NANO2ALL

SOCIETAL ENGAGEMENT ON RESPONSIBLE NANOTECHNOLOGY

D4.3 NANO*futures* Working Group for Societal Engagement

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Responsible scientist/administrator:	NANO*futures* -IDONIAL
Contributor(s):	Raquel Garcia (IDONIAL-Nfa), Paula Queipo (IDONIAL-Nfa), Olga Kammona (CERTH-Nfa), Ineke Malsch, (Malsch TechnoValuation)
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Changes with respect to the DoA

N/A

Dissemination and uptake

The report is primarily aimed at the project partners and the EU project officer. It will be made publicly available, allowing other interested persons to read it as well.

Short Summary of results (<250 words)

This report describes the new NANOfutures (Nfa) horizontal working group (WG) for societal engagement created within Work Package 4 (WP4) "NANO2ALL Roadmap", including its structure, rationale, objectives, stakeholders, and expected impact, formulated to assure the sustainability and update of NANO2ALL's findings, actions and roadmap after the project's end.

This document summarises the results of the work obtained in task 4.3 "*Establishment of NfA sustainable working group*" particularly referring to the definition of the WG objectives, based on the needs identified as a result of the national and European dialogues held within WP3; the planning of the activities to be carried out to ensure the achievement of those objectives, and providing it with appropriate structure and tools, aligned with NfA and the other WGs' structures, in order to ensure its integration in the platform actions.

Evidence of accomplishment

Report

Contents

1. Introduction

The presented document was developed by NANO*futures* (NfA) as part of the NANO2ALL (Nanotechnology Mutual Learning Action Plan for Transparent and Responsible Understanding of Science and Technology) project, which has received funding from the European Union (EU) Horizon 2020 programme under the Grant Agreement number 685931. This report represents deliverable 4.3 and it is aimed to describe the new NfA horizontal working group (WG) for societal engagement created within Work Package 4 (WP4) "NANO2ALL Roadmap", including its structure, rationale, objectives, stakeholders, and expected impact, formulated to assure the sustainability and update of NANO2ALL's findings, actions and roadmap after the project's end.

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NfA has the responsibility of this deliverable, with its third parties PRODINTEC (IDONIAL) developing the WG description and CERTH collecting and coordinating feedback from WG chairs, ETPs and supporting CSA coordinators. Also, the WG chair Ineke Malsch worked on the WG description.

2. NANO*futures*: the European Technology Integrating and Innovation Platform on Nanotechnology

NANOfutures environment is an ETIP European Technology Integrating and Innovation Platform, multi-sectorial, cross-ETP, integrating platform with the objective of connecting and establishing cooperation and representation of Technology Platforms that require nanotechnologies in their industrial sector and products.

The main objective of the NfA Technology Platform, created in 2009, is to facilitate the nanotechnology development and commercialisation by connecting all relevant nanotechnology stakeholders. NANOfutures acts as a "Nano-Hub" by linking JTIs, associations, ETPs with expert groups in a collaborative environment. The platform is open to any profile and free of charge. It currently involves more than 1.100 actors representing industry, research, networks, associations, policy makers, among others.

Strategic Vision

There is a huge amount of information around nanotechnology coming from the active stakeholders and various initiatives. In this complex environment there is a clear lack of an intersectorial view defining the key nodes of strategic nano activities, including the needs of society, policy and environmental issues (what is "Responsible Governance of Nanotechnology") allowing to optimise and maximize the impact of resources deployed, avoiding duplicated, disconnected and fragmented actions and operating, in general, under a single-reference-responsible, capable of communicating with the general public and political institutions and actors at all levels (local, regional, national, European and worldwide).

In order to support European industries to successfully profit from nanotechnologies a number of issues needs addressing:

*Involvement of the general public and a clear orientation of all undertakings to bring benefit to the community;

*Fragmentation of research and innovation efforts due to the interdisciplinarity and complexity of nanosciences;

*The need for a converging approach requiring interactions between life sciences, chemistry, microelectronics and other sectors;

*The differences between the regions in Europe.

All this call for a different approach for exploiting these new technologies. There is a need for clear market drivers – examples of high-profile industrial problems that can be demonstrably solved by applying nanotechnologies - if nanotechnology is to develop from an enabling technology to an end product. Industrial foresight needs to build on established as well as new companies ready to pursue

the potential. Finally, public perception is crucial. A pre-cautionary approach to safety issues and clear communication is needed.

These are all barriers to commercialisation that can only be effectively addressed through an integrated, cross-platform, collaborative approach. In this sense, the crucial added value of NfA is its capacity to avoid duplication of work, learning from each other and having access to experts from all over Europe. This translates into a critical mass capable of increasing the valorization of research in the public and private domain, and a real force to integrate all the concerned stakeholders within a common platform.

Structure

To do that, NfA follows a multi-sectoral, multi-disciplinary and multi-national approach, with which its structure is fully aligned:

- **Multi-sectoral:** representatives from 11 ETPs from different industrial sectors.
- **Multi-disciplinary:** 11 horizontal working groups covering key topics beyond technological gaps. Belonging to these WGs is free of charge and open to new NfA members to join.
- **Multi-national:** lighthouses (local contact points) network in 26 countries.

This is also reflected in its Steering Committee, which guides and steers the platform, and is composed by:

- **1 chair**: Paolo Matteazzi (MBN).
- **2 co-chairs**: Paula Queipo (PRODINTEC/IDONIAL)) and Andrea Reinhardt.
- Representatives of **11 ETPs**: ERTRAC, ENIAC, PHOTONICS21, ETPIS, ECTP, MANUFUTURE, NANOMEDICINE, MINAM, EUMAT, Suschem ETP and Textiles ETP.
- Chairs of the **11 Working Groups**: Societal Engagement, Critical Raw Materials, Industrialisation, Technology Transfer & Innovation Financing, Networking, Communication, Regulation, Research & Technology, Safety, Skills & Education and Standardisation.

Main activities

- **Public roadmaps** addressing the barriers to commercialization of nanotechnology developed within specific CSAs (NANO*futures*: a cross-ETP Coordination Initiative on nanotechnology and Value4Nano: Industrial valorisation of strategic value chains for nano-enabled products).
  The structure of the roadmaps and their implication is recognizable in the EC approach, in particular the Value Chain structure and the inclusive method that consider all the non-technological aspects (safety, regulation, networking etc.) as fundamental for a sustainable and balanced growth and development.

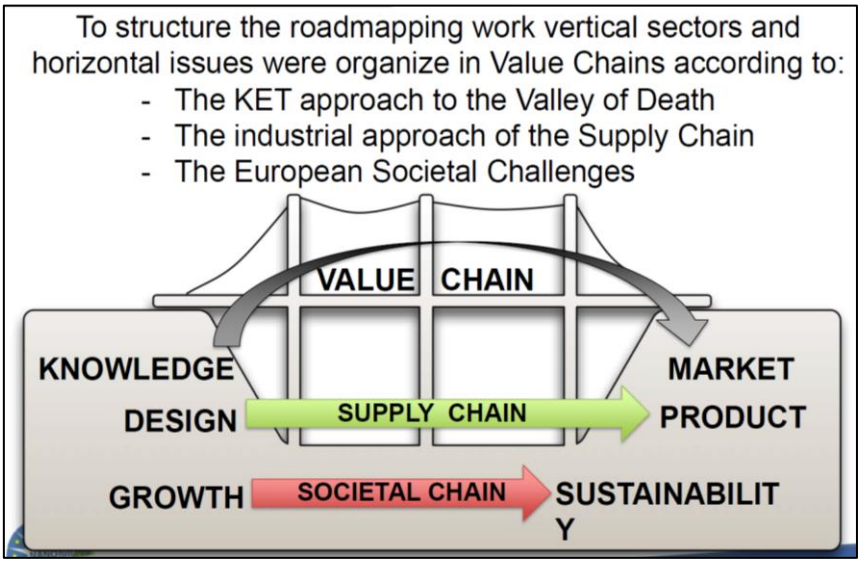

Fig1. *NANOfutures roadmapping approach*

- **Community engagement**: Facilitate community interaction and collaboration along the value chain.
- **Networking activities** to facilitate the formation of competitive alliances to reach the market. NfA actively participates in several international, national and regional events and organizes networking events and expert workshops for concrete actions.

  An example of the networking activities performed by NfA is the Brokerage Event for Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing held on 13th November 2014 in Brussels, organized by NfA with the collaboration of the European Platforms for Advanced Engineering Materials and Technologies EUMAT and Manufacturing, MANUFUTURE and opened by the Director of European Commission DG Research & Innovation.

  It attracted nearly 500 attendees which posted more than 800 requests and offers in the 32 booths dedicated to the NMBP specific topics, including PPPs (Factory of Future, Energy Efficient Buildings and Spire). Also, more than 80 project ideas were submitted to be presented during the event, from which a total of 50 were selected.
- **Support to new initiatives:** Since 2017, Nfa is involved in the **European Pilot Production Network** (EPPN) that acts as coordination and "bridging" platform in the area of nanotechnology and advanced materials technology upscaling and pilot production. The overall objective of EPPN is to provide pilot lines and advisory services, facilitate the access for SMEs and start-ups, and maximise the impact of these facilities for all. The initiative also seeks better coordination of innovation programmes and finance opportunities from H2020, regional and private sources to maximise synergies and impact of these instruments.

  NfA started supporting the Pilot Lines before EPPN´s definition, with the Implementation Roadmap on Value Chains and related Pilot Lines and will continue to sustain the growth of

EPPN through its network. So far, NfA actively participated in the EPPN workshop held in Brussels on October 2015 and hosted a workshop during EuroNanoForum in Malta on June 2017. Also, the Platform is a partner in the H2020 project associated to this initiative. The overall project goal is to boost the European competitiveness through the exploitation of the existing European pilot line production facilities in the area of nanotechnology and advanced material by creating a network of fully connected and collaborating pilot lines and boost the effectiveness and the efficiency of existing (and future) pilot line facilities by creating a digital ecosystem, acting as an interactive marketplace for professional members.

3. NANO*futures* working groups

NfA WGs are organised under the 3 main topic areas addressed by NANOfutures: "technology", "regulation and standards" and "innovation". The objectives of the horizontal WGs are to present recommendations for strategic actions under each of these three main topics.

The first 9 WGs of NfA were created in 2010. In February 2015 an additional WG on Critical Raw Materials was officially launched. In September 2018 the Societal Engagement WG, as a result of the NANO2ALL project, was created. These working groups are focused on cross-sectorial issues related to nanotechnology, which cannot be solved only at industry-sector (i.e. ETP) level.

Initially, one of the main targets of the WGs was the definition and development of a set of strategic key nodes (up to 5) in terms of cross-sectorial research, development and innovation where the EU should focus public and private efforts in the following 10 years, in order to achieve a lead position in the nanotechnology worldwide market in a sustainable way. Each of these nodes covered needs coming from many sectors/ETPs and relevant to several horizontal areas (e.g. safety, standardisation, regulation, consumer and social issues etc.). Such work was carried out with close interaction with the 11 ETPs involved in NfA and was the basis for the Integrated Research Industrial Roadmap for European Nanotechnology released in July 2012. The WGs were involved as well in the development of the Implementation Roadmap on Value Chains and related Pilot Lines released in August 2015: chairs were invited to provide their feedback during two specific workshops and WGs members were asked to contribute remotely.

The tables below show, for each of the 10 WGs, their structure (chairs and currently number of members), rationale within the NfA platform and expected impacts:

SAFETY WG	
Chairs	Rob Aitken (IOM) Sheona Read (IOM) Katja Nau (KIT) Michael Riediker (IST)
Number of members	398

Rationale within NfA platform	This WG aims to improve knowledge concerning the risks exposure/toxicology/safety/impact, particularly in relation to risk assessment and to contribute to promoting safe, sustainable and socially responsible nanotechnology. This WG tries to create synergies among on-going EU activities and networks in the field of safety.
Expected impacts	- Improved knowledge and improved sharing of knowledge concerning the risks exposure/toxicology/safety/impact, particularly in relation to risk assessment - A more efficient process by which new knowledge is generated - A nanotechnology industry (processes, materials, products) which is safe, sustainable, and meets the needs of society

COMMUNICATION WG	
Chair	Andrea Reinhardt
Number of members	408
Rationale within NfA platform	The objective of this WG is to support the NfA WGs and nano community. The members seek to integrate the knowledge and experiences of industry, SMEs and academia, speed up sharing and managing the path of emerging issues by tackling stock of trends, challenges, concerns, laws and regulations.
Expected impacts	- Impact on EU competitiveness of nanotechnology: support collaboration with ETPs, identification of industry needs, improved technology transfer (TT) through the organization of TT event and dissemination of TT material, etc. - Impact on education and the social community: improved communication of research results, improved knowledge on nanotechnology and awareness - Improved visibility of the Impact of Nanotechnologies on Grand Challenges - Benefit for the NfA participants: increased level of collaboration between industrial and academic partners, support to SMEs, etc. - Increased awareness for importance of HSE and Regulation for successful exploitation.

INDUSTRIALISATION WG	
Chairs	Mauro Comoglio (DIAD) Vito Lambertini (Centro Ricerche FIAT) Svetan Ratchev (University of Nottingham)
Number of members	564
Rationale within NfA platform	This WG is aimed at focusing on industry needs related to manufacturing of nanomaterials and products and to the industrialisation and scaling-up of innovative nano-inventions and prototypes developed within funded projects, laboratory research, proof of principle studies, etc. This target is achieved in close collaboration with all the relevant ETPs and related sectors linked to the NfA initiative, with particular relevance to MINAM ETP, dedicated to micro and nano manufacturing issues.

Expected impacts	- Identification of the value chain deficiencies useful for the creation of a leading micro and nanomanufacturing industry; this will be achieved through the involvement of several companies active in these technologies and finding up-scaling solutions of the excellent R&D results (public projects), pilot cases and first lines set in Europe. - Contribution to the dissemination of the most advanced progresses on micro and nanomanufacturing technologies which are strategically important for maintaining the industrial base of the European Community and allowing European industry to play a leading role in the global market. - Roadmapping activity in strict collaboration with MINAM2.0, MINAM platform and MANUFUTURE to support the establishment of a new industry for the manufacturing of products based on emerging micro and nanotechnologies.

NETWORKING WG	
Chairs	Paula Queipo (PRODINTEC) Åsalie Hartmanis (SwedNanoTech) Eeva Viinikka (Spinverse)
Number of members	514
Rationale within NfA platform	The main goal of this WG is to coordinate the activities of stakeholders at regional and national level. This should align financial institutions, industry, research institutions and universities and civil society with the platform objectives. This WG intends to create an environment that stimulates innovation and to provide firms with the incentive to perform R&D and innovative activities at transnational level in nanotechnology.
Expected impacts	The main expected impact is to create a robust network around nanotechnology involving the main stakeholders in Europe. This network should involve regional/national working groups from other already existing ETPs, innovative industrial clusters, active Economic Development Agencies, financial institutions and outstanding researchers from Universities and Technology Centres. NfA is a platform created to bring innovation to the nanotechnology field and, hence, one of the key components should be the European industry. Building a knowledge platform on nanotechnology is believed to contribute to overcoming the current hurdles which hamper industrial companies interested in this emergent field of science to adopt nanotechnology and to develop new added-value product or processes. This should also enable companies to open new niche markets or stabilize the existing ones.

REGULATION WG	
Chairs	Anna Gergely (Steptoe & Johnson)
Number of members	269
Rationale within NfA platform	This WG is aimed at identifying the current gaps and possible strategies for the establishment of a suitable regulatory environment which will enable the responsible development of the industry. The WG establishes interactions

	with current initiatives and networks on industrial-driven voluntary regulation initiatives.
Expected impacts	Regulation is a critical element in the sustainable development of nanotechnologies. It defines the benchmark for safety, assisting compliant industry to fulfil their due diligence requirements and restricting the marketing of products which are not in compliance. Appropriate regulation also provides reassurances to investors and consumers, securing trust and investments in the technology and expected market opportunities for its products. Finally, regulation provides certainty, which enables further developments without the risk of getting it wrong. However, "bad" regulation, which is premature and unjustified, could stifle innovation and create barriers to trade. Hence, the role of the WG is paramount in assisting all stakeholders to build a regulatory framework which recognizes the important impact of regulation. - As "good" regulation can only be created on the basis of sound scientific understanding and reliable test results; the involvement of academia and industry in a coordinated fashion is a key element of creating a suitable regulatory framework. The regulation WG aims to contribute to the dialogue among all relevant stakeholders and secure the necessary collaboration of all actors.

RESEARCH & TECHNOLOGY WG	
Chairs	Udo Gommel (Fraunhofer IPA) Markus Dickerhof (KIT) Bertrand Fillon (IPC)
Number of members	738
Rationale within NfA platform	The activity of this WG is aimed at focusing European strategic efforts on key aspects related to nano research and technology. For all the key issues, it is necessary to work on roadmaps, vision papers, etc. for supplying and establishing accessible instruments.
Expected impacts	- Reducing fragmentation and increase synergies between the various European and national research and innovation activities. - Increasing cooperation and synergies between the actors from the various industrial sectors, research and education communities. - Creation of a seamless link between research output and innovation needs. - Reduction of research fragmentation, by promoting and developing a joint programme of activities.

SKILLS & EDUCATION WG	
Chairs	Lars Montelius (INL) Olga Kammona (CERTH)
Number of members	371
Rationale within NfA platform	This WG develops a set of strategies to promote an effective and interdisciplinary education and training of R&D personnel involved in nanotechnology together with a strong entrepreneurial mindset. A key issue could be the fast transfer of basic knowledge from research to application by education in "learning factories" equipped with new solutions for information

	supply like ubiquitous computing, wireless technology and navigation systems.
Expected impacts	The competitiveness of the EU nanotechnology industry is dependent on several factors. A key requirement for success is the availability of a skilled workforce. Education and training issues are critical and young peoples' interest in science (nanotechnology) careers needs to be raised by improving the image of the nanotechnology. NfA makes a significant contribution through the planned activities related to information sharing, knowledge transfer, and technology transfer in rapidly emerging areas and key nodes for research. NfA promotes a culture change that includes information sharing - among government, universities, and companies- to help the community to build a common knowledge on nanotechnology and focus on developing and commercializing nanotechnologies in the near term.

STANDARDISATION WG	
Chairs	Michael Stintz (TU Dresden) Gianfranco Coletti (Università Degli Studi Di Genova)
Number of members	301
Rationale within NfA platform	The WG helps identifying cross-sectional gaps and challenges in standardization relevant to nanotechnologies. Example of key topics of interest are: occupational health and safety protocols, measurement and characterization protocols to support hazard and risk assessment of nanomaterials, performance and sustainability assessment.
Expected impacts	Standardization is critical to scientific communication and commerce because, in order to build on lessons learned, researchers need to quickly convey scientific discoveries across disciplines. NfA supports the definition of priorities related to standardisation and coming from researchers, industries and authorities. An example could be the need for Standard Procedures for Nanomaterial Synthesis (e.g. for the development of reproducible methods for synthesis of high-quality nanomaterials).

TECHNOLOGY TRANSFER & INNOVATION FINANCING WG	
Chairs	Donato Zangani (D'Appolonia) Paolo Milani (University of Milan)
Number of members	521
Rationale within NfA platform	This WG aimed at creating an open, networked and adaptive nanotechnology innovation system by developing Technology Transfer and Innovation Financing services and strategies. NfA promotes technology transfer of nanotechnologies from different sectors to the industrial sectors of relevance to the involved ETPs, linking together network of excellence on nanotechnology.
Expected impacts	- To increase the European technology transfer of nanotechnology innovations from research to industry and among stakeholders from different technology sectors. - To increase the opportunities for commercialisation of nano-enabled products and thus enhance the competitiveness of European nanotechnology.

	- To create synergies among European stakeholders from different industrial sectors, contributing to the creation of a single European innovation market. - To contribute to the implementation and further development of the European Commission's action plan on nanotechnology.

CRITICAL RAW MATERIALS WG	
Chairs	Santiago Cuesta (ICCRAM)
Number of members	116
Rationale within NfA platform	This WG meets two fundamental needs: - On one hand, the creation of a collaborative network of expertise to develop new materials, products and technologies based on nanotechnology, by connecting fundamental and applied research with the aim of substituting or reducing the need of CRMs in strategic EU industrial value chains. - On the other, to extend the knowledge and technology transfer within the NfA community to scientists, engineers, technologists, and European industry.
Expected impacts	- To develop a strong EU research strategy for the development of a full material life-cycle methodology towards substitution of CRM by nanotechnology innovation. - Analyse and listen to the current problems and technological barriers that the EU industry have, guiding the R&D&I effort in resource efficiency management, energy efficiency, eco-design/eco-innovation and CRMs substitution towards meeting the specific demands for technological innovation in SMEs and large industries. - Share the last technological and research advances in material science and nanotechnology, related to the CRMs strategy, that can be applied to the development of high Technological Readiness Level (TRL) solutions and products to be integrated in EU industry. - Create a Roadmap to foster the technological developments and products of the EU industry and positioning them in the forefront of the EU initiatives in nanotechnology value chain redesign according to resource efficiency management and CRMs saving/substitution. - Share experiences in order to catalyse the advance of fundamental knowledge and technological innovation in the field of CRMs in a natural symbiosis with nanotechnology. This will lead to minimizing the use of CRMs along the value chain of products and services, minimizing the dependence of value chains on the availability of natural resources, and maximizing the use of nano materials within a cycle closure perspective.

NfA puts the following tools at its WGs' disposal for networking, announcement and discussion:

- **2.0 tools** for disseminating (projects, events, asking for feedback…) and networking:
  - **Twitter:** 1.750 followers (February 2019)
  - **Linkedin**: 803 members (February 2019)
- **NANO*futures* website** with two different sections:
  - Public area, which includes events announcement, news, projects database, relevant documents, among others.

- Member area, in which each of the WGs has a forum where to create and share topics of discussion, create polls, disseminate relevant outcomes, findings and events, among others.

4. NANO*futures* working group for societal engagement

4.1. Structure of the WG

The societal engagement WG consists of the following members: i) Chair represented by Dr. Ineke Malsch from Malsch TechnoValuation, ii) active members. Up to date, the WG is composed 21 members.

The main tasks of the Chair are related to coordinating all the activities within the group, giving special emphasis to integrating stakeholders from different backgrounds and European regions in the platform. She is also in charge of establishing communication protocols within the WG, moderate discussions as well as actively inform partners about any interesting outputs of other WGs activities. On the other hand, members will mainly contribute to informing about any interesting news related to societal engagement for further dissemination within the WG and platform.

4.2. Rationale of the WG within NfA

The rationale behind NfA Societal Engagement WG is to support the NANO2ALL project in achieving its main objective: contributing to the establishment of Responsible Research and Innovation (RRI) practices in the field of nanotechnology by establishing a European-wide sustainable platform for mutual learning and informed dialogue among citizens and stakeholders involved in the co-production of knowledge.

Although at its beginning the project focused on the concept of inclusiveness, during the dialogues carried out at national and European level the broader concept of responsiveness towards societal perspectives was addressed, and, in particular, the question of what is needed to make the nanotechnology research and innovation system more flexible to adapt and truly respond to perspectives of stakeholders and citizens.

Responsiveness is a concept still to be explored, since it includes a broad range of themes, topics and activities and many questions to be answered, such as how transparent decisions are; how sensitive and responsive policies are to the needs and perceptions of the full range of stakeholders; and how ethical, legal, and social issues are addressed, that will determine public trust and the future of innovation driven by nanotechnology, so further reflection on what responsiveness is about and what would be needed to enhance it is needed.

Because of all the above, this WG aims at meeting a fundamental need identified throughout the NANO2ALL project: to support establishing an open and respectful dialogue environment in which each participant would have the chance to share their ideas and opinions freely and feel stimulated to join the discussions actively by the creation of a collaborative network of experts with different backgrounds (policy makers, consumers, journalists, CSOs, GNOs, regulators, manufacturers, end-users, researchers, scientists…) and putting at their disposal tools for networking, dissemination and discussion, all of this free of charge.

4.3. Objectives of the WG

Based on the recommendations identified during the national and European dialogues for enhancing responsiveness and societal engagement in nanotechnology research and innovation processes, the following objectives for the Societal Engagement WG have been established:

- Improve the relationship between those who produce scientific innovation and those who can benefit from it.
- Support the involvement of societal actors, including citizens, and interaction between stakeholders.
- Support to fostering a collaborative environment, not hiding the diversity of points of views while also respecting them.
- Promote the transparent co-production of knowledge, more responsive to the needs of society and capable on engaging all the people involved in scientific innovation.
- Favour inclusion of societal voices in nanotechnology development processes, respecting and balancing different perspectives.
- Support the exploitation of Nano2All outcomes to ensure the sustainability of the project once it has finished.

To achieve these objectives, the following activities have been defined:

- Consultation and validation of the draft version of NANO2ALL roadmap
- Dissemination of NANO2ALL results through NfA network (other WGs, related ETPs, lighthouses…)
- Contribution to future initiatives organized by NfA, such as CSAs, events, roadmaps…
- Set up discussions in the WG forum
- Dissemination of relevant information on RRI and nano (publications, events, projects…)

5. Summary and next steps

The main expected impact of the Societal Engagement WG is to create a robust network involving the main stakeholders in Europe. The creation of this WG is believed to sum efforts from different stakeholder aligning them with common objectives and stimulating discussion on hot topics in the field. By assembling leading experts from around Europe, it is hoped that these talks will encourage cross-fertilization of ideas and lead to a comprehensive RRI strategy. NfA offers an established and sustainable hub where all types of actors are already present with tools that facilitates interaction among them. The existing and consolidated WGs, tackling topics of interest (e.g. risks, regulation,…)

Moreover, the working group can be considered as an initial seed for the NANO2all roadmap sub recommendation on category C "*Systematize interactions between relevant communities on RRI", that* recommends to create EU level / regional / local platforms for continuous discussion, dissemination and trust building related to nanotechnology development between communities, businesses, civil society and researchers.

Efforts in the near future will be put into achieving a critical mass comparable to that of other WGs (60 pax approx.). Citizens, civil society organisations and media will be particularly targeted, since nowadays this type of entities are under-represented in NfA WGs and their involvement is crucial for the fulfilment of the objectives of the WG.

Expected interactions with other NfA WGs, specially with communication and networking WGs is expected. Since risk and regulation were two of the topics raised during the dialogues, the WG will also keep a close eye to the safety and standardisation WGs.

It is also foreseen to keep linking with other projects and initiatives: GoNano CSA, RRING RIA, RRI-Practice CSA, NewHoRRIzon, CSA RiskGONE (RIA)



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