VANGUARD INITIATIVE
New growth through smart specialisation

IDEA
CONSULT thinking ahead

New Nano-Enabled Products Pilot

A Vanguard Initiative Pilot Project

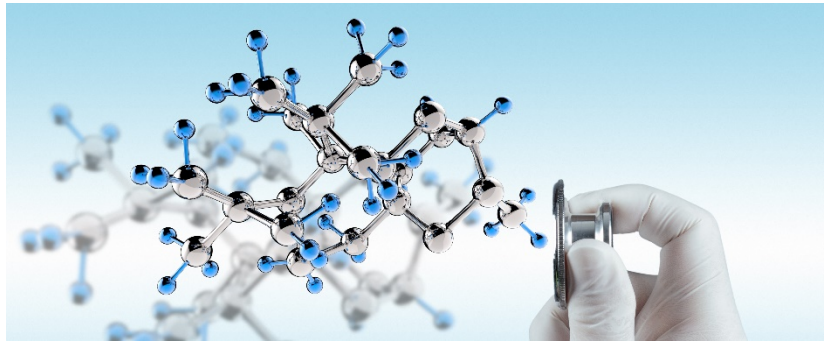
11 April 2018

Brussels

Dr. Els Van de Velde

Network Manager of the New Nano-Enabled Products Pilot

1. Introduction:
What is the New Nano-Enabled Products Pilot?



Vision:

- Connect regions to build industrial ecosystem in nanotechnology
- Create pilot production facilities for products based on nanomaterials
- Development of prototypes & securing the reproducibility

www.s3vanguardinitiative.eu/cooperations/vanguard-initiative-pilot-project-new-nano-enabled-products

1. Introduction:
What is the New Nano-Enabled Products Pilot?

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Added Value:

- Connecting regional strengths
- Create a strong European industrial fabric within nanotechnology
- Emergence of new value chains within innovative nanomaterials
- Connecting European R&D and laboratory infrastructure with different types of industries
- Strong network with extensive experience
- Supporting SME's in their internationalisation

1. Introduction:

What is the New Nano-Enabled Products Pilot?

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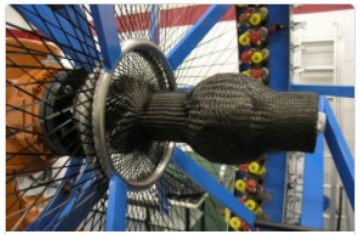
Part of the Smart Specialisation Platform on Industrial Modernisation

Advanced manufacturing

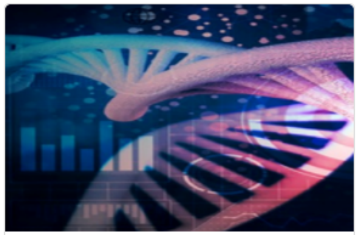
Non-food Biomass

Efficient and Sustainable Manufacturing

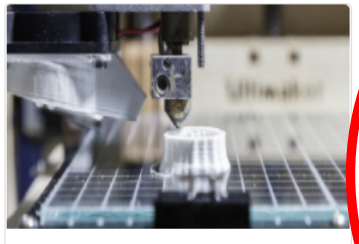


Textile Innovation

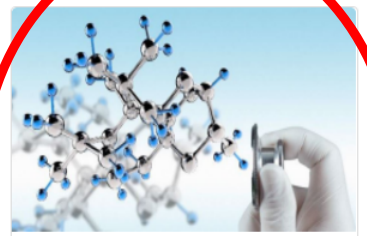
Medical technology



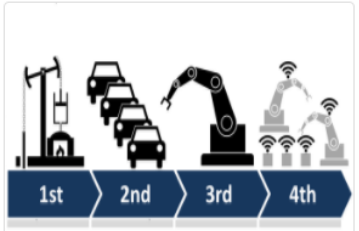
Photonics



3D-Printing



New Nano-Enabled Products



SMEs to the Industry 4.0

Sport

Digitalisation and Safety for Tourism

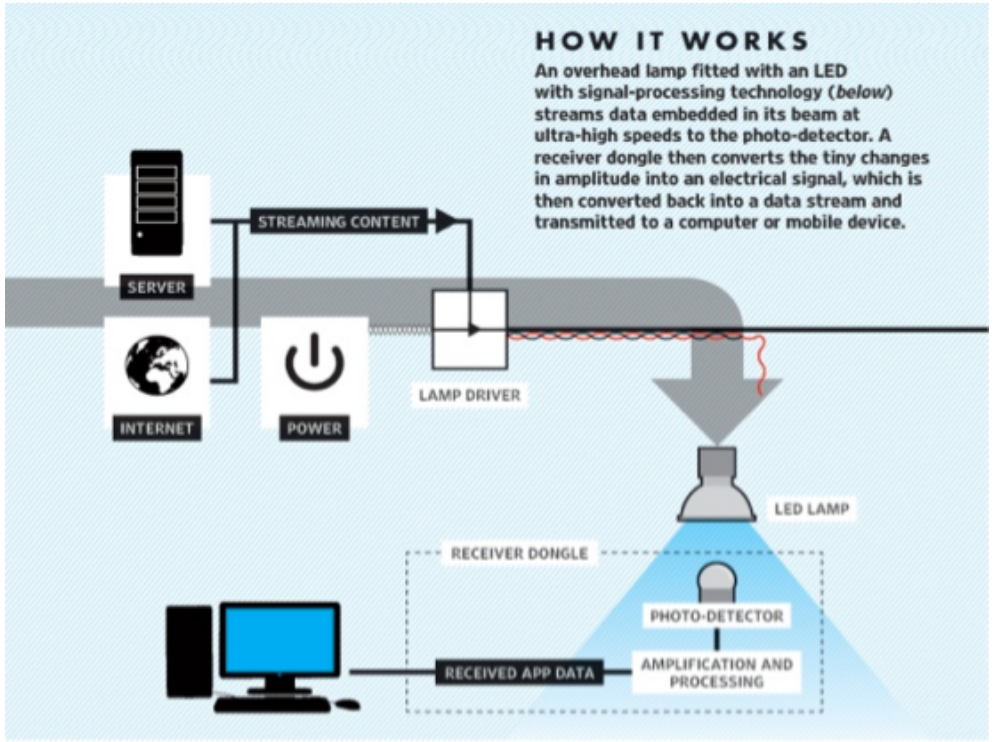
2. Cases:
1: Nano Wires for ICT and Energy Applications

Aim:

- To identify opportunities to commercialise the nanowire technology
- Address nanowire specific challenges:
  - High yield production
  - Integration of nanowire components in existing systems
  - Injection into existing value chains

Market Segments:

- Photovoltaics:
  - Using complex geometry to serve as antennae
  - New production technology for mass production sought
- Lighting:
  - Efficiency and tune-ability of LEDs via nanowires
  - Filling the "green gap"
- Power and RF electronics:
  - Enabling cost effective high-quality substrates



GaN/InGaN high speed LEDs for optical data transmission (LiFi)

Source: RI.SE

2. Cases:
1: Nano Wires for ICT and Energy Applications

Proposed action:

- Development of a cross-regional platform on nanowires
- Objective:
  - Showcase potential of companies working with nanowire-focused products
  - Facilitate engagement of international partners in joint efforts
  - Creating new inter-regional value chains spanning throughout Europe
- This will require active participation and validation from RTOs and industrial players

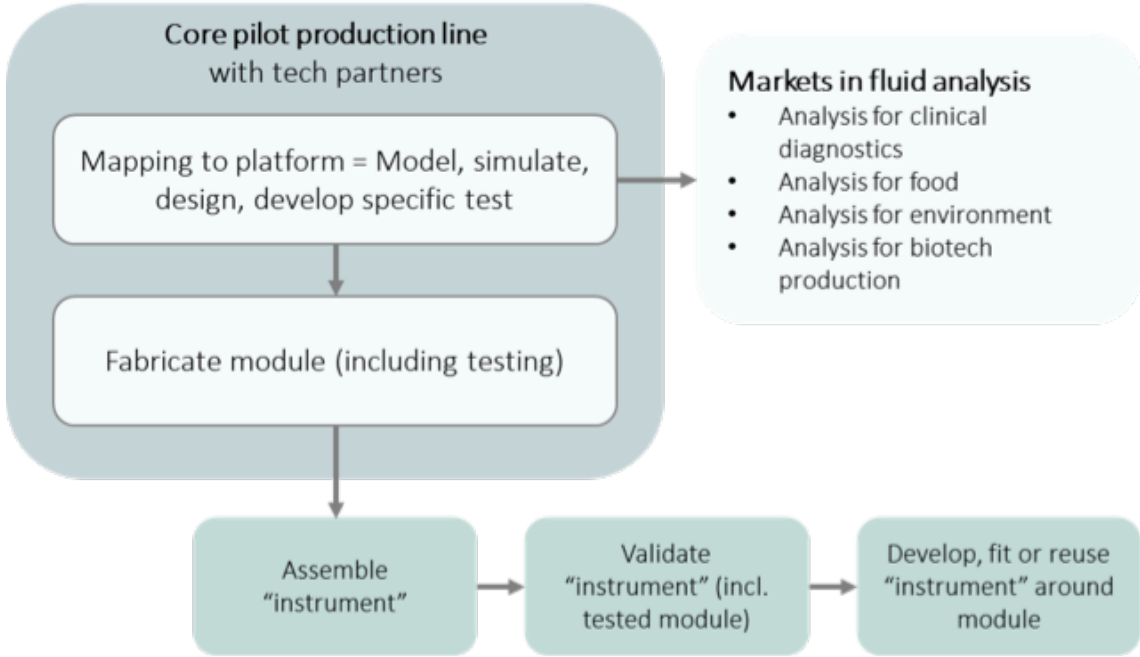
Contact:

- Dr. Kristian Storm, Senior Scientist and Project Manager at RISE Acreo AB in Sweden
- Kristian.storm@acreo.se

2. Cases:
2: Nano-enabled Microsystems for Bioanalysis (NeMs4Bio)

Aim:

- Address the microfluidic integration challenges covering aspects such as:
  - bio-functionalisation,
  - nano-functionalisation,
  - heterogeneous cross-KET microfluidic integration (Si-on-X, Si-in-X)
- Towards a module format
  - (e.g. chip carrier, cartridge)

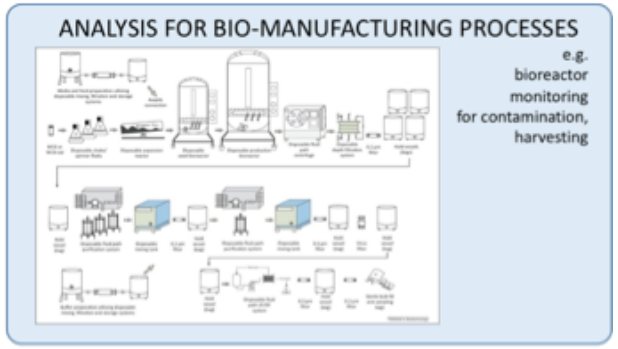


Source: imec

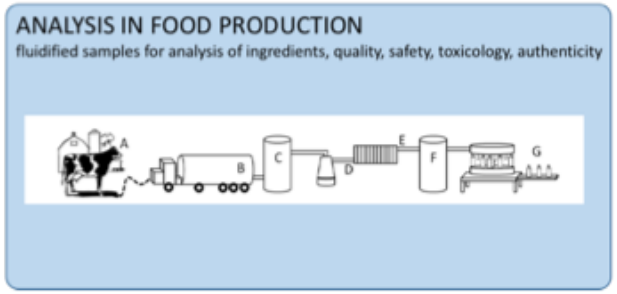
2. Cases:
2: Nano-enabled Microsystems for Bioanalysis (NeMs4Bio)

Markets in fluid analysis:

- Analysis for medical applications
- Analysis for food production
- Analysis for environmental lab analysis
- Analysis for bio-manufacturing processes



in flow or batch, continuous or repeated monitoring (mostly excluding single-use)

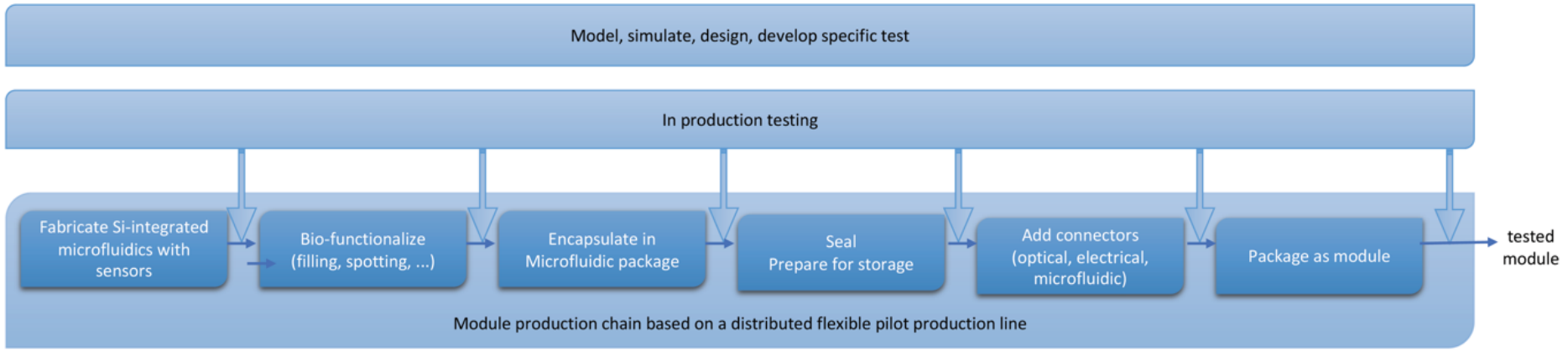


Source: imec

2. Cases:
2: Nano-enabled Microsystems for Bioanalysis (NeMs4Bio)

Proposed action for the platform:

- **Developing a network** of pilot production facilities across participating regions and involvement of core platform teams and application-specific experts, including system builders and end-users
- This will require active participation and validation from RTOs and industrial players



Source: imec

Contact:

- Dr. Wolfgang Eberle, Funded Program Manager Smart Health at imec in Belgium, wolfgang.eberle@imec.be

2. Cases:
3: Nano-Enabled Printed Electronics

Aim:

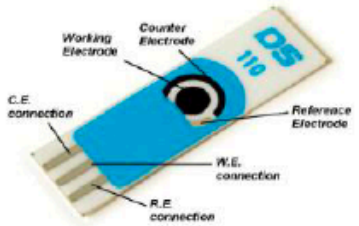
- Objective is to push printed electronics to the market

- Potential application fields are located in:
  - Intelligent sensors (automotive, medical technology, food monitoring and smart textiles)
  - The Internet of Things (IoT)
  - Security applications
  - Energy storage and energy harvesting

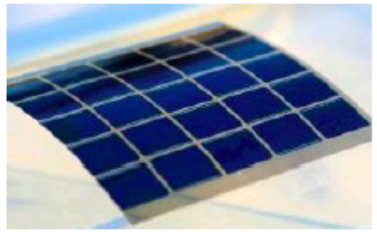
- Challenge faced: transfer of such technologies from the lab to the market

2. Cases:
3: Nano-Enabled Printed Electronics

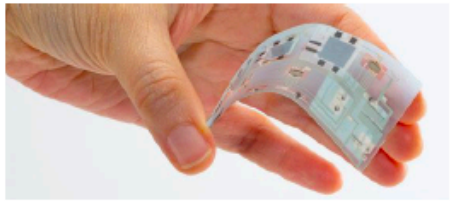
Printed battery (Enfucell)



Screen-printed electrodes for disposable devices (DropSens)


Printed solar sub-module on flexible substrate (KIT)


Inkjet-printed OLED (Merck)


Smart label w/ printed memory technology licensed to Xerox

Hybrid passive RFID w/ screen printed antenna

2. Cases:
3: Nano-Enabled Printed Electronics

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Projects:

- Printed Smart Tags:
  - Development of an interface for the interaction with a smartphone display for variable applications
- Printed Electronics on Curved Surfaces (SHAPETRONICS)
  - Development of technologies to apply functional printed structures directly onto 3d-objects.
- Smart Textiles and Sensors
  - Product design and commercialization of integrated sensors in textiles for medical application.
- Organic Electronics
  - Development of fabrication processes and upscaling of organic electronic devices.

Contact

- Dr. Christian Punckt, Associate Director of NanoMat, KIT, Germany, Christian.punckt@kit.edu

3. Way Forward

1: The issue

- Industry Modernisation is a common concern of:
  - Industrial competitiveness
  - Growth and Employment
  - Regional Policy - Smart Specialisation 2.0
  - Policies across levels of governance (regions - MS - EU)

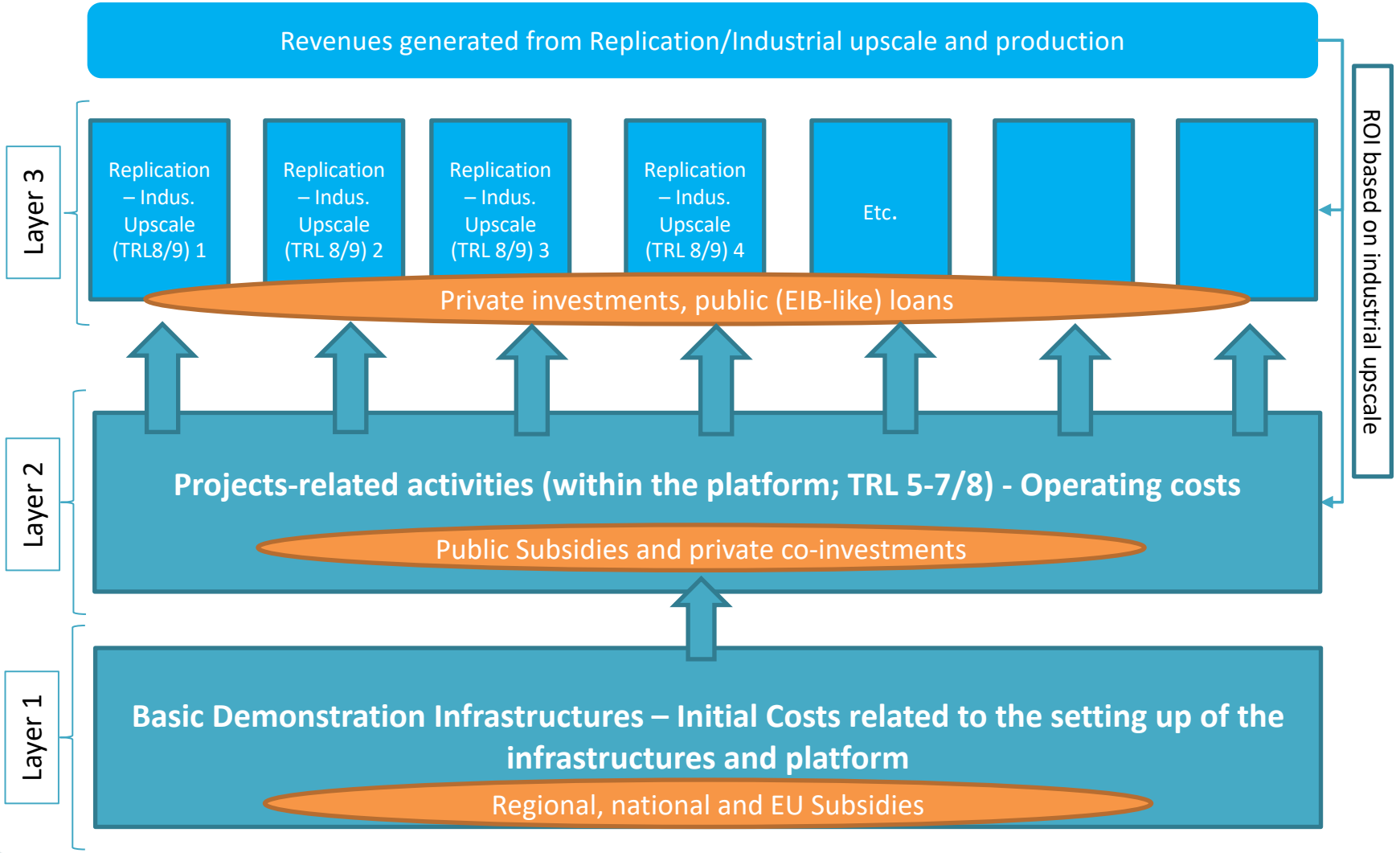
- Deployment and absorption of new technologies = critical ingredient of Industrial Modernisation, growth & jobs ...

- But the EU increasingly challenged by (new) competitors with regard to technology deployment and industrial performance

- The EU is sub-performing in technology deployment; the VI has identified inadequacies in the current funding landscape that prevent any continuous pipeline of investments to emerge ...

3. Way Forward

2: Approach for new investment pipelines



Establishing "Industry Commons" = shared demonstration facilities to speed up technology deployment in/by industrial companies

3. Way Forward

3: Constraints: lack of adequate funding instruments

- Strong industrial interest & comittment, but major constraint = How to get this funded ?

- Some partial solutions exist, but ...
  1. There remains a financial gap ('non-profitable top') that can only be covered by subsidies (mainly layer 1)
  2. Such funding instrument (subsidies) does not exist in pan-EU context
  3. Existing solutions (layer 2 & 3) are
     - Highly uncertain, and
     - Extremely complex to combine with each other

- Thus, at this moment: impossible to set up a continuous pipeline of industrial investments ... Only 'lucky one shots' possible ...

3. Way Forward
4: Potential solutions

- Layer 1 costs (establishing the joint-demo infrastructure):
  ➔ Centrally managed EU fund, co-financed by regions, or an expanded Interreg 'B', to support the creation of industry commons with grants

- Layer 2 costs (operating costs for demo activities):
  ➔ combining regional subsidies to compensate for costs incurred to visits to demonstration facilities in other regions

- Layer 3 costs (industrial replication & upscale):
  ➔ thematic expansion of the InnovFin Energy Demo Projects instrument to cover broader industrial modernisation activities.

- The major constraint in this funding model is the provision of centrally managed grants for the establishment of shared infrastructure (layer 1).

3. Way Forward
5: Impacts

1. Lowering technology risks and uncertainty

2. Speeding up industrial upscale and market uptake ➔ Additional leverage for the EIB and InnovFin;

3. 15 to 20 'Shared Demonstration Platforms' ready to start; strong industrial committment to co-invest and use the demo-infrastructure once it is operational.

4. Potential to increase efficiency of research and innovation systems

5. Moving beyond "just retour" thinking, towards "high return thinking".