

Nanotechnology in our lives

Emerging challenges

A Future-proof approach to Nanomaterials

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Director General

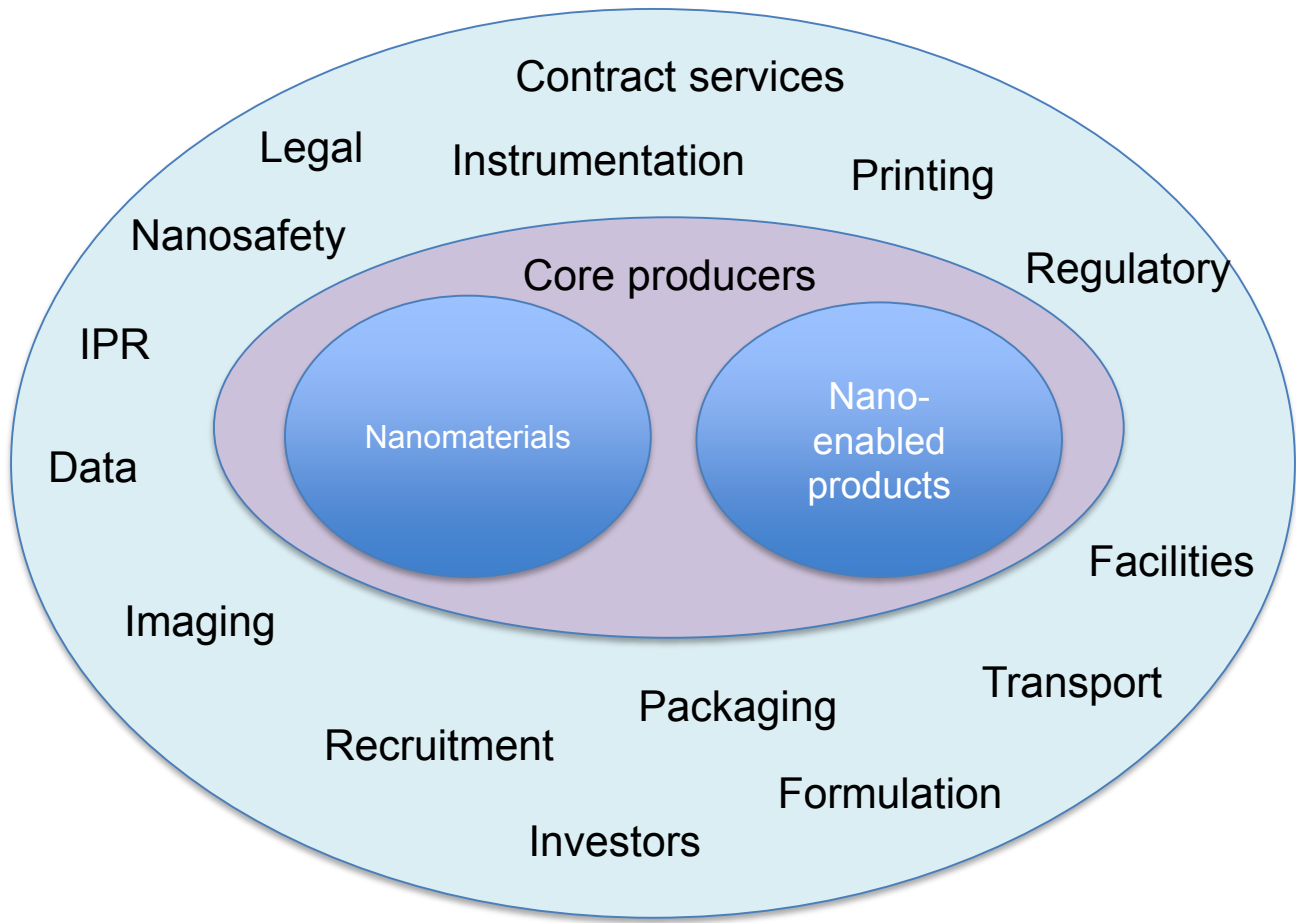
Nanotechnology Industries Association

- Display the landscape for commercial nanotechnology
- Its maturity as an economic contributor to Europe
- Challenges and opportunities for full maturation
- Roadmap to a successful sector within Europe
- Role of policy-driven activities such as Risk Governance Council, Safe by Design – from concept to business reality

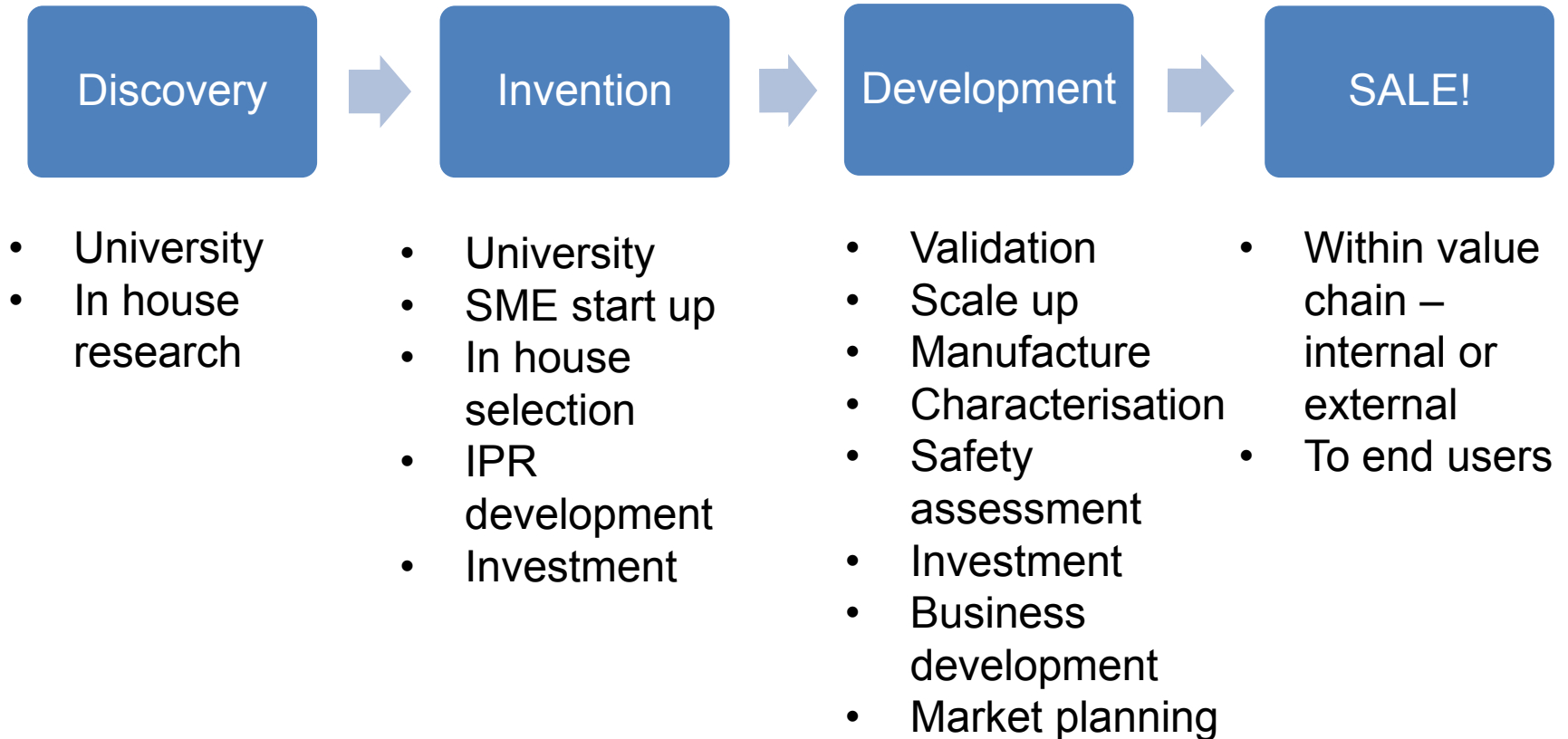
- Global non-profit association – Brussels
- Mission – to support the innovation and commercialisation of next generation of nanotechnologies and promotes their safe and reliable advancement
- Members – product and process industry, research, expert service providers, national associations
- Member services:
 - **Regulatory support:** Global monitoring and support to Members, with Monitoring database and Global Regulatory Working Group
 - **Business and scientific networking:** With Associations across sectors for new applications and partners
 - **Scientific advancement:** Nanotechnology Innovation Council for joint horizon scanning and latest disruptive technologies
- Ecosystem development:
 - International projects linked to nanotech framework
 - Nanosafety Cluster

- Europe provides a competitive long term, sustainable ecosystem for technologies such as nano
- Critical mass and cross border flow
- Strong cluster development within EU framework
- High value, lower volume production
- Innovation driven by consumer pull and also from regulatory push around safety and disposal
- Members not talking about ‘materials’ but control of the nanoscale
- When I talk about supporting commercial development:
 - Will it help an SME grow?
 - Will it raise employment?
 - Will it generate economic return for countries and the EU?
 - How can we position nano for optimum performance in the EU?

- Chemicals
- Transport
- Energy
- Pharma
- Food
- Plastics
- Coatings
- Appliances
- Semi-conductors
- Electronics
- Agriculture
- Textiles
- Manufacturing
- Process engineering
- Med devices



- SMEs (1-250)
- Mid-sized
- Large co.s
- Public
- Private



Development: Focal point to enable commercial maturation
Where private money kicks in

Maturity Technology with sustainable economic activity

- Constant flow of innovation through the value chain
- Investment into recognised technologies
- Substantial commercial services sector
- Public money still primes the pump, still valley of death but the flow is through to market

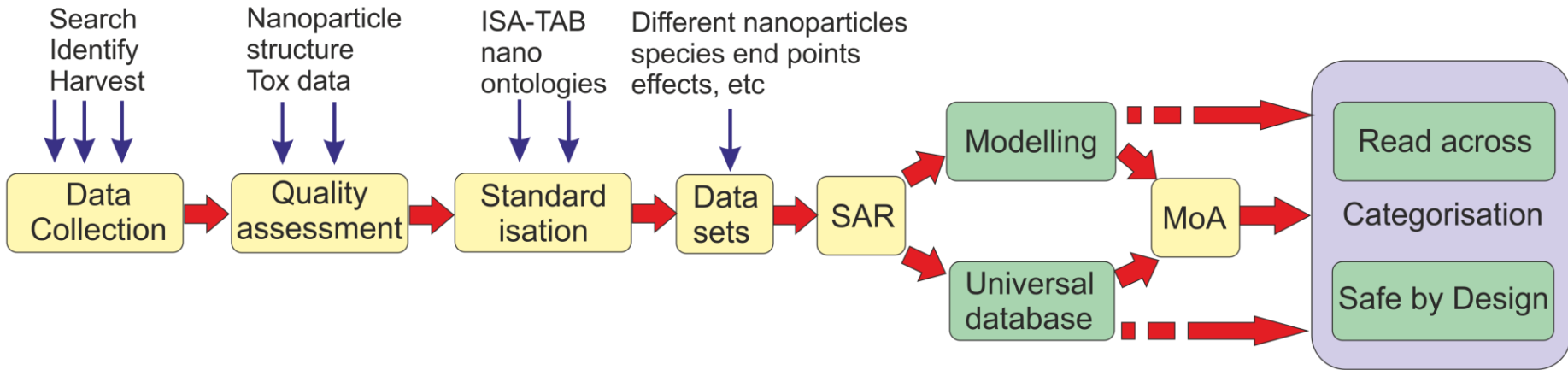
Technologies on the economic spectrum:

- Biotechnology – Mature. *Recognised technology, strong early investment, significant service sector, robust regulatory framework*
- ICT and digitisation – Mature
- Advanced materials – Developing
- AI and additive manufacturing – Developing

Nanotechnology and materials is young as an EU economic contributor compared to its potential:

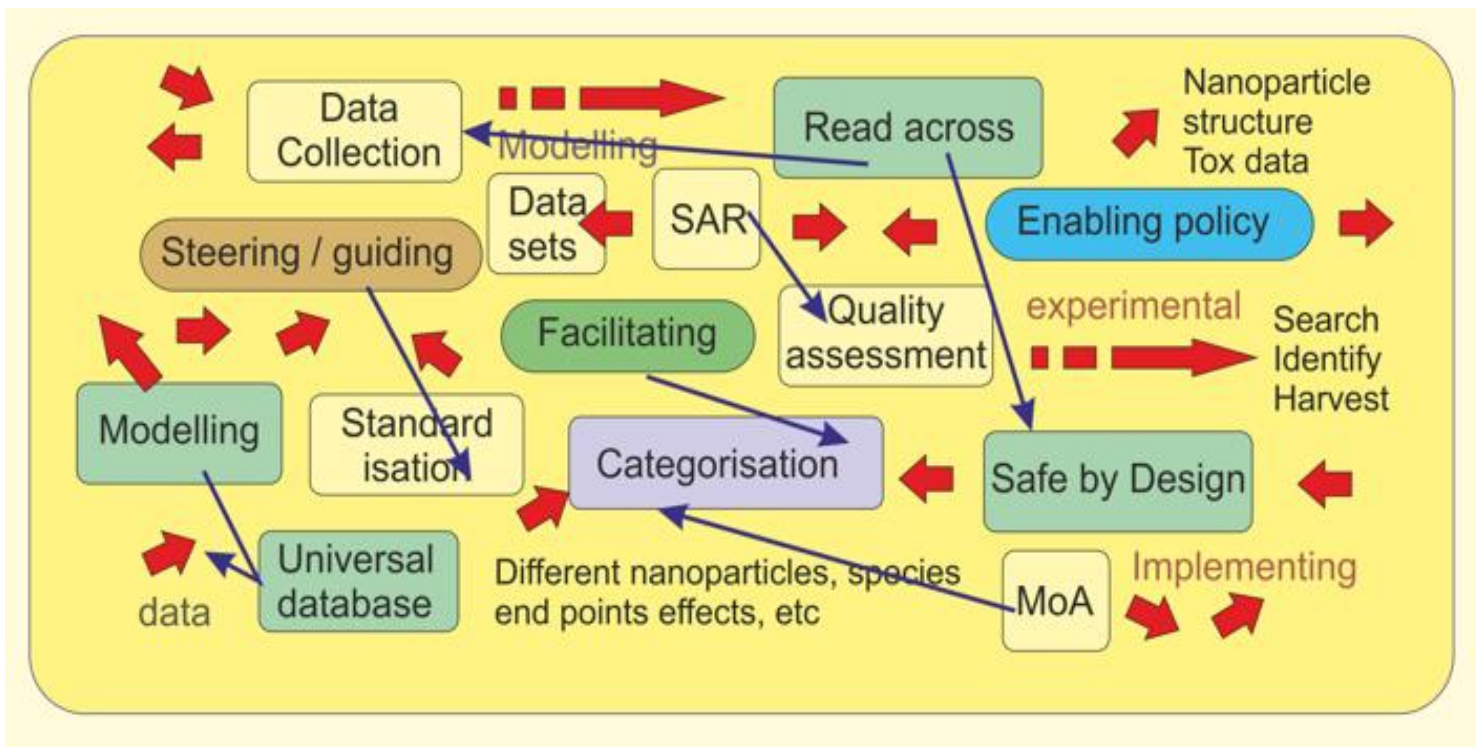
- Much activity still within public sector (spending rather than generating tax revenue)
- No significant services sector compared to mature KETs
- Imaging and characterisation technologies now catching up with materials development – allows operation on the nano-scale, not just materials
- Many activities on the nanoscale not recognised, identified or promoted – hard to monitor
- Many of the bottlenecks are not scientific

- Complex and incomplete landscape despite no substantial evidence presented of nano-specific hazard
 - REACH for chemicals
 - Food, medical devices, biocides cosmetics, waste
 - National, EU, US...
- Nanomaterial definitions – 14 different definitions tracked globally, 10 in Europe with national and sector variation
- Labelling required for food and cosmetics
- 7 years for the revised EU definition
- Guidance is very open to interpretation
 - EFSA ‘nanoscale-effects’ over 100nm
 - ECHA Nanoform grouping justification



From van Teunenbroek et al: (2017) Particle and Fibre Toxicology 14:54

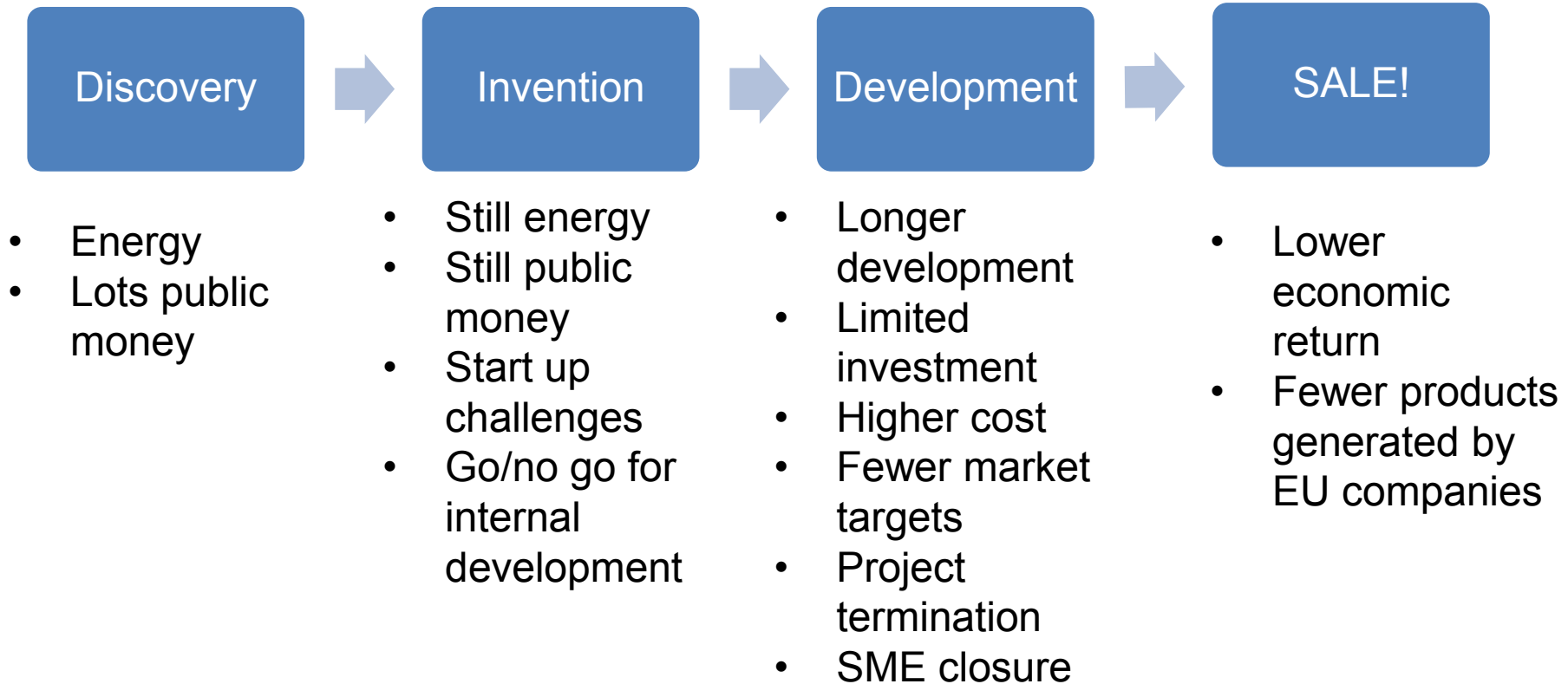
A smooth and orderly flow from data collection to MOAs as envisaged in the White Paper



- Large companies have deeper capability and can navigate to market
- Translatable technologies and SMEs do not have the luxury of time, money or experience to map their pathway

Certainty is all for industry - builds communication, trust and confidence through the value chain

- Persuading an investor to give you money – potential value, risks and timescale to return on investment
- Access a pilot facility to scale up your material
- Sell your material to enable somebody else's product
- Sell your product to consumers
- Regulatory landscape currently creates challenges for points above
- Clarity on management of nanomaterials is not communicated through the chain well enough
- Results in a TRUST DEFICIT in nanomaterial value chain





- Silicon based nanoparticles for mechanical reinforcement of materials
- Laser pyrolysis
- Rejected by scale up facilities due to uncertainty on management of nanoparticles

RAS AG
materials + technologies

- agpure®: Antimicrobial additive
- ECOS®: Silver nanowire technology

- Resistance in selling nanomaterials to 'traditional' companies
- Need to create collaborations to overcome caution

The European project – let's do it!

- Europe has huge potential and capability for nano €€€
- All ingredients in place for the sector
- Investment in R&D
- High skills development
- Investment in infrastructure
- Regional science and industry strengths
- Single market and customs union
- High value products and trusted regulation
- FP9 under development - perfect opportunity to consolidate the nano ecosystem through to market
- Potential to access rights skills and facilities anywhere in Europe
- Europe can and should lead innovative products



- Many actions are already underway
- Relevant for this conference
- Mature and clarify the regulatory landscape:
 - harmonise definitions
 - alignment between sectors
 - framework for grouping and read across
 - Where nano is specified, guidance needs to be as specific as possible whilst allowing for adaptation
- Build communication and confidence through the chain:
 - Blockchain, safety data sheets, safe by design
- Connect facilities across Europe: public-private partnerships to combine skills and industry needs

- Expert commercial technical and business services, responding to increased flow of innovation, investment and products
- Accelerated instrumentation, high throughput screening, contract services
- Skills development in all aspects of nanotechnology and materials development to market
- Cluster development around specialised materials or applications
- Exporting safety (and other) services worldwide
- Claire's nano Utopia – Regulatory framework is the key to this:
 - Clearer map to market for inventions (time, requirements, cost)
 - Higher leverage for more investment
 - Public private partnerships for scale up (right facilities, right skills)
 - Faster flow of nanomaterials into applications
 - Clear information on nanomaterial management at all stages to market

- **Risk Governance:** Important to create industry and consumer confidence. Risk Governance Council at global level could be solid foundation for confidence in business decisions
- **Safe by Design:** Enable and recognise it within regulatory framework – move it into ‘real’ industry tools
- **European Observatory for Nanomaterials:** Already in progress – empower and build on a strong platform for excellent science and neutral reporting.

MUST be more than concepts or partly complete pathways – invest for the long term delivery where you can quantify industry benefit. Set ambitious indicators in realistic time and budget.

Let's do this thing



Thank you

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