DELIVERABLE

5.5

COLLECTION OF THE GONANO POLICY AND INDUSTRY BRIEFS

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CONTENT

EXECUTIVE SUMMARY

This report is Deliverable 5.5 "Collection of Policy and Industry Briefs" of Work Package 5 "Governance and Policy Outreach and Alignment" (Task 5.4: "Policy Briefs and Roundtables") of GoNano.

The task developed 7 policy briefs and an industry brief based on the white papers (GoNano D5.3, 2020), on experiences of the methodology development and pilot studies in WP 3 and 4. The briefs are kept short, and they take up a specific part of the findings and challenges GoNano dealt with throughout the project. They are specifically directed to policy makers, as well as industry and businesses in R&I of nanotechnologies. The short briefs address specific results of the engagement activities as well as the recommendations based on the conducted research.
The policy brief topics can be considered a consortium joint activity as the topics were commonly decided on in the consortium and all partners were involved to contribute, feed in and provide feedback. The GoNano Industry brief was prepared in close relation to the GoNano business case (D5.4) and commented upon by the partners.
Each one of the GoNano policy briefs covers one distinct aspects of co-creation in research and innovation), with a focus on nanotechnology. The policy briefs are intended as targeted communication material towards policy makers in science funding, as well as in research and development in the nano field while the industry brief sums up aspects that seem especially relevant for industry and businesses as sketched out in the business case (D5.4).

Therefore, the GoNano policy and industry briefs cover the following topics:

- Policy brief 1: Co-creation: A Practical Tool to Enhance Responsiveness in Research and Innovation
- Policy brief 2: Moving from reflection to proactive engagement and action on societal needs, values, and concerns
- Policy brief 3: Opportunities and Challenges of Co-Creation: Experiences from the GoNano Project
- Policy brief 4: The Value Chain: An approach to Implement Responsible Research and Innovation (RRI) practices in Nanotechnologies Development
- Policy brief 5: Positioning Co-Creation: Democratisation versus Added Value
- Policy brief 6: Inclusion in Co-creation: What is Needed in Practice?
- Policy brief 7: Gender Issues in Nanotechnologies research and innovation
- Industry Brief: The power of co-creation: Designing Solutions to shared problems

THE GONANO POLICY AND INDUSTRY BRIEFS

GoNano

CO-CREATION

GONANO POLICY BRIEF NO. 1

Co-creation: **A Practical Tool to Enhance Responsiveness** in Research and Innovation

Co-creation can enhance responsiveness by:

- **Supporting the translation of abstract needs, values and concerns into practical options and action in research and innovation practices**
- **Facilitating a process of realisation and exploration of how and why broader societal perspectives matter in research and innovation**

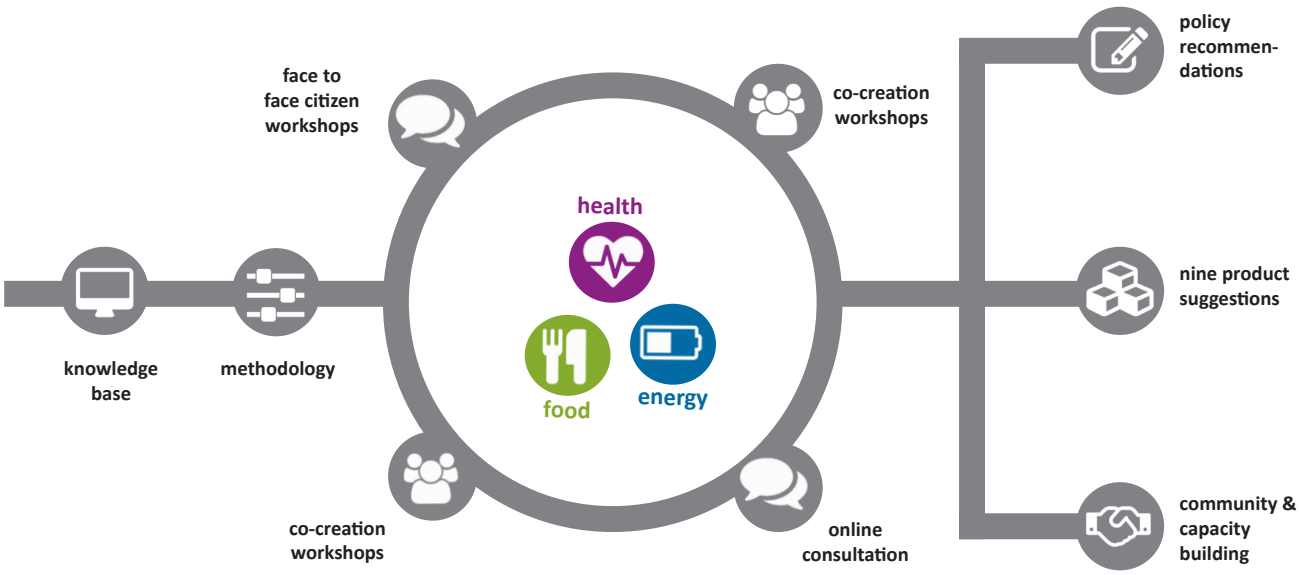
The issue at stake

GoNano explored how co-creation might be used to enhance the responsiveness of nanotechnology research and innovation. Responsiveness is understood as the capacity and willingness of researchers and producers to integrate societal considerations in early stages of technology development (see GoNano Policy Brief 2). Co-creation can enhance responsiveness by enabling productive collaborations between researchers and societal stakeholders over longer timeframes, leading to tangible outcomes such as a new research avenue, proposal, product or prototype.

GoNano strategy and key findings

GoNano aimed to demonstrate how researchers can work with publics and professional stakeholders to create novel suggestions for future nanotechnology products. Citizens discussed possible future nanotechnology application areas

GoNano process: Governing nanotechnologies through societal engagement



to identify their wishes, needs and concerns. Building on outcomes of the citizen workshops, stakeholder workshops were organised to co-create concrete 'responsive' design suggestions for future nanotechnologies. These suggestions were shared and discussed more widely by way of an online citizen consultation.

The results from the online consultation were in turn used as input for a second round of stakeholder workshops, focusing on the uptake of the responsive design suggestions of the previous round.

- Participants appreciated the co-creation events and valued the opportunity to learn from stakeholders they would not usually engage with. Such appreciation of opportunities for interaction and learning should not be underestimated. Productive integration of societal considerations in research and innovation will, to a large extent, depend on mutual learning between stakeholders, and on the shared conviction that broader societal perspectives matter.
- The gap between the appreciation of broader issues around research and innovation and knowing how to integrate those issues in daily research practices and priorities remains significant: the challenge is to get from constructive dialogue to practical action.
- GoNano showed that focused, guided interactions between different stakeholders can lead to novel suggestions on how to integrate broader considerations in research and innovation decisions.

Key recommendations

on using co-creation to enhance responsiveness in research and innovation

● Identify participants' motivations

The GoNano experience confirms that co-creation processes need to identify the concrete interests and address the motivations of all participants, whilst staying true to the objectives set out at the beginning and maintaining continuity of thought throughout.

● Bridge the gap

Design and use co-creation processes to 'translate' needs and concerns from the social realm to practical options in the technological realm. Start broad and gradually drill down to the level where the discussion topics and identified courses of action are specific enough to be relevant to and affect the decisions of the actors involved.

● Transition from knowing to doing

Aligning research and innovation to societal needs and values is not just a matter of deciding what sorts of future applications European citizens and stakeholders want and need. It is also a matter of practically realising the desired change. Calls for responsiveness will need to identify the win-win opportunities where 'doing good' and 'doing well' coincide.

The EU-funded GoNano project (Governing Nanotechnologies through Societal Engagement) aims to align future nanotechnologies with societal needs and concerns. From September 2017 until December 2020, GoNano brought together citizens, researchers, industry, civil society organisations and policy makers across Europe to co-create concrete suggestions for future nanotechnologies.

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RESPONSIVENESS

GONANO POLICY BRIEF NO. 2

Moving from reflection to **proactive engagement and action** on societal needs, values, and concerns

The move to action can be supported by:

- **Building collaboration in the early stages of research and development and encourage creativity and design thinking**
- **Supporting the training of interactional skills, literacy and expertise**
- **Implementing rewards for researchers that invite other experts and societal stakeholder to discuss and contribute to their work**

The issue at stake

A perceived increasing public mistrust in science has led to scrutinising the normative authority of scientists and science. One result is the call for scientific practices and scientific norms of public research to be at more publicly accountable. Regarding this accountability, RRI scholars have put emphasis on “responsiveness”, a term that refers to the alignment between scientific and societal values, in short, between science and society. In the debate on a more inclusive science, as well as safer technological solutions, the main question has been “who is going to be (potentially) affected, in what ways, and how may we develop better solutions?”.

Evaluation of perceived risks and benefits of new technologies like nanotechnologies may differ e.g. between experts’ and the public’s evaluations. Such differences are not only a normative challenge, they also influence the uptake, use and acceptance

The results from the citizen workshops suggest that citizens recognise and appreciate the promise of nanotechnologies, but they also realise the fact that scientific progress does not necessarily create merely benefits. Their recognition that benefits cannot be taken for granted because of technological development was clearly visible. Citizens repeatedly wanted the relevant stakeholders to make sure that nanotechnologies do not harm our natural environment or the human body.

Outcome GoNano Citizen Workshop 2019

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of new innovations and technological solutions in e.g. healthcare (see also GoNano Policy Briefs 6 and 7). Therefore, aligning science with desired research strategies or product solutions, can also reduce losses of capital expenditure for the public as well as private research and product development.

GoNano strategy and key findings

GoNano's co-creation approach enabled the transition from a mainly risk-oriented approach to an active involvement of non-scientists in the product development process. The aim of this was to focus deliberation on the relation between values, needs, and concerns product ideas or research lines. Doing this gradually and iteratively allowed for better alignment of the guiding principles and real-life research undertakings or plans and to take them further in a creative, active and common manner. This process created transparency (as a foundation for general trust) between different actor groups (i.e. research actors and a wider public), allowed for dialogue and networking between participants, and resulted in win-win situations for scientists, experts and other participants.

Key recommendations
on moving from reflection to action

- Leave space for the recognition of opportunities and consciously integrate "interactional expertise"

Opportunities to enhance responsiveness require attention (and time) to identify them, and the openness and willingness to recognise and act on them.

- Build bottom-up to encourage creativity and design thinking

There is clearly a need for collaboration between researchers, stakeholders and citizens, and one should provide the opportunity for all to actively participate from the beginning, contributing ideas as much as identifying concerns. This requires time and a good organisation which needs to be supported by management and financial resources.

- Support the training of interactional skills, literacy and expertise

This can successfully enhance the collective potential to identify suitable scopes within research design settings and relevant questions that can meaningfully be addressed by actors striving for responsiveness.

- Implement rewards for researchers in the research system

Facilitating responsiveness between research and broader values to counter a perceived democratic deficit is widely appreciated. Policy needs to ensure a provision of benefits on a systemic level for individual researchers who are willing to invest in mechanisms and structures to foster responsiveness.

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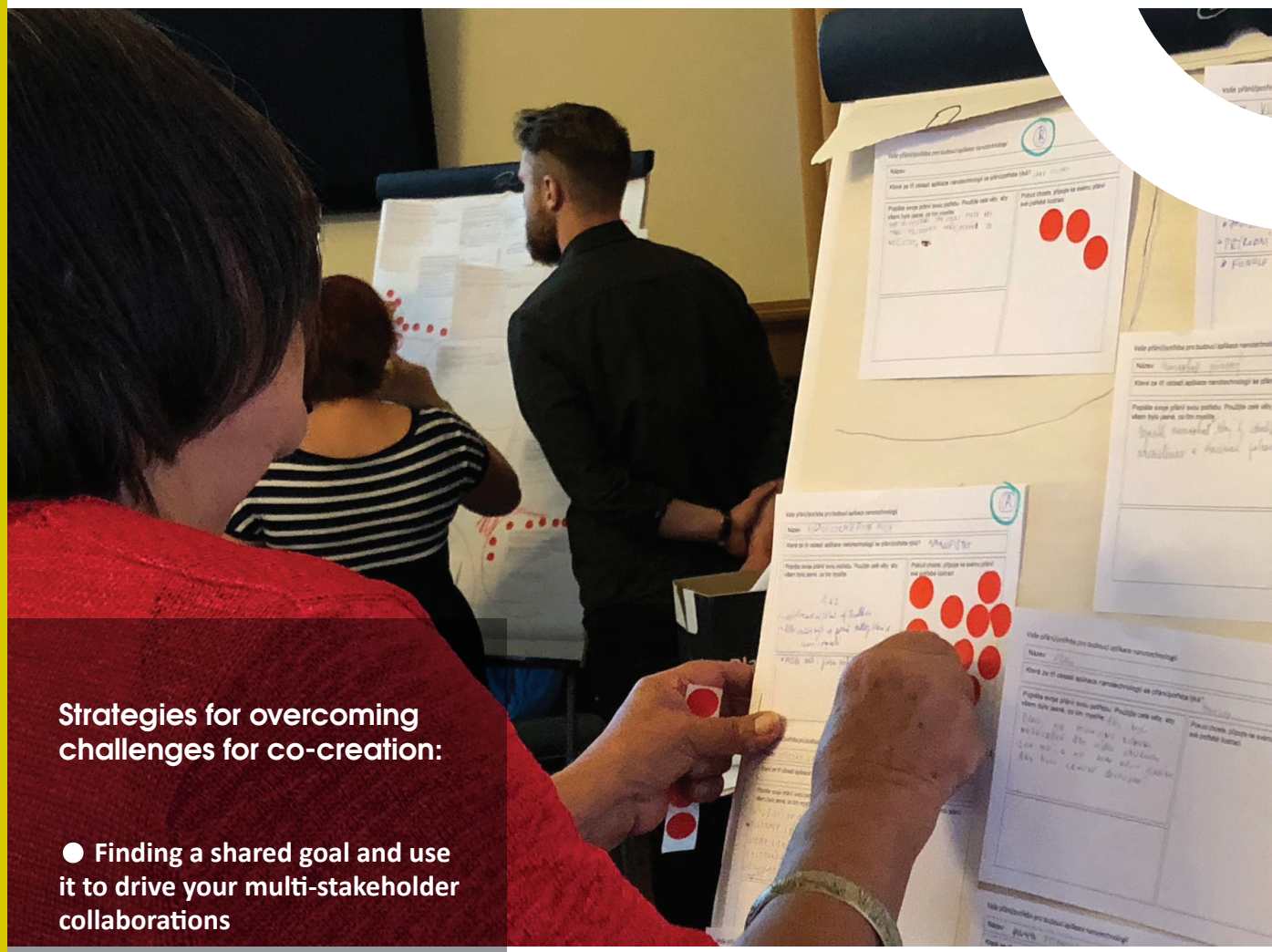
CHALLENGES

GONANO POLICY BRIEF NO. 3

Opportunities and Challenges of Co-Creation: Experiences from the GoNano Project



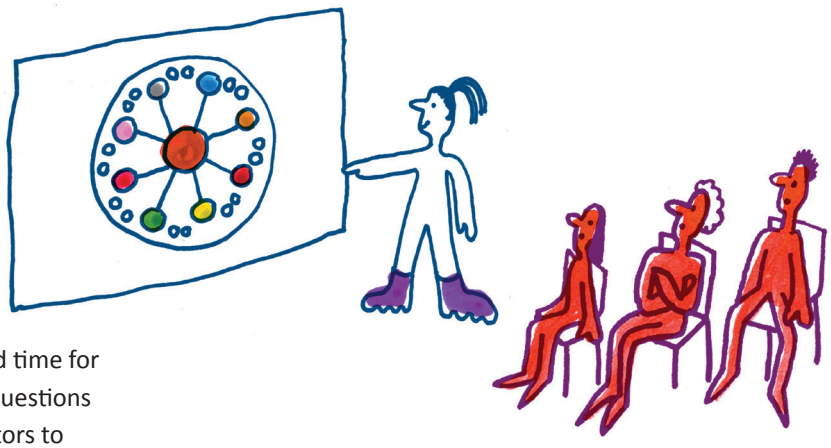
Strategies for overcoming challenges for co-creation:

- **Finding a shared goal and use it to drive your multi-stakeholder collaborations**
- **Planning time to translate and mediate between your different types of stakeholders. The more diversity the more time you will need to mediate and build common understanding between groups**
- **Choosing a clear purpose of the co-creation in research: democratisation or creation of shared value through product development. The goal prescribes the actors that should be involved and their ways of contribution**

GoNano strategy and key findings

The GoNano co-creation methodology was designed to formulate a shared goal as the driver for multi-stakeholder collaborations. Collaboration was seen as a joint enquiry in matters of common concern, where all participants would have a genuine influence on the process. GoNano aimed to establish a transparent process that discussed suggestions for future nanotechnologies that were specific enough to affect decisions. Recognising that all participants are expert in some fields and laypersons in most other fields, the GoNano process sought to build trust and enable mutual learning between participants.

- Co-creation is a general approach that can be applied to many goals. Its possible functions were observed in GoNano: co-creation for *envisioning*, for *user-led innovation*, and for the *creation of shared value through product development*. Each



of these involves different types of actors with different expected outputs in different stages of innovation.

- It is important to select the appropriate stage and time for engagement in co-creation and to address specific questions in specific contexts. Supporting the ability of R&I actors to react to societal input when technological trajectories are still malleable can present significant opportunities to align R&I with societal needs and values. However, a key factor for change is the emergence of opportunity, coupled with actors' abilities to recognise and act on it.

- Co-creation as a process holds opportunities *and* drawbacks. It can be an effective tool to tackle special types of problems such as 'wicked problems' (impossible to solve because of incomplete, contradictory and changing requirements that are often difficult to recognise). Nanotechnology governance is such a wicked problem: the challenges do not only reside in the development of the technology itself, but also in the required alignment between working practices, responsibilities, knowledge levels, expectations and concerns across widely divergent fields of expertise.

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Key recommendations
on opportunities and challenges of co-creation

- Co-creation comes in many shapes and sizes, but you cannot do it all at once

Define the purpose of the co-creation event, as it prescribes the actors that should be involved and the ways in which they contribute. In some cases, a co-creation process benefits from having combined and multiple purposes; however, shifting between these purposes during the process is difficult to manage.

- Co-Creation is transdisciplinary, practice-oriented, and iterative

Design co-creation events to have an adaptive approach and allow for flexibility concerning timeframe and financial reserves to attract a variety of committed stakeholders, as this will ensure consistent contributions and help to increase yield.

- Co-creation is a process

Acknowledge the processual nature of co-creation. It is not a quick "one fix for all" tool and can change in accordance with the needs of the process and the participants.

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VALUE CHAIN

GONANO POLICY BRIEF NO. 4

The Value Chain: An approach to Implement **Responsible Research and Innovation** (RRI) practices in **Nanotechnologies Development**

How the value chain approach can support the implantation of RRI:

- It provides a schematic approach and a stepwise guide for embedding co-creation in business practices
- It helps identify hands-on suggestions to help successfully co-create along your value chain

The issue at stake

Public engagement is seen as one of the core values of Responsible Research and Innovation (RRI). Within the broad area of public engagement, co-creation requires a more active role for non-experts and non-scientists within the development of technology. Citizens and non-experts are invited to actively contribute in a variety of ways; for example, they may provide fresh ideas and creative solutions based on their perspectives about a specific technology or challenge. However, co-creation is only vaguely defined throughout existing narratives and debates around RRI. Despite this, some have experimented in applying co-creation in various areas from business to public health on the level of research and innovation agendas, as well as in specific product consultations. However, these attempts seem to follow two different rationales: one aims to increase the normative goal of democratising the research process, while the second one contributes to product improvement (see GoNano PB 5). GoNano defines co-creation as *"(…) activities*

Experts claimed that it was easier when citizens' suggestions were close to the stakeholders' own working context. They could directly relate to them and start working with the outcomes of the process.

GoNano Workshops 2019

[that] enable productive collaborations between researchers and societal stakeholders over longer timeframes, focusing on specific nanotechnology research lines, leading to tangible outcomes such as a new research avenue, proposal, product or prototype"[1].

GoNano strategy and key findings

The GoNano project took on the challenge of exploring, clarifying, and bridging the gap between democratisation-oriented formats – common in public engagement – and the practical implications required for application in business contexts. Building on experiences from the GoNano pilot studies, GoNano explored co-creation inspired by the concept of the value chain (as shown in the schematic below) to facilitate communication and to establish co-creation within an industrial and business context.

Co-creation and stakeholder engagement along the R&D value chain

Experiences from the co-creation pilots in three different research areas of nanotechnology (food, health, energy) showed the importance of context specificity, as well as awareness of possibilities to adjust the scoping of the overall process where still possible. However, still having the opportunity to change the path of technology development (or research line) according to the outcomes of the co-creation process was crucial for industry actors to be able to integrate content from the co-creation workshops. The process of discussing example research proposals with stakeholders along the whole value chain also proved helpful in further developing the scope of work.

1. GoNano D2.1: http://gonano-project.eu/deliverable-2-1/ [20-02-2020]

Key recommendations
on using the value chain approach

- Be cognisant of what changes are possible within the research and innovation (R&I) system you aim to impact upon

Make a realistic assessment of what is achievable through co-creation and identify the steps to tackle specific challenges, rather than remaining stuck at the abstract conceptual stage. Also clarify responsibilities before even starting projects, i.e. who is actually able to contribute what type of input to each step, as well as their expectations, capacities, needs and interests.

- Balance "opening up" and "closing down"

Co-creation calls for open and divergent phases, collecting the largest possible number of ideas or needs from a large and varied group of stakeholders (brainstorming), but also calls for phases where abstract ideas need to converge on concrete applications (prototyping) involving selected stakeholders. In order to be both responsive to society and effective for a successful innovation, the co-creation process should balance these rationales, thus supporting the creation of win-win situations.

- Establish understanding between stakeholders' perspectives

Finding consensus on broad societal goals is usually rather easy; however, the meanings of specific terms may differ between stakeholder groups. Successful co-creation processes must establish a respectful and trustful relationship between different stakeholder groups, as well as shared understanding and language.

- Restructuring the environment is possible: Create a culture of co-creation

The challenges outlined above cannot be carried by researchers alone – collaboration and co-creation need to become mainstream practices among all stakeholders involved in R&I. This implies overcoming a lack of incentive structures for researchers, confidentiality or privacy limitations, and other obstacles currently limiting co-creation. This cultural change requires a fundamental rethinking at the systemic level of research practices, and of research funding and incentive structures.

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DDED VALUE

GONANO POLICY BRIEF NO. 5

Positioning Co-Creation: **Democratisation** versus **Added Value**

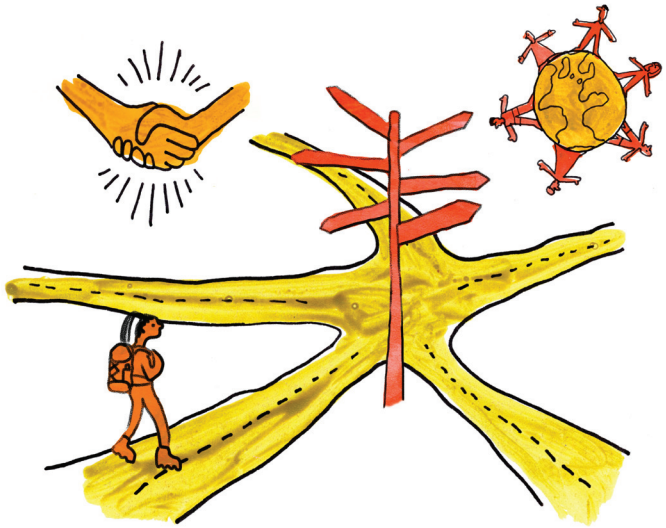
Possible uses of co-creation in research and innovation:

- **It can be used to integrate diverse perspectives and knowledge for improvement of innovation product and ideas**
- **It can be used to integrate diverse perspectives and knowledge for evaluation of the priorities and direction of research and innovation policies and practices In each case, organisers should carefully consider the role of, and expectations placed on laypeople in a co-creation process**

The issue at stake

The involvement of non-experts in research activities or in science and policy decision-making has become popular. This involvement can happen according to two paradigms: (1) democratising research processes to a wider public that contributes its visions, worldviews, values and needs, i.e. involving citizens as “experts of daily life” with their own agendas; or (2) including laypeople to make use of their creativity and perspectives in order to materialise better products with improved marketability, i.e. involving citizens as users or consumers.

While both framings rely on an active integration of laypeople as a valuable knowledge source, the concept of *who is considered a layperson and their role* differs between citizens, consumers, non-experts and uninformed people. Accordingly, the way experts and laypersons are expected to interact (or not) differs fundamentally and remains mutually exclusive.



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GoNano strategy and key findings

The GoNano co-creation definition put research avenues and product development in the spotlight while paying attention to broad and inclusive citizen deliberation. The notion of "co-creation" holds the promise of integrating these two rationales, but not making a clear choice between the two framings complicated the involvement of non-experts. In the end, this was partially resolved on a methodological basis in GoNano.

"One of the most critical voices described the citizens' outcomes as a "...mixture of attitudes without any real knowledge", and that "...citizens don't have any awareness". [...] This critical perception may be attributed to the fact that initially, there was no representative of the citizens, NGOs or the media involved in the discussion. Moreover, the debate was dominated by a few applied researchers and a company director. While some citizens´ needs and values were accepted, the relation to nanotechnologies remained unclear.

Outcome GoNano Workshops 2019

Key recommendations

on using co-creation in research and innovation

- Align the project strategy with the intention

Be clear on the intention and motivation for participation and co-creation. Consider whether the question is suitable for involving laypeople, or reframe it accordingly if necessary.

- Be aware of what you expect of laypeople

What role are lay participants assigned? State your expectations regarding laypeople's contributions. Is it creativity? Normative orientation? Evaluation of a product? Clarify roles for laypeople and also make sure that they are willing to contribute in this way. However, also be sure to leave space (and time) for thinking "outside the box" and exploring differing perspectives.

- Commit to a strategy and follow through

There are different options on where to start a process. Where you choose depends on the research field in question and your expectation of laypeople's contributions. It helps to commit to one specific starting point and focus on one strategy to gain a clear outcome, but again include flexibility in the timeframe for the unexpected that may provide benefits for the overall co-creation process.

- Support the implementation with shared language and empathy as a precondition or outcome of co-creation

Allow for organisers to proactively support participants in challenging the ways in which the views of others are anticipated, simplified (or ignored), compared to science/scientists, industry/industry representatives and society/citizen-consumers. Additional economic resources to implement and foster this attitude should be provided if needed (see Policy Brief 6 and 7).

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INCLUSION

GONANO POLICY BRIEF NO.6

Inclusion in Co-creation: **What is Needed in Practice?**

Key requirements for realising inclusion in co-creation:

- **Investing in co-creation and develop skills and competencies of organisers to develop strategies that ensure continuous inclusion**
- **Carefully balancing the topic, questions and preparatory materials to avoid common difficulties for inclusion in co-creation and engagement processes**
- **Paying attention to your communication strategy and the messages you share about your project and process to communicate in a way that supports inclusion and diversity**

The issue at stake

Attempts to make technology development more inclusive have been at the heart of discussions in technology governance for decades. Being inclusive is both a challenge and a benefit for technology development. Designing co-creation and engagement processes for nanotechnology development requires conscious strategies, skills and resources. GoNano emphasised the importance of action and inclusion from the outset, and assumed that innovation processes are open to be adapted accordingly to societal inputs. GoNano also attempted to provide a method to grapple with societal concerns as comprehensively as possible by considering diversity in interests, concerns and values. The main challenges in co-creation were seen to be the additional effort for organisers to: (1) keep the diverse participants interested and active during the whole process; (2) clearly communicate aims and possible outcomes and impact to all actors involved; and (3) establish appreciative and respectful communication between all actors.

Generally speaking, we relate differently to new technologies like nanotechnology, depending on the different roles we take up in society in various ways.

GoNano Workshop Participant 2019

GoNano strategy and key findings

Keeping stakeholders and citizens on board requires that the co-creation process is, and remains, relevant and interesting to all participants, as the whole outcome of the project depends on their motivation and engagement. Therefore, it is essential to explore the interests of stakeholders and society (citizens and other societal stakeholders) before co-creation starts, and to continuously reflect these throughout the process. The co-creation workshop setting and agenda must be attractive to all participants, so that they engage in bilateral exchanges rather than simply receiving information about an interesting topic (e.g. nanotechnology keynotes), which as an exclusive motivation could lead to an increase in the number of passive participants and drop-outs.

Co-creation itself requires translational efforts to facilitate a fruitful communication between a diverse general public on the one hand, taking into account their values, needs and expectations, and engineers and researchers on the other, who have quite clear ideas of innovation, development and progress. Co-creation should produce visible or tangible outcomes for all participants involved. In doing so, it can help develop technologies that include non-mainstream opinions and ideas as an expression of effective inclusion and communication.

By investing in additional efforts, skills and strategies for communication and coordination, GoNano successfully navigated multiple co-creation processes. Workshops benefitted from facilitators who ensured continuous inclusion of participants in the individual groups, e.g. by countering dominant members of groups during discussions. The facilitators also countered the difficult challenge of keeping the focus in the workshops on nanotechnology instead of extending the debates to a much wider context of developing new technologies in relation to societal needs.

Key recommendations

on realising inclusiveness in co-creation processes

- Inclusion needs additional efforts, skills, and resources

Making co-creation relevant and workable for all participants is crucial for its success. Organisers and decision makers must acknowledge the extra effort required to achieve this and policies should support the provision of appropriate resources for its realization.

- Clarity on purpose, contribution, and role

Despite repeatedly stating the topic and the goals of the day before and during the co-creation events, in some cases these remained abstract for many participants. Even more effort to provide balanced information (e.g. scenarios of possible future everyday-life applications) is recommended to enable equal participation.

- Frame the role of citizens and highlight potential beneficial inclusion effects

Stakeholders in all workshops saw the relevance of including societal needs and values in the early phases of research and innovation. Some stakeholders even saw a consultation as too passive a format and that, with a clear framing, they could have even more appreciation for the role and contribution of the citizens, not only as users but as agents of societal values.

- Ensure a continuous communication process

To achieve specific product and/or research suggestions and to foster the participants' sense of ownership, a series of workshops are essential, rather than one-off events. A long-term interactive process with a continuous dialogue is therefore required to keep enthusiastic stakeholders involved in the project and to motivate other stakeholders to take up the action as well.

Also see GoNano Policy number 7 for additional considerations on how to be inclusive and consider the full diversity of societal and behavioural roles.

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GENDER

Gender Issues in Nanotechnologies research and innovation

Gender issues in nanotechnologies research and innovation include:

- **Male norms and visions of future role and function of technological applications give shape to research ideas and processes thereby missing possibly discriminatory or harmful implications**
- **The performance and potential of women in science is judged and viewed differently than their male counterparts**
- **A lack of discussion and awareness on the difference between sex and gender. Gender or "gender equality" refers to the socially constructed roles, behaviours, activities, and attributes that a given society considers appropriate for men and women, whereas sex refers to the innate biological characteristics**

The issue at stake

One of the fundamental conditions shaping our social behaviour is our gender identity. In research and public discourse, the difference between biological sex and socially constructed gender complicates the tasks of addressing the issue of identity. As it stands now, the core values and assumptions in STEM fields (Science, Technology, Engineering and Mathematics) have been fundamentally shaped by men and male norms. This means that innovation processes miss integrating gender and diversity, and the perspectives of large portions of the population are neglected as the gender concept is becoming increasingly variable. Thus, the benefits of differentiating and including issues of sex, gender, and diversity, and of adopting an intersectional approach, need to be highlighted in broader contexts and discourses of policy making and research itself, as well as in the context of co-creation processes.

GONANO POLICY BRIEF NO. 7

GoNano strategy and key findings

GoNano succeeded in strengthening inclusion with regards to gender in recruiting participants for the co-creation workshops. But apart from conscious recruitment, it is also important that the co-creation settings themselves take diversity and gender into account (i.e. as the input or information provided) and that viewpoints which differ from the norm and mainstream are actively integrated into the process. Diversity and gender can be addressed as a function of different contexts, positions and roles in life (e.g. religious beliefs) that matter and play a role in opinion making. Including this from the beginning helps to achieve a beneficial and inclusive end-product of the co-creation process.

If the inputs embrace different cultural and intersecting social identities and demographics, different opinions are captured, a broad discourse is fostered and a two-way communication between different perspectives may develop. In practice, the GoNano methodology adopted several strategies to reach participants with balanced information, while also adopting an easily accessible communication style. From a policy relevant structural point of view, it is important to notice that gender inclusion strategies should include both an applied dimension to actually include diverse actors (*Who* is discussing, deciding, doing?) and a content dimension (*What* is discussed? Taking which perspectives into account?).

As the term gender is not equal to biological sex, the approaches of “woman in science” and “gender equality” operate on fundamentally different levels. Gender or “gender equality” refers to the socially constructed roles, behaviours, activities, and attributes that a given society considers appropriate for men and women, whereas sex refers to the innate biological characteristics (World Health Organisation 2010). This is why the term gender provides the opportunity for more diverse societal roles than by simply differentiating male and female. Therefore, it is also important to note that neither sex nor gender is exclusively binary (male or female, man or woman) but a person can also be intersex or self-identify on a broader gender spectrum. Social identities coin values and concerns towards new technologies, like nanotechnologies. So, someone’s interpretation will differ greatly according to cultural background, roles of individuals and the way these are expressed in society.

Key recommendations

on considering gender issues in co-creation processes in research and innovation

Based on its experiences, GoNano has identified the following recommendations as being crucial to normalise the concept of gender diversity in nanotechnology and science in general.

- A balanced and diverse engagement of citizens, stakeholders, organisers, hosts, and facilitators

It is important to provide resources and to support the inclusion of citizens and stakeholders with different perspectives, specific needs, imaginations and wishes which are coined by diverse socio-economic parameters, life contexts, experiences, values and diverse cultural backgrounds (including aspects like ethnicity or religion). Considering diversity allows for an increased innovation capacity which can be better aligned to societal needs and values.

- Implement inclusion as a desirable societal norm

The GoNano engagement methodology showed that gender mainstreaming, equality, diversity, culture and communication are important and should be addressed from the outset. Adopt a strategy for providing targeted resources to support inclusion and engagement systematically in research and participatory projects. This could be of great help to challenge implicit discrimination and gender issues.

- Support stakeholders and hosts who value and promote diversity and inclusion

Stakeholders should acknowledge and promote diversity in research, industry and co-creation in the process. As stakeholders occupy an important and representative role in the process, their communicated attitude towards gender, inclusion and diversity is of utmost importance.

The EU-funded GoNano project (Governing Nanotechnologies through Societal Engagement) aims to align future nanotechnologies with societal needs and concerns. From September 2017 until December 2020, GoNano brought together citizens, researchers, industry, civil society organisations and policy makers across Europe to co-create concrete suggestions for future nanotechnologies.

The GoNano policy briefs present the results of the engagement activities and provide recommendations based on the GoNano experiences. This is the seventh of a series of seven policy briefs. Please see http://gonano-project.eu/policy-briefs/ for the complete series.

GoNano is a Coordination and Support Action funded by the European Union under the NMBP Programme of Horizon 2020, Grant Agreement n° 7 68622.

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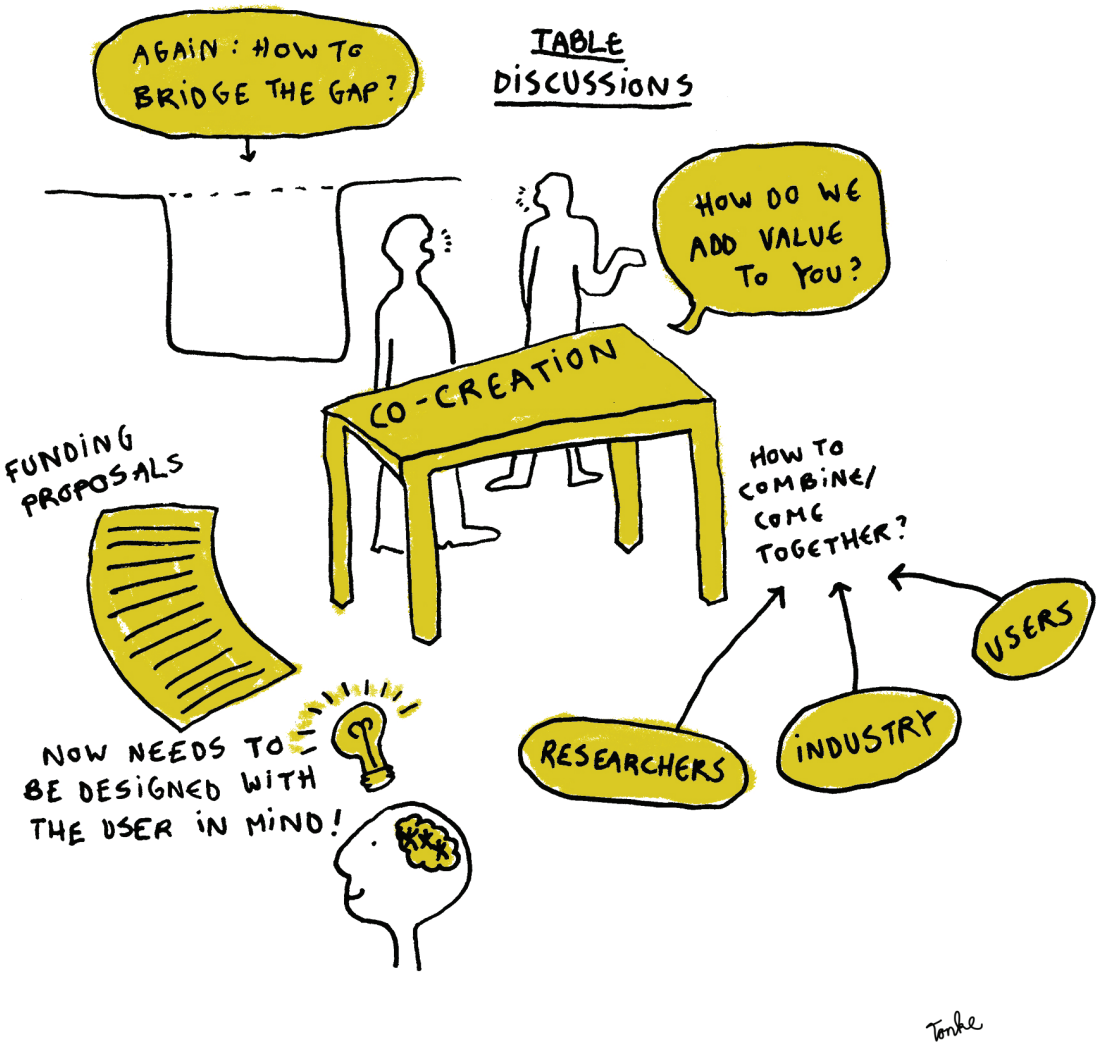
GoNano

THE POWER OF CO-CREATION

GONANO INDUSTRY BRIEF

Designing solutions to shared problems with citizens and stakeholders



Co-creation is about the joint development of new value. The EU-funded GoNano project sought to unleash the power of co-creation on the design and development of nanotechnologies, orienting research to products and services that citizens want and need.

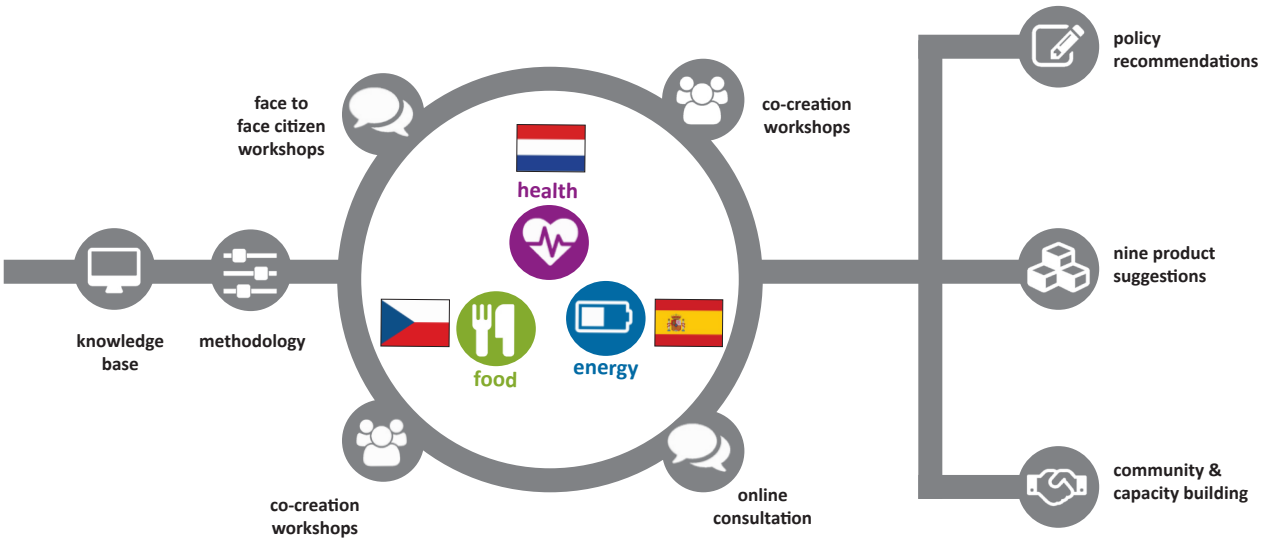
This industry brief highlights experiences from the GoNano project and provides suggestions on how co-creation processes might add value to innovation processes.

What is co-creation?

Co-creation is the joint development of value by innovators and users. It is a collaborative tool that is increasingly being used to design solutions to shared problems. The Creator Space initiative launched by BASF for example aims to foster open innovation within the company by bringing together stakeholders with varying experience from within and outside of the company to develop concrete, challenge-based products and services. Others have used co-creation to enhance participation in research and innovation. The EU project Making Sense EU empowered citizens to use low-cost, open-source technologies to measure air pollution, water quality or sound pollution in their own environment.

Co-creation has the potential to add value to innovation processes by *enabling user-led innovation*, where prospective users of new technological applications provide feedback

Overall design of the co-creation process in GoNano



on prototype designs in early stages of development, or by *envisioning technological futures*, where a diverse group of stakeholders designs demonstrators (e.g. sketches, drawings, prototypes, roadmaps, etc.) to visualise and address the potential societal impacts of new technologies.

The GoNano experience

The EU-funded GoNano project GoNano brought together researchers, producers, citizens, civil society and policy makers in an iterative design process to co-create concrete suggestions for future nanotechnologies. The co-creation process was built around four interrelated steps:

1. *Exploration*: mapping knowledge requirements, needs and interests of participants: define the shared problem.
2. *Ideation*: drawing on the available expertise around the table to imagine creative solutions to the shared problem.
3. *Prototyping*: developing concrete demonstrators of possible solutions.
4. *Reflection*: consider the feasibility of the proposed solution, strengths and weaknesses, and identify next steps.

The co-creation events provided productive spaces for engagement and mutual learning between the participants. Focused, guided interactions led to innovative suggestions on how to integrate broader considerations in research and innovation.

The value of co-creation

The GoNano experience points out that co-creation could offer new inroads for research and innovation. For instance, discussions between policy makers, civil society, researchers and a diabetes patient on the artificial pancreas (a monitoring device for diabetes type 1 patients) led to data management considerations that may be relevant for future data sharing agreements between the producer and users of the device.

Co-creation can also help to make normative commitments explicit, so that possible social and ethical impacts of new applications can be addressed at early stages of innovation (preventing more significant costs due to resistance later down the line).

Co-creation is not a panacea - but it can be an especially effective tool to tackle 'wicked problems': problems that have no single solution because of incomplete, contradictory and changing requirements that are often difficult to recognize and require collaboration between stakeholders.

To find out more, please visit the GoNano website and embark on the co-creation journey, working together with citizens and societal stakeholders to create new solutions to shared problems.

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