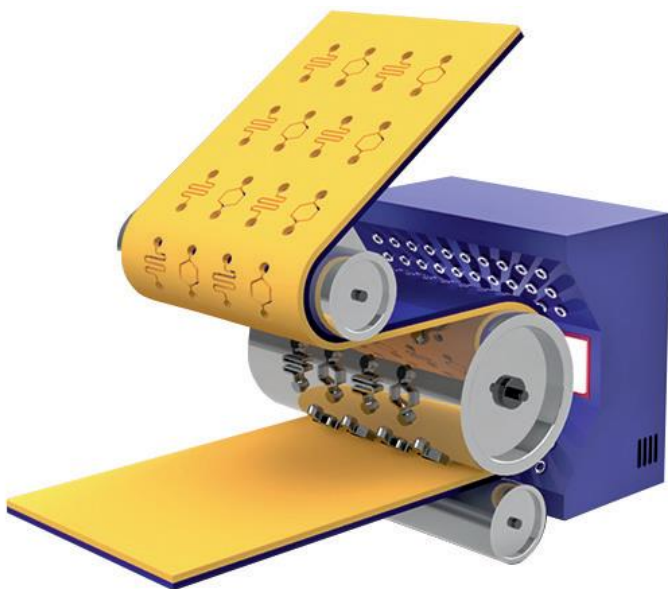
A roll-to-roll platform is an industrial vetted way to handle solution-based processes and coatings for high-volume manufacturing.

Partner Owner: Joanneum Research Center

Europe Region: Austria

Location: RTD Centre

Access:



INSPIRED ▼

INDustrial Scale Production of Innovative nanomaterials for printed Devices.

Consortium:

(1) Intrinsic Materials Ltd IML (UK); (2) Nanogap subnm powder S(A) (Spain); (3) Joanneum Research Forschungsgesellschaft mbH (Austria); (4) M-Solv Ltd (UK); (5) Thomas Swan & Co Ltd (UK); (6) BioNanoNet Forschungsgesellschaft mbH (Austria); (7) Touchnetix Ltd (UK); (8) Midsummer (Sweden); (9) EuroLCDs (Latvia); (10) Nanotechnology Industries Association AISBL NIA (Belgium); (11) Alma Mater Studiorum-Universita Di Bologna UNIBO (Italy); (12) Fundación **TECNALIA research & Innovation (Spain)**; (13) Universidade de Santiago de Compostela (Spain)

TRL Range:

Abstract:

The INSPIRED project will address **fundamental issues within the printed electronics industry**: **Ensuring that suitable functional nanomaterials formulations (inks)** are available for end users in industrial scale quantities. Production of these nanomaterial formulations on an industrial scale and then depositing them using cost-effective, high throughput printing technologies enables rapid production of printed electronic components, on a wide variety of substrates. Therefore, enabling new electronics applications, whilst overcoming the problems associated with traditional manufacturing.

TRL 1

TRL 2

TRL 3

TRL 4

TRL 5

TRL 6

TRL 7

TRL 8

TRL 9

Pilot description:

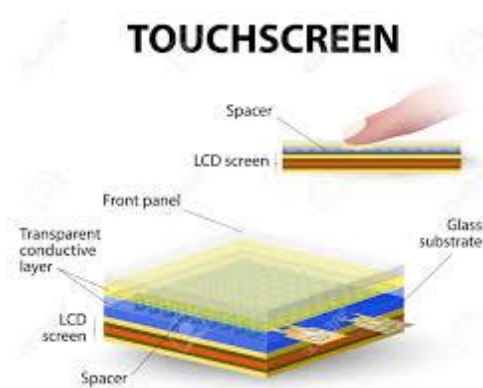
Pilot Line 1. Synthesis of Nano-copper including scale-up; Pilot Line 2. Synthesis of Ag Nanowires including scale-up; Pilot Line 3. Synthesis of graphene materials including scale-up; Pilot Line 4. Formulation of nanocopper inks including scale-up; Pilot Line 5. Formulation of AgNWs including scale-up; Pilot Line 6. Formulation of graphene materials including scale-up; Pilot Line 7. High-volume printing and sintering including development of pilot equipment.

Partner Owner: PL1. Intrinsiq Material; PL2. NanoGap; PL3. Thomas Swan; PL4. Intrinsiq Material; PL5. NanoGap; PL6. Thomas Swan; PL7. M-Solv

Europe Region: Spain and UK

Location: Industry

Access: Private Access



BASQUE INDUSTRY 4.0 IMPLEMENTATION STRATEGY



REFERENCE
MODEL



STRATEGIC
INITIATIVE 1



FOCUSED VIEW

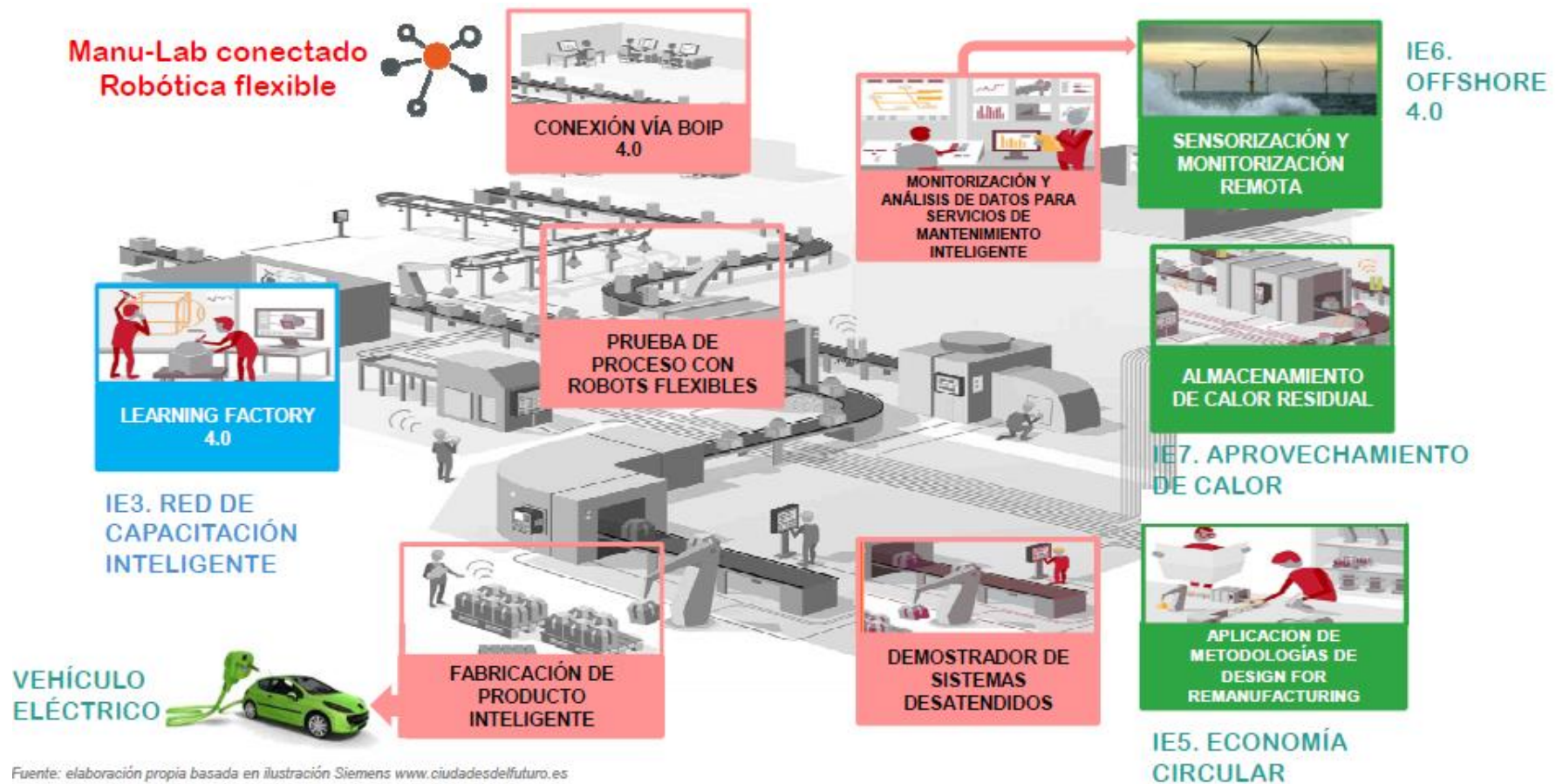
Towards a Competitive Industry 4.0 in Basque Region



Network of connected and distributed Infrastructures. PILOT PLANT. HUB



Pilot Plants are environments where Industry (SMEs) and training centers will develop, test, learn about new technology and new business models/services in specific fields



Fuente: elaboración propia basada en ilustración Siemens www.ciudadeselfuturo.es

THANK YOU FOR YOUR ATTENTION!!!



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