Societal engagement in Nanotechnologies:

experiences for a dialogue in the food, energy and health sectors

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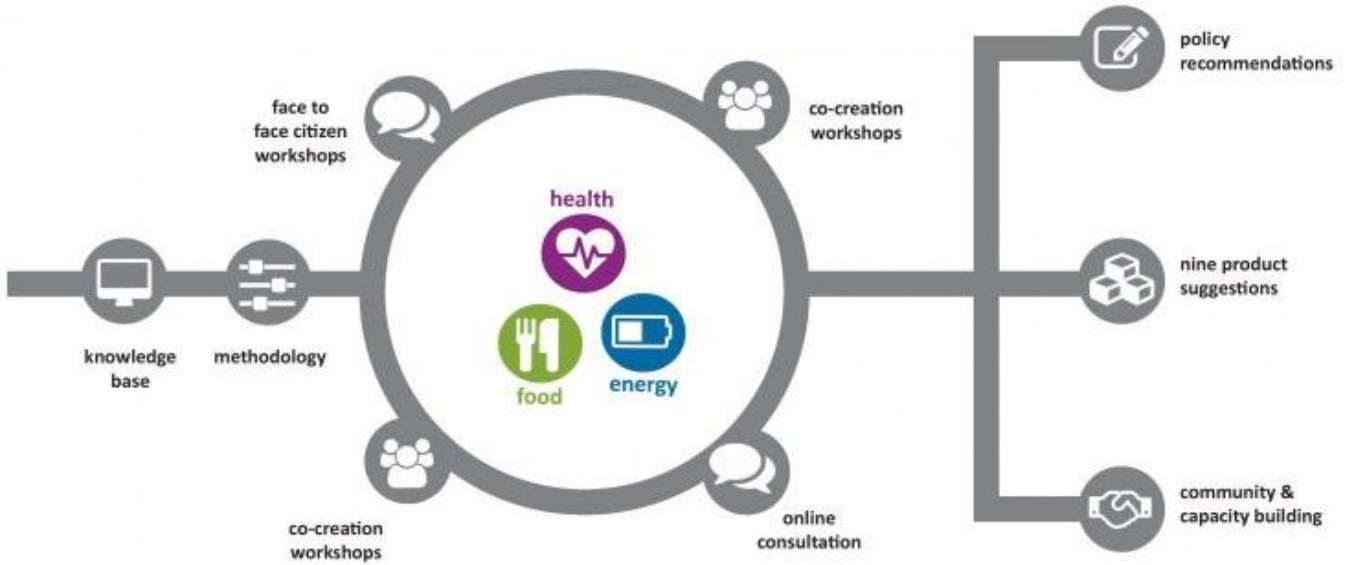
The GoNano project

WHY: promote societal engagement to align future nanotechnologies with societal needs, values and concerns in the sectors of Food, Health and Energy

WHO and WHEN: 10 partners from 9 countries, project running from 2017 to 2020

HOW:

- **Analyse previous learning public/stakeholder engagement initiatives (Knowledge base)**
- structured co-creation "pilot" process on nanotech in Food, Health and Energy
- Involving citizens, researchers, industry, civil society organisations, and policy makers
- Community building and policy recommendation



Interviews on stakeholders experiences and views (knowledge base)

Semi-structured interviews, leading to two public reports:

- ✓ **The role of public and stakeholder engagement, and co-creation exercises in improving R&I processes** (GoNano – D1.1)
- ✓ **Areas and issues for a dialogue on nanotechnologies: future developments and their potential impact on society** (GoNano – D1.3)

Available on: gonano-project.eu

Interviews on stakeholders experiences and views

Panel of respondents

- **30 stakeholders** involved on D1.3 (plus 20 on D1.1). Period: Jan to May 2018
- **Companies, R&I Networks** (industrial associations, EU Tech Platforms), **public research, policy and end-user**s from 10 EU Countries
- **Experts** in nanotech and Food, Energy, Healthcare

Focus

- **Areas and issues for a dialogue on nanotechnologies with stakeholders and citizens, in particular** (selection for this presentation):
  - Current and future applications and product scenarios
  - Societal impacts and priorities
  - Key issues to debate

Nano in Food:
Scenarios, impacts and priorities to inform stakeholder and citizens dialogues

Product scenarios and expected impacts

- ❑ **Smart packaging**
- ❑ **Nano-filtering** for beverage, water management and cleaning
- ❑ **Functional (novel) foods** (e.g. targeted delivery/release of nutrients)
- ❑ **New tech for minimally processed food**, while granting food safety
- ❑ **Nano-enabled plant protection products** for agrifood (improve resistance to microorganisms)

→ *Reduced use of resources, reduced environmental impact*

Priorities

- ➢ **Communication**: balanced information to citizens on use of nanotech
- ➢ **Regulatory and safety aspects**:
  - ➢ standardization, classification and definition of NM (e.g. natural vs. engineered nanoparticles)
  - ➢ Safety aspects of nanomaterials, in-depth safety testing
  - ➢ Lack of technologies to detect nano-particles (e.g to establish whether nano-particles from packaging could migrate in food)

Nano in Food: Issues to debate with stakeholders and citizens

- **How to better target R&I priorities** for nanotech towards societal values and challenges?
- **What is the impact of more/less demanding normative frameworks** on developments in food: what benefits and risks for consumers?
- **What are the risks of food packaging materials** and food contamination by nanoparticles ?
- **How to distinguish nanostructures that naturally occur in food** and those that are intentionally added or used in food processes for specific purposes?

Highlights

"…I think that engagement of stakeholders and citizens in development of nanotechnologies is redundant [..]. Researchers in nano-field should possess also ethical and moral qualities that would prevent them from developing potentially harmful nano-applications. As consumers themselves, researchers don't need input from general public" [R&I network]

"Food companies (large) are developing innovative products, more than novel products. They already use consumers' panels to evaluate their innovation and thus they might not see the added value of the GoNano initiatives." [R&I network]

Nano in Health:
Scenarios, impacts, and priorities to inform stakeholder and citizens dialogues

Product scenarios and expected impacts

- ❑ **Diagnostic and assistive medical devices** with improved features and functionalities (minimally invasive systems and easier, faster, cheaper and more accurate measurements for early stage detection)
- ❑ **Targeted and personalized medical treatments** (e.g. using principle of viruses)
- ❑ **Regenerative medicine** (e.g. using bodily substances, artificial organs/cells/tissues, smart patches for wound healing and devices for rehabilitation)

→ *Lowering the social, human and economic burden experienced by patients*

Priorities

- ➢ **Communication**: Negative effects of a single nanomaterial, could influence reputation of nanotechnology as a whole
- ➢ **Regulatory and safety aspects**:
  - ➢ Regulatory preparedness: regulation too slow compared to tech development
  - ➢ Safety and risk assessment of nanomaterials, safe by design
  - ➢ Debate on guidelines is expert oriented, not policy oriented (lack of social debate)
- ➢ **Technical issues:** scalability, affordability, integration of new devices.

Nano in Health Care: Issues to debate with stakeholders and citizens

- ✓ **What relationship with health care organization/structures** and what procedures, regulations, responsibilities, and cost coverage policies
- ✓ **How to ensure people life and wellbeing, how** treatment/assistance is provided to ensure respect of patient's rights

- ✓ **What new ethical and social issues rising from the personalized nature of the treatment**, how to ensure reliability and transparency in communication with patients
- ✓ **What challenges related to the increasing ability to monitor biological and health parameters**: limits on what to measure, what to do with the data and who is the owner of medical data (security and privacy issues)

Highlights

"the debate about nanotechnology is about trust and acceptance on a societal level. You do not want to get a polarized debate on nanotechnology, between believers and non-believers. […] within the medical area these types of polarized discussions are less apparent as people have a much higher acceptance when the innovation can actually help them. So, there is a totally different risk perception on the same technology. In our field societal debate is more about the power of different stakeholders, than on safety and acceptance." [policy]

"The problems addressed can all have a high human, social, and economic cost and their solution/mitigation is in principle positive. […] Impacts evaluation must be part of the research effort along the entire value chain." [R&I public]

Nano in Energy:
Scenarios, impacts and priorities to inform stakeholder and citizens engagement

Product scenarios and expected impacts

- **Energy generation**
  photovoltaics, Small distributed devices able to harvest energy from the environment
- **Energy Storage**
  Batteries for electric transport, small devices, domestic generation, Supercapacitors
- **Energy efficiency/savings**
  OLEDs, New insulating materials, Rapid charging devices
- **Internet of Things devices to support energy production, distribution and storage**

→ *Substitution of critical raw materials in production process*

Priorities

- **Technical issues:** Cost effectiveness of the fabrication and scale-up of nanomaterial based-technologies
- **Regulatory, safety and security aspects**:
  - Slow adapting regulation, promoting fossil fuels, ignoring sustainability issues
  - Long–term sustainability (life-cycle perspective)
  - IoT cyber attacks affecting critical systems
  - Health and environmental impacts of nanomaterial
- **Ethical issues:** Equity and justice in access to energy (large scale systems vs. distributed power generation)

Nano in Energy: Issues to debate with stakeholders and citizens

- ✓ **What future energy models and what is their societal impact?**
  - ✓ Sustainability models
  - ✓ reconfiguration of generation, storage, distribution and usage of energy
  - ✓ Impact on social organization and everyday lives (e.g. urban contexts, smart cities)

- ✓ How to promote **open and transparent development of regulations**, to ensure predictability of regulatory developments and provide security for investors

Highlights

"The focus should be put on getting industry involved, in the energy field industry is not so prone to collaborate and talk with nanoscientists, need to promote it as much as possible." [R&I public]

"The main societal effect will be big changes in employment and energy distribution. Jobs in energy production and distribution are jeopardized …… [R&I private]

"Aviation industry has little need for direct interaction with citizens." [R&I private]

Final remarks: aspects for dialogue

- Focus on sectors and scenarios increase interest of stakeholders, and help to collect suggestion for concrete, specific topics to discuss (avoid vagueness of debate)
- Questions , issues and interest for dialogue are often not nano specific
- Key aspects for the dialogue (cannot be avoided):
  - Regulatory boundaries and uncertainities
  - Societal value (beyond market value)
  - Safety needs, but do not limit the dialogues to risks
- Engage users and end-users, people interested/concerned with the application (e.g. patients).. more than «lay-people»
- Consider benefits to participate («return on investment») of stakeholders involved, including the public

GoNano will explore these aspects, working with stakeholders and citizens to co-create innovations taking into account their expectations, social values, and concerns.

Thank you!

News about the on-going dialogues (Spain, Netherlands, Czech Republic) on: gonano-project.eu

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Cross-cutting Nanotech
Proposals for themes and questions to debate from interviews

Broad topics on innovation and RRI

- ✓ Structural and economical issues to facilitate connection of stakeholders along the R&I value chain, and bridge the gaps from research to market *(e.g. how to support SMEs in open innovation processes)*
- ✓ Circular economy and substitution of hazardous materials
- ✓ How to promote Responsible Research and Innovation at policy level (Innovation eco-system)

Nanotech

- ✓ Distinction between nanomaterials and nanotechnology in public debate
- ✓ How to communicate nanotech: missing or misleading information on nanotech; fear on nanotech; taking into account cultural differences

Towards a balanced view on nanotechnologies

Ambivalent character of nanotechnologies:

- Driver for industrial competitiveness, economic growth and prosperity and a solution to societal challenges - > Framed as the (only) solution to a range of problems ("imperative" to innovate)
- Emergence of new risks, uncertainties, regulatory issues and public and stakeholder concerns -> will continue to exist

Counter the technology-fix view in the pilots:

a) Allow for open visioning and thinking in alternatives *in addition* to the thinking about concrete nanotechnology products

b) Address the persistence of risks and uncertainties: Which uncertainties and risks are we (pilots participants) willing to take in exchange of the benefits of nanotechnologies?