INCREASING INTERNATIONAL STI COOPERATION BETWEEN BRAZIL AND THE EUROPEAN UNION

Action Plan for Advanced Manufacturing and Nanomaterials

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INCOBRA
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Action Plans in the INCOBRA project

- **INCOBRA: H2020- Coordination and support action (2016-2019)**

Increasing Science, Technology and Innovation (STI) **In**ternational **Co**operation between **Bra**zil (BR) and the European Union (EU) through **partnerships**, **consortia** and **joint R&I projects** to enhance the relevant framework conditions addressing priority cooperation areas.

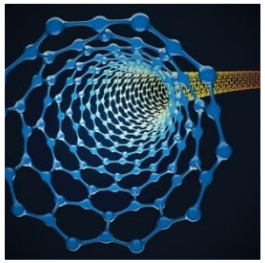
- **Aim of Action Plans:** Identify successful cooperation patterns for each EU-BR priority area

Priority Areas Brazil-EU R&I cooperation:

• Green Energy

• Bioresources

•Food security and adaptation of agricultura to climate change



•Advanced Manufacturing & Nanomaterials

• Smart Cities and Systems

Advanced Manufacturing and Nanomaterials

- Wealth generation
- High quality jobs
- Global societal challenges

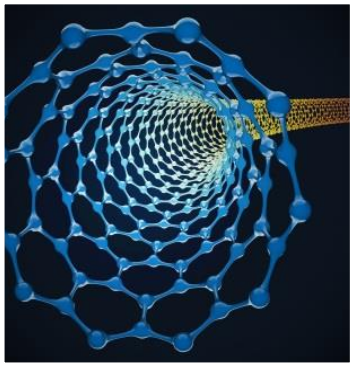
All aspects of the value chain:

- Concept design
- Technology
- Marketing

ADVANCED MANUFACTURING

Academia-Industry cooperation:

Public-Private Partnerships



Advanced Manufacturing and Nanomaterials

Unique optical, electronic or mechanical properties at the nanoscale

NANOMATERIALS

- Emerging
- Industrial scale manufacturing to be implemented

- Risks for the environment
- Health and safety concerns

Priority R&I topics in Advanced manufacturing and Nanomaterials

Prioritized research topics for Brazil-EU cooperation based on scoping activities carried out within INCOBRA:

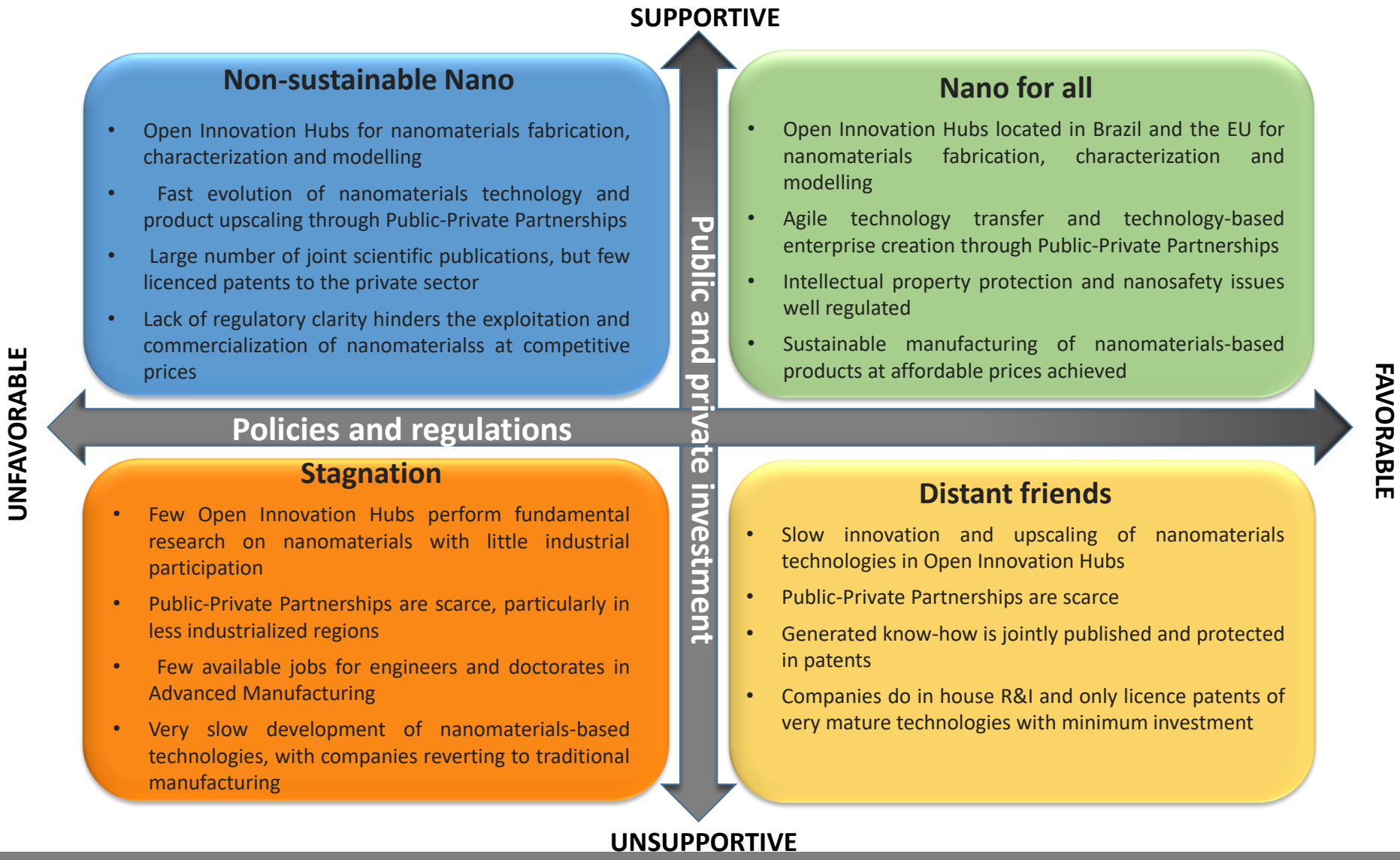
Advanced Manufacturing of
- **Nanomaterials**
- **Nanosensors**
- **Nanodevices**

Nanomaterials for:
- **Energy and Environment**
- **Electronics**
- **Biotechnology**
- **Health and Pharmaceutics**
- **Agriculture and Food Security**
- **Textiles**

Nanoscale metrology

Toxicity of nanomaterials

Brazil-EU Cooperation Scenario Analysis



Robust trajectories

I. Establishment of a legal framework for the Brazil-EU collaboration in Advanced Manufacturing and Nanomaterials R&I

II. Development of a joint Brazil-EU multi-annual work Program in Advanced Manufacturing and Nanomaterials R&I

III. Brazil-EU industry participation in the definition of collaboration priorities in Advanced Manufacturing and Nanomaterials R&I

IV. Joint Brazil-EU establishment of Open Innovation Hubs for strategic R&I on Advanced Manufacturing of Nanomaterials

V. Joint Brazil-EU commitment to develop a continuous training program in Advanced Manufacturing for science and engineering graduates and technicians

VI. Design of a common evaluation protocol for BR-EU collaboration R&I programs in Advanced Manufacturing and Nanomaterials

VII. Joint Brazil-EU development of a science-based risk governance of Nanomaterials

Action Plan

Layers	Actions		
	Short-term	Mid-Term	Long-Term
	2020	2025	2030
Regulations and Policies	Signing of a Framework Agreement between Brazil and the EU		
		Periodical revision and renewal of Framework Agreement	
	Development of standardised safety regulations and compliance protocols for nanomaterials		
		Implementation of standardised safety regulations and compliance protocols for nanomaterials	
			Implementation of optimised science -based safety regulations and compliance protocols for nanomaterials

Action Plan

Layers	Actions		
	Short-term	Mid-Term	Long-Term
	2020	2025	2030
Market	Identification of strategic advanced manufacturing sectors and nanomaterials		
	Monitoring of nanomaterials market trends and dynamics for each relevant application segment		
		Prioritize R&I projects on multifuncional nanomaterials for increased number of product market segments	
		Foster industrial stakeholders access to pilot scaling and risk assessment experiments	
			Establishing strategic public-private partnerships with key leading companies for timely production of innovative nanomaterials

Action Plan

Layers	Actions		
	Short-term	Mid-Term	Long-Term
	2020	2025	2030
Technology	Identification of strategic advanced manufacturing sectors and nanomaterials		
		Nanomaterials technology R&I focused on increasing materials functionality for enhanced manufacturing flexibility	
		Implementation of advanced tools for nanoscale testing and selecting the best materials science solutions in R&I projects	
		Implementation of repeatable and scalable manufacturing processes and parameters in R&I projects to facilitate the rapid adoption of nanomaterials with exceptional properties	
		Implementation of automated manufacturing tools in R&I projects including smart robotics, sensors and data analytics, etc	
		Implementation of advanced information technologies in R&I projects like Big Data and IoT	

Action Plan

Layers	Actions		
	Short-term	Mid-Term	Long-Term
	2020	2025	2030
Competences and Resources		Implementation of aligned R&I initiatives through projects focused on product design, proof of concept, prototyping, and pilot scaling	
	Identification of excellence research and technology centres involved in Advanced Manufacturing and Nanomaterials		
		Proactive investment in state-of-the-art manufacturing infrastructures with participation of public and private actors	
		Creation of 3-4 innovation hubs	
			Creation of spin-off companies originated from open innovation hubs
	Identification of required skills, capabilities and resources in R&I projects		
		Development of tailored training programs in advanced information and manufacturing technologies, STEM skills and entrepreneurship	
			Development of MSc and Doctorate courses in advanced manufacturing and nanomaterials
			Creation of "Innovator of the Year" award

Conclusions

- Support of **Open Innovation Hubs** is essential for:

i. **Industrial** involvement in Advanced Manufacturing R&I activities
ii. Fast **technology transfer** and **timely production** of Nanomaterials
iii. **Training** of doctorates and engineers

- Prioritize Projects on **multifunctional Nanomaterials** to maximize number of market segments

- Prioritize Projects that involve **automated fabrication, sensors, data analytics or IoT** to facilitate technology transfer to the productive sector

- Dedicated Projects to investigate the effect on health and environment of emerging Nanomaterials to **create a database** on which **safety regulations** will be based