PLANNING GUIDE FOR PUBLIC ENGAGEMENT AND OUTREACH IN NANOTECHNOLOGY

KEY POINTS FOR CONSIDERATION WHEN PLANNING PUBLIC ENGAGEMENT ACTIVITIES IN NANOTECHNOLOGY

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FOREWORD

The public and society at large have become key actors in the development of the field of nanotechnology and this engagement is critical to the acceptance of the technology in marketable products. In recognition of this, strategies for outreach and public engagement in nanotechnology have been identified as crucial elements of government policies regarding nanotechnology. The need to clarify how to communicate, with whom and how to engage a wide audience in the debate on nanotechnology, and in the development of policies related to it, has been a major point of discussion amongst policy makers.

Conscious of these issues and of the challenges policy makers face in establishing communication strategies, the OECD Working Party on Nanotechnology (WPN) in 2007 initiated a project on public engagement. In 2009 this lead to the identification of 8 key points designed to assist policy makers in establishing activities for communication and outreach in nanotechnology. These key points for consideration are presented in this "Planning Guide for Public Engagement and Outreach in Nanotechnology".

The OECD WPN project on Public Outreach and Engagement in Nanotechnology was launched in May 2007 through a workshop –"Nanotechnology Outreach Workshop" – held in Leuven (Belgium) and hosted by the Inter-university MicroElectronics Center (IMEC). From late 2007 until 2008, a survey of national experiences of challenges and practices in nanotechnology-specific public engagement, outreach and communication was undertaken using two questionnaires. For these surveys, questions were developed to gather information and to establish a common understanding of approaches. In October 2008, a further workshop "Nanotechnology and Public Engagement" was held in Delft, The Netherlands to examine in detail the information gathered through the questionnaires. The Delft workshop launched work on methodologies for good practice in public engagement in nanotechnology which could be of use to policy makers.

Building on this work, the OECD WPN developed a guide for planning outreach and public engagement in nanotechnology. This guide identifies key issues to be considered by policy-makers involved as organisers, commissioners, or funders of public engagement activities in nanotechnology.

Several WPN member countries including Australia, Ireland, Korea, the Netherlands, and South Africa have made use of the guide since its initial development. Feedback from these countries s the utility of the guide and notes that some aspects of the guide are very useful; however there is room to improve on other aspect.

This report presents the planning guide, and details the methodology through which the WPN developed the guide. It details the eight key points for consideration when planning and evaluating public engagement activities in nanotechnology. Finally, it provides a critical review of these key points and presents case studies from countries that have been using the guide since 2009 in their communication activities.

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Introduction

The emergence of nanotechnology in the economy and in society at large is expected to have significant impacts. Nanotechnology is increasingly stimulating discussion regarding the technical possibilities it brings, for example, applications in products relevant to day to day life such as touch screens and tyres, and its role in addressing major global challenges including clean water, sustainable energy and improved health.

Policy makers and practitioners are also increasingly studying the policy issues related to the "responsible development" of nanotechnology. Responsible development is a key element in nanotechnology governance strategies, as the field raises a number of questions linked to health, environment and safety, as well as ethical concerns.

Nanotechnology also features in revived policy and public debate on the role and place of emerging sciences and technologies in society. Nanotechnology stirs discussions around major issues such as:

- How do governments and civil society make decisions regarding scientific and technological development and interventions to undertake for society? and
- How to govern emerging sciences and technologies and their potential risks?

The public and society at large are increasingly becoming key actors in the development of the field of nanotechnology and of its acceptance in marketable products.

As a consequence, over the past few years, strategies for outreach and public engagement in nanotechnology have been identified as important elements of government policies regarding nanotechnology. The need to clarify how to communicate, with whom, and how to engage a wide audience in the debate on nanotechnology, and the development of policies related to it, has been a major point of discussion amongst policy makers.

In the past, policy makers had to develop their communication strategies for emerging sciences and technologies from scratch. However, as nanotechnology is a rapidly developing field, providing guidance to policy makers to assist in the development of efficient and well defined communication plans has become critical.

Conscious of these issues and of the difficulties policy makers and other practitioners can face in establishing communication strategies, in 2007 the OECD Working Party on Nanotechnology (WPN) initiated a project on public engagement that lead to the development in 2009 of eight key points to assist policy makers in establishing activities for communication and outreach in nanotechnology. These key points for consideration are presented in this "Planning Guide for Public Engagement and Outreach in Nanotechnology". The guide may also assist industries, industry bodies and other entities in establishing their communication strategy and engaging with the public. The guide may also be used as support for developing public engagement activities for other emerging technologies which would raise the same type of societal issues such as synthetic biology.

This report presents the planning guide, and details the methodology through which the WPN developed the guide. It details the eight key points for consideration when planning and evaluating public engagement activities in nanotechnology. Finally, it provides a critical review of these key points and presents case studies from countries that have been using the guide since 2009 in their communication activities.

Approach to developing the Guide

Development and evaluation of the guide has occurred over four years. The approach has comprised of a series of workshops, surveys of OECD WPN member countries, the development of the key points for consideration and their trial and evaluation by a number of WPN participating countries.

A kick off workshop on "Nanotechnology Outreach"

The OECD WPN project on Public Outreach and Engagement in Nanotechnology was launched in 2007 through a workshop entitled "Nanotechnology Outreach Workshop" held in Leuven (Belgium) in May 2007 and hosted by the Inter-university MicroElectronics Center (IMEC). The workshop sought to examine challenges for communicating with the public about nanotechnology; to identify best practices, and to develop a multi-disciplinary vision for increasing public understanding of nanotechnology. The workshop served as an information gathering tool and allowed analysis of current public perceptions of nanotechnology.

The main conclusion from the meeting was that more information about what countries are doing in the area of public outreach and engagement in nanotechnology was needed. A more systematic effort should be undertaken to gather experiences from countries in communicating with and involving the public. It should also serve to foster a dialogue between policy makers about good practices in this field.

As a follow up to the 2007 Leuven workshop, the WPN planned an international survey to systematically identify challenges and effective communication practices, outreach and public engagement in nanotechnology to inform and underpin policy development in member countries.

A survey of national experiences of challenges and practices

In late 2007 and 2008, a survey of national experiences of challenges and practices was undertaken using two questionnaires addressing the topics of nanotechnology-specific public engagement, outreach and communication. For these surveys, questions were developed to gather information and to also establish a common understanding of public engagement, outreach and communication.

The two questionnaires were adapted to their target audiences – one for policy makers (Questionnaire 1, see Annex 3) and the other for practitioners in the communication and understanding of nanoscience and technology, such as science museums, interactive centres and public awareness bodies (Questionnaire 2, see Annex 3). The approach, of dual surveys, was used to cover as broad a range of issues and technological fields as possible.

Respondents to these two questionnaires were asked to consider the following issues:

- Challenges in communicating nanotechnology to the public.
- What are effective and comprehensive communication practices that can be used to develop a more comprehensive approach to the communication of nanotechnology?
- What are effective practices and challenges in public engagement in nanotechnology that can inform and support policy development in participating countries?

Conclusions were drawn from responses to these questionnaires by the following 15 countries and the European Commission[1]: Australia; Austria; Belgium, Finland, Germany; Ireland; Israel, Korea; Netherlands; Norway, Poland; Portugal, South Africa; the United Kingdom and the United States. Responses were analysed at the end of 2008.

Some of the lessons learned about public engagement as identified by policy makers and practitioners are provided in Boxes 1 and 2.

1. It should be noted that the findings of the survey are limited by the comparability, quantity and quality of the information received and by the nature of the respondent (*e.g.* local, national, regional, organisational). The findings are therefore presented in lists without further analysis or commentary. The lists in themselves are felt by the project participants to have potential value in informing the thinking and planning of public engagement activities by policy makers.

Box 1. Lessons on public engagement from policy makers

- Start from a position of trust.
- Activities should be scientifically supported.
- Activities should be unbiased and balanced.
- Proactively define the different "public(s)".
- Establish strong partner networks with key publics.
- Have continuous dialogues with all stakeholders.
- Understand public concerns and aspirations.
- Understand diversity of target audience(s), their issues, who they trust, what media they use, and levels of awareness and knowledge.
- Use multiple forms of communication.
- Be proactive in the media debate.
- Use best-practices of social and behavioural research in developing strategies.
- Have an engaged and professional approach.
- Other technology(ies) concerns can be applied to nano.
- Cultivate public engagement experts.
- Public engagement is important for success in nanotechnology strategies**.**

Box 2. Lessons on public engagement from practitioners

- Credibility is everything.
- A large demand for information exists.
- Present information in accessible and scientifically accurate forms.
- There is a need to have strong industry allies.
- Do not overstate the potential or risks.
- Monitor and learn from activities worldwide.
- Many issues can be addressed using the existing science.
- Do not underestimate or overestimate your audience.
- Challenge audiences with dilemmas and successes.
- Hands-on activities are effective.
- The public enjoys and learns through direct contact with researchers.
- Secondary students enjoy participating in research.
- Researchers enjoy receiving students.

The rationales behind developing a nanotechnology outreach strategic plan identified by survey respondents included:

- raising public awareness;
- providing information about research findings and policy to the public;
- gathering input for future policymaking;
- attracting younger people into science;
- exchanging information with partnering agencies/institutions; and/or
- political mandate.

Approaches reported by survey respondents included a "bottom up" approach starting with the research community, or a "top down" approach, for example a national awareness programme aimed at providing balanced and scientifically supported information about nanotechnology. Government, private industry and public/private partnership organisations were identified as involved in these national nanotechnology communication efforts.

Most countries reported they had undertaken, at most, 1-2 national public engagement efforts between 2005 and 2007. The goals of these activities included:

- increasing public awareness about nanotechnology and its benefits and risks;
- improving knowledge about ethical and societal issues;
- raising awareness of regulatory practices for health and safety issues;
- initiating dialogue between stakeholders;
- enabling an informed public debate; and
- increasing awareness about funding, co-ordination and policy for a range of audiences including the general public, teachers, industry, NGO's, researchers, policymakers, and other stakeholders.

Outcomes from these activities included:

- increased awareness and knowledge about nanotechnology, and about societal, ethical, and environmental, health, and safety issues;
- increased public involvement in policy development;
- better informed public debate;
- an increase in positive attitudes about nanotechnology and industry activities by the public; and
- increased dialogue between stakeholders.

Survey respondents were also asked to comment on media coverage of nanotechnology. Respondents identified a range of media outlets covering nanotechnology, including websites, broadcast, and local, specialized, and national written press. Media coverage and tone were generally reported as being either positive or neutral. When positive, the media messages focused on opportunities and progress, and potential applications in environmental, safety, health and energy applications. When negative, the messages included lack of regulations, unknown properties and risks of nanotechnology in the areas of environment, safety, and health, and ethical and societal issues. Agreement existed that neutral messages included a balance of positive and negative aspects.

Box 3. Key features of effective communication

- Use scientifically correct information;
- Feedback from engaged participants;
- Provide balanced (positive and negative) information;
- Allow exploration of normative justifications underlying participative approaches;
- Provide personal relevance to audience;
- Keep information understandable;
- Use broad and general information;
- Address aspects of risks;
- Interact honestly;
- Listen to the audience;
- Aim for transparency in regulations;
- Highlight the importance of innovation for the national economy; and
- Highlight the importance of innovation for national welfare.

Overall, information provided by survey respondents allowed the identification of the key features of effective communication about nanotechnology. These are shown in Box 3.

A definition and key aspects of public engagement: conclusions from the 2008 OECD Delft workshop on "Nanotechnology and Public Engagement"

In order to examine in detail the information gathered through the questionnaires, a WPN workshop entitled "Nanotechnology and Public Engagement" was held in Delft, The Netherlands, in October 2008 sponsored by the Netherlands Ministry for Education, Culture and Science; the Rathenau Institute and the OECD. The Delft workshop launched work on methodologies for good practice in public engagement in nanotechnology which could be of use to policy makers. There were two key outcomes of this workshop: *i*) a definition of public engagement was agreed amongst the participants, and *ii*) a process was initiated to develop a planning/evaluating guide that would help policy makers in establishing activities for communication and outreach in nanotechnology.

A common definition of public engagement was agreed at the Delft workshop. For the purposes of this work by WPN, public engagement is a process that is:

- *Deliberative* – emphasising mutual learning and dialogue.

- *Inclusive* – involving a wide range of citizens and groups whose views would not otherwise have a direct bearing on policy deliberation.

- *Substantive* – with topics that are related to technical issues, and appropriate to exchange; and

- *Consequential* – making a material difference to the governance of nanotechnologies.

The 2008 Delft workshop clearly illustrated that participating countries were at different stages in their experiences of public engagement with nanotechnology. Some countries had already carried out many activities in the area, undertaken analysis of their findings and were seeking mechanisms to use the outcomes of the activities in the formulation of policy. Others were seen to be at an earlier stage and spoke of different experiences, sometimes made more complex due to the lack of information available on such new technologies.

The variety of activities presented at the workshop was extensive, ranging from science ambassadors to blogs and games, and research into ethical, legal and social issues. These activities included expert presentations; technology assessment; reports and fact sheets; surveys; art; blogs; games and competitions; television; public meetings and lectures; newspapers and related media; and research.

The stakeholders involved in public engagement activities described at the workshop included government (including politicians, ministries, agencies); scientists (including social scientists); the public and citizens; the business sector; NGOs and agencies; agents of change and activists; communicators and the media; and people and groups in other countries.

The workshop also highlighted that it would be beneficial for new types of public engagement activities in nanotechnology to move from traditional risk communication toward real dialogue and engagement with the public. Communication between the many stakeholders involved depends on a variety of complex factors and is very much context-dependent. Rapid advancements in nanotechnology come at a time when science and technology's role in society face increased public scrutiny. Participants also emphasised that stimulating a good overall governance strategy for the safe and efficient development of nanotechnology should be addressed in parallel to efforts to democratise and enlarge the debate on this field.

Establishing communication strategies for emerging sciences and technologies is complex. Defining who to engage, by which means, taking into account the context in which a technology is developing, and the evolution in governance of the field are many factors contributing to the difficulty in the organisation of communication strategies. Furthermore, there are very few mechanisms for formal discussion or debate on emerging science and technology. In this context, workshop participants considered it would be useful to develop a planning/evaluating guide which would give an overall framework to develop public engagement activities.

A summary of conclusions from the Delft workshop is in Box 4.

Box 4. Main Conclusions from the 2008 OECD Delft workshop on nanotechnology and public engagement

Reasons for communication, outreach and public engagement were identified by the speakers as:

- Building trust and openness in policy formulation and in government dealings with the public
- Building partnerships
- Enabling governments to develop better policies, informed by stakeholder views
- Good governance (although there were concerns expressed that this might be a mechanism to push a policy or to replace democratic processes)
- Aiming to change perceptions (*e.g.* perceptions of risk)
- Visibility (to be seen to engage) and for credibility (*e.g.* of scientists)
- Inclusiveness
- Establishing networks
- Broadening the social debate
- Monitoring and evaluation purposes
- As a reaction to negative past experiences (*e.g.* genetically modified organisms debate)

The following important issues to consider when preparing for public engagement were identified:

- Know why you are engaging, know your goals
- Select and understand your audience
- Carefully consider and frame the question which you wish to address
- Choose your tools and methodologies to suit the purpose
- Involve decision makers
- Think about how the results will be used.
- Be aware that there are varying interlinked cultural and personal factors which influence risk perception. These may include responses to media coverage, personal experience and beliefs.
- Consider the issue of size (is it important that an event be large and visible?)
- Optimise cost *vs.* benefit – avoid large activities if they have small benefits
- Decide in advance which is most important: the process or the output, or both?
- Remember that organised public engagement is just one part of a wider system, one part of the experience of stakeholders
- Ensure a good feedback loop from participants (*e.g.* find out what the participants experienced, learn from it and build on it for future activities)

An overview of the planning guide for public engagement and outreach in nanotechnology

Based on all its background work, the OECD Working Party on Nanotechnology developed a guide for planning outreach and public engagement in nanotechnology (the guide and supporting document are in Annex 1). This guide identifies key issues to be considered by policy-makers involved as organisers, commissioners, or funders of public engagement activities in nanotechnology.

The guide is intended to assist policy makers, public engagement strategists and practitioners. The guide may also be of assistance to industry, industry bodies and others engaged in communicating about nanotechnology with the public. This guide comprises eight key points for consideration to assist when planning public engagement activities. It also contains a set of tables with questions to guide the policy maker through the process of developing a public engagement activity. The questions address topics including, for example, the type of activity, the nature of the participants, the purpose of the activity, resources required and monitoring and evaluation of the activity.

For the purposes of the guide, the definition of public engagement is that described earlier, that is, outreach and communication activities, undertaken under deliberative formats (dialogues, discussion groups, etc.), and expected to influence (in direct and indirect ways) the governance of nanotechnology. The key points presented in the guide are not in chronological order and may be considered more than once in the development of a public engagement activity. They are further described below:

Point 1: Identify the context

Public engagement activities do not occur in a vacuum. They take place within specific contexts that need to be taken into account. For instance, if experienced public engagement stakeholders have felt their previous involvement(s) did not make a difference, they may be reluctant to accept invitations for future engagement activities. Additionally, if there is a low level of prior awareness of an issue among stakeholders, the process and outputs are likely to differ from those where the stakeholders are better informed about a specific topic or emotive subject. Similarly, public engagement approaches may differ because they may need to be adapted to audience needs (*i.e.*, consider an issue being discussed in policy circles (*e.g.* regulation of nanomaterials) compared to concerns of less immediate personal or political relevance, such as auto-replication at the nano-level). This illustrates the importance of considering the specifics of the issue itself as participants' expectations and the potential outcomes may differ from case to case. Finally, the level of trust in the institutions involved in the activity (either as organisers or commissioners) will influence the attitude of potential participants towards the method(s) used.

Point 2: Be clear about your objective(s)

Public engagement activities can have various objectives. It is important that policy-makers be clear about their objectives, expectations, and the intended outputs from the engagement activities they are sponsoring and/or organising. For example, science shops (which are university-based participatory research mechanisms) aim to:

- Gather and make available, in a usable format, objective and reliable information on certain developments in nanotechnology (technological road maps, possible scientific developments, potential uses, ethical, legal, social aspects);
- Compile specific questions requiring use of nanotechnology *e.g.* medical studies or in clean energy or filter application; or
- Investigate possible consumer issues after large scale introduction of nano-products in society (false claims, health effects, etc).

Point 3: Identify the participants

Public engagement activities do not always seek to engage the same 'public'. Useful questions to answer will include "Who is the public?", "How will they be identified and recruited?", "How will organisers decide to target a 'general public' versus a representative subset of the 'general public'?", "What factors about participants are most important when recruiting participants?". For example, participants in public meetings are often interested, self-selected audiences. The organiser might therefore want to ensure that the audience is as broadly representative as possible by expanding and diversifying their recruitment efforts to include uninformed, disinterested people. For citizen conferences, the public should be a representative panel. It is also important to ensure a statistical balance of the panel. If the objective is to discuss specific regulations with non-governmental organisations (NGOs), then some participants should be from the NGOs most active in the field. In addition to the participant groups with vested

interests, it will be important to ask "Who are the other participants in the activity? What are their expected roles and responsibilities?" For example, scientists may be asked to provide scientific knowledge prior to discussions, while other representatives may be asked to explain the national social or economic policy and regulation contexts.

Point 4: Plan the process

Public engagement activities can be resource-intensive. Resource issues, including funding, materials, and personnel must be given sufficient consideration in the early stages. For example, in the preparation phase, development and distribution of preparatory information prior to the event may require personnel, raw materials, and the actual development and dissemination of materials. For instance, a citizen conference may require disseminating written materials to participants. Other cases may involve other specific logistic issues (*e.g*. travel expenses).

Point 5: Select the activity

There is a wide range of experience to draw on when planning and implementing public engagement activities, and several forms of activity should be considered. The format selected will depend on a variety of issues, including the objectives, intended audience(s), scale, and outputs. It is important to recognise that each mechanism for public engagement produces specific outputs: if groups of people engaged in the activity are narrowly defined, the range of possible actions during the public engagement activity may also be limited; or, it may be necessary to provide other specific opportunities for discussion and input from the public for the activity. For instance, a discussion at a science museum between scientists and self-selected participants may attract people mostly familiar with the activities of the museum. While not expected to directly influence policy, these activities can offer alternative ways to obtain input from the public. In contrast, a dialogue between civil society organisations and policy-makers can be designed with the objective of directly influencing the governance of the issue being discussed.

Point 6: Identify the organisers

Organisers of events are often diverse and varied in their levels and knowledge or expertise in conducting and evaluating public engagement activities. Policy-makers often rely on external experts or consultants to help organise an activity. For instance, the Australian Office of Nanotechnology partnered with local agencies in holding the Public Forums on Nanotechnology. These included state governments, universities and research institutions. In such case, it is important to plan the process and co-ordination. In other instances, organisers might be specific bodies devoted to public dialogue in science and technology (*e.g*. The French Commission Nationale du Débat Public) and/or technology assessment (*e.g*. The Dutch Rathenau Institute).

Point 7: Know your goals/evaluate and success/engage in follow-up

The success of any public engagement activity depends on matching the type of activity to the objective of the engagement. For instance, a positive outcome for a science café might be that participants have a deeper and more complex understanding of nanotechnology issues. A positive outcome of a citizen conference might be a detailed set of recommendations for policy-makers. A positive outcome for a science centre might be increased interest in science as measured by increased purchase of science-related magazines in the surrounding area.

Point 8: Learn and adapt

Evaluation and monitoring are important aspects of public engagement. They provide opportunities to learn from past experiences and to build upon more successful efforts. In this way, feedback mechanisms are essential (*e.g.* mechanisms to ascertain participant and organiser experiences, impact of outputs, etc.).

Evaluation should thus be planned from the beginning, reflecting the objectives being set, and may require specific methods that use qualitative and/or quantitative criteria. The evaluation of a given public engagement activity should be measured by how well the objectives are met. It will be important to clearly state objectives and define specific evaluation criteria before the activity begins. For instance, vocal opposition during public meetings should not necessarily lead to a negative evaluation of the process if the activity aims to explore the variety of social positions regarding a particular issue.

Engagement activities by nature are a continuous and iterative process that policy-makers can capitalize on to learn and adapt from past experiences. The evaluation of a public engagement process should build in methods for formative and summative methods to ensure that past and current activities will inform future activities.

Using the guide, 2009-2010

Several WPN member countries have made use of the guide with its points for consideration since its initial development. Feedback received s the utility of the guide, highlights that some aspects of the guide are more useful than others, and that there is room to improve some of the points.

Review of the use of the guide

WPN participating countries including Australia, Ireland, Korea, the Netherlands, and South Africa have trialled the guide when planning or evaluating different national activities for public engagement and outreach in nanotechnology. In general, these users report that the framework provided by the guide is very useful and is a good basis to structure discussions and plans for developing specific public engagement activities. However, the framework doesn't take into account the moving environment in which the field is developing. Users commented that an implementation framework providing advice about adapting to this changing environment would be of great help to policy makers, public engagement strategists and practitioners. Some users also noted that a guide to support the post planning phase for marketing, social media use or continuity planning of the activities may be valuable.

Feedback and commentary from countries utilising the guide is described in greater detail below.

Strengths of the guide

> "The guide is extremely useful on monitoring and evaluation of the activities (especially Point 7) and on how to plan for the future (proactively incorporating feedback mechanisms to allow the follow up and betterment of the activity in future). The use of this framework proved very valuable in the undertaking of nanotechnology awareness programmes. It helps activities in a way that greatly increases chances of success. Potential problems are identified well in advance (mostly during the planning stage) and dealt with at an early stage."

"The document is very useful for public engagement practitioners and strategists as well as for beginners in public engagement activities."

Two points were seen to be of particular interest:

- Point 2 ("Be clear about your objectives") was found to be one of the most valuable points in guiding the awareness activities. It enabled an in-depth consideration of what the activity should achieve, and provided a basis of which an appropriate activity is identified. It also helped evaluate the success or otherwise of the activity. Even in cases where an activity was predetermined, this point enabled the organisers to focus on the objectives and drive the activity for the realisation of those objectives.

- Point 3: ("Identify the participants") was also seen as a very useful aspect of the guide.

- The issues raised in Point 4 ("Plan the Process") helped in ensuring the meticulous planning, which was largely responsible for seamless undertaking of activities. The focus on the optimal use of resources, for example, compelled organisers to consider available options for ensuring that resources were optimally used – that was one of the great benefits. This point for consideration has also found application widely, not only in nanotechnology awareness programmes.

Weaknesses of the guide

The guide can be complicated to use and would be well supported with a shorter version that provided key principles to address activities that might not require such a detailed level of planning.

The guide would also benefit from an implementation framework that showed how it can be used in light of changes to the public debate on nanotechnology, which has become more nuanced, with different attitudes and debates needed for different applications. The guide is of little help in assisting the identification of the international and organisational context.

Some aspects of public engagement activities are not addressed in the guide:

- Marketing

- Social media uses

- Continuity (more focus on: re-use of materials, extend already existing partnerships)

Reporting from country case studies

By trialling the guide, participating countries reported on specific activities they were or are developing nationally (see Annex 2 for selected examples of reporting by the countries involved).

From these case studies, we have extracted some key issues regarding the way countries are engaging in public awareness and outreach in nanotechnology, which are set out below.

Common goals for public engagement

Overall the objectives of the *Nanopodium* initiative (see Annex 2) in the Netherlands provide a good summary of the main goals that participating countries said they wanted to achieve with public engagement:

- "Inform the general public and raise awareness [...]
- Engage them in a dialogue
- Study changes in public opinion related to their knowledge of the subject matter."

More than just a didactic approach, a real will to engage the public in a dialogue on nanotechnology is reflected by the different national initiatives.

Most of the participating countries reported that early discussion of nanotechnology was limited to people directly engaged in the field, that is, specialists. But with increasing support from governments, national communication plans to engage more broadly with the general public have, and are, being undertaken. In South Africa for example, there are many fairly new but ongoing activities which aim to engage all stakeholders playing a role in nanotechnology development, including industry, media, interest groups, school learners, school educators, children and the general public. This growing effort from governments to engage in communication activities in science and technology arises from the priority that STI has on many political agendas today, where science and technology are expected to play an increasingly important role in economic growth and social welfare. For example in Ireland, nanotechnology has been d as a "key enabling technology" at the policy level. The public is playing a strong role in the acceptance or rejection of the new technology. Therefore, public awareness and outreach is an important topic for policy makers when building STI governance strategies.

Targeted participants: the general public and the media

To summarise, one could say that the populations targeted by public engagement activities to date are primarily the media and the general public (with a particular focus on school educators and teachers). Activities are undertaken with the primary goal to inform and provide adequate knowledge about nanotechnology, rather than for policy makers to gather information about the perception of the public on current developments in science and technology and the way issues related to this are currently addressed. Activities inform about the science and specifics of the technology but also about the social and economic issues associated to its development. Debates also tend to include discussion on the role the government is playing in the development of the technology.

While most of the activities are directed toward established interest groups, increasing efforts are being made toward reaching the "disengaged" or "unengaged". For example, in Australia, an activity called "*Nanodialogue with the unengaged*" aimed to hold a series of small group discussions to gain a better understanding of the publics' knowledge, concerns and aspirations towards nanotechnology, framed in terms of applications of these technologies. Recruitment for these nanodialogues concentrated on the unengaged and disengaged members of the public, who don't normally attend science events. Participants were recruited via market research companies, seeking a cross section of age and education - the targeted group was people who admitted to not being strongly interested in science issues.

The tools used

Various strategies and activities exist and are used to engage the public according to the goals of the activity and the type of participants targeted (see Annex 3). Amongst the activities, ICT tools feature heavily (*e.g.* multimedia, live sessions, radiobroadcasts, WebTV) with an increasing development of online discussions. The different media platforms available allow targeting specific subgroups. Reaching a young, technologically aware audience will be easily done through webforums, YouTube or Twitter. Some case studies especially showed that the association of platforms such as YouTube/Web 2.0 forums with very well known science infrastructures (such as Kennislink, a very popular science website in the Netherlands, or the Science Gallery installation in Ireland) are providing very robust tools for public engagement. They bring a real added value in the range of perspectives and level of engagement that can be encouraged though these platforms. The recently conducted *Nanotalk activity*: "Your Science Your Say: Nanotechnology" in Ireland is a very good example of such type of activity (see Annex 3, case study 3).

More "traditional" ways of engaging the public are still in wide use, as with the organisation of focus discussion groups (*e.g.* Nanodialogue in the United Kingdom), public meetings and debates (*e.g.* public debate on nanotechnology organised in France in 2009-2010), interactive exhibits, public meetings and symposium and seminars (*e.g.* the Nanotechnology for Green World which was held in Korea in 2010, see Annex 3 – case study 4). Nanotechnology is now also fully represented in many large national science and technology public engagement initiatives, as in the case of National Science week in South Africa.

Topics linked to public engagement and awareness are also appearing more and more often at major national and international conferences addressing nanotechnology issues. These are more often directed to "nanotechnology practitioners" and they aim to attract attention to the importance of public awareness in nanotechnology development.

The main topics addressed: technology and science with societal issues

In general, communication activities focus on some particular sub-fields of nanotechnology applications, being mainly: health (especially nanochips used for pharmacogenetics), environment and climate change (*e.g.* water treatment and green growth), new materials, and sustainable energy growth. This strategy, oriented toward providing a basis for understanding the technology and its use, facilitates subsequent debates on the societal issues that are raised by nanotechnology. Initiatives increasingly try to balance discussion between risks and benefits, or opportunities and challenges in the field, assisting policy makers to gather information from participants about their fears and hopes for nanotechnology.

Conclusion: A real willingness from all parties to define principles for engaging the community

Case studies also illustrated the increasing willingness from stakeholders such as industry, media, academia, policy makers and NGOs to get together and define how to establish framed, efficient and flexible communication strategies for emerging sciences and technologies in general, and for nanotechnology in particular.

ANNEX 1: PLANNING GUIDE FOR PUBLIC ENGAGEMENT AND OUTREACH IN NANOTECHNOLOGY

KEY POINTS FOR CONSIDERATION WHEN PLANNING PUBLIC ENGAGEMENT ACTIVITIES IN NANOTECHNOLOGY

The OECD is an intergovernmental organisation whose members are countries which are committed to democracy and the market economy. The OECD works to compare policy experiences, seek answers to common problems, identify good practice and co-ordinate domestic and international policies. The Working Party on Nanotechnology (WPN) is a policy-oriented OECD group working under the remit of the Committee for Scientific and Technological Policy (CSTP). The role of the WPN is to advise CSTP on policy-relevant issues within science, technology and innovation which are related to the responsible development of nanotechnology.

Introduction

This document proposes lines **for policy-makers** involved as organisers, commissioners, or funders of public engagement activities in nanotechnology. It provides a series of **points for consideration**, each divided in several sub-points.

Using these points for consideration, policy-makers are expected to **reflect on the engagement process** in which they are involved, thereby increasing the robustness of the **planning, implementation, and evaluation**. Using this document thus supposes that the policy-makers involved **complete the tables** provided at the end of the document.

The table below lists the eight ***points for consideration*** for reference. These points are not in chronological order and may be utilised more than once in the development of a public engagement activity.

Point	Action
1	Identify the context
2	Be clear about your objective(s)
3	Identify the participants
4	Plan the process
5	Select the activity
6	Identify the organisers
7	Know your goals/ success
8	Learn and adapt

Public engagement is defined in this document as a process that is:

- *Deliberative* – emphasising mutual learning and dialogue.
- *Inclusive* – involving a wide range of citizens and groups whose views would not otherwise have a direct bearing on policy deliberation.
- *Substantive* – with topics that are related to technical issues, and appropriate to exchange; and
- *Consequential* – making a material difference to the governance of nanotechnologies.

For the purposes of this document, the definition of *public engagement* includes outreach and communication activities, all undertaken under deliberative formats (dialogues, discussion groups, etc.), and expected to influence (in direct and indirect ways) the governance of nanotechnology. This definition is neither prescriptive nor exhaustive and is intended to capture a wide variety of public engagement activities including science festivals, science cafés, science weeks, interactive science centres, consensus conferences, debates, public hearings and citizen juries. See Annex 2 and Annex 3 for links to more information on public engagement activities including descriptions and examples.

Points for consideration

Point 1: Identify the context

Public engagement activities do not occur in a vacuum. They take place within specific contexts that need to be taken into account. For instance, if experienced public engagement stakeholders have felt their previous involvement(s) did not make a difference, they may be reluctant to accept invitations for future engagement activities. Additionally, if there is a low level of prior awareness of an issue among stakeholders, the process and outputs are likely to differ from those who are better informed of a specific topic or emotive subject. Similarly, public engagement approaches may be different because they may need to be adapted to audience needs *i.e.*, an issue being discussed in policy circles (*e.g.* regulation of nanomaterials) to concerns of less immediate personal or political relevance, such as auto-replication at the nano-level. This illustrates the importance of considering the specifics of the issue itself as participants' expectations and the potential outcomes may differ by case. Finally, the level of trust in the institutions involved in the activity (either as organisers or commissioners) will influence the attitude of potential participants towards the method(s) used.

Contextual factors	Examples of questions
Social, cultural, historical, political and/or economic context	How is nanotechnology impacting on your society (if at all)? What are political attitudes to the issue? Were there previous participatory activities organised with the same actors (organisers, participants, commissioners, etc.)? If so, what were the output and outcomes? Is nanotechnology being widely discussed in your country? If not, how come?
Context of the issue itself	To what degree is the issue known or unknown to the participants? What is the political environment? How are special interest groups influencing the context? What is the stage of development of the issue (*e.g.* are nanotechnology products already on the market)? What is the scope of the issue being discussed? How widely is the issue(s) being discussed in your country? What special interest groups are organised and mobilised for or against that issue?
Institutional and organisational context	What is the structure and ethos of the institution or organisation undertaking the activity? What are potential organisational constraints that could influence the outcome of the activity? How is the organisation placed to undertake the activity?
Who is commissioning the activity? What is their status?	What type of organisation will be funding the activity? Who will be conducting the activity? What are their relationships to the public? What influence do they have to implement outputs? How much are they trusted by the public? Who is the commissioner of the activity? What is the organisation undertaking the activity? How much credibility does the organisation have for conducting public engagement? What are the organisation's strengths and constraints?
Who are the interested groups?	Who else would want to know the answer to the question? What other groups or people would want to engage with the public in this context? What are the strengths and constraints to collaborating with other interested groups?

Point 2: Be clear about your objective(s)

Public engagement activities can have various objectives. It is important that policy-makers be clear about their objectives, expectations, and outputs from the engagement activities they are sponsoring and/or organising. For example, science shops (which are university-based participatory research mechanisms, see Annex) aim to:

- Gather and make available, in a usable format, objective and reliable information on certain developments in nanotechnology (technological road maps, possible scientific developments, potential uses, ethical, legal, social aspects);
- Compile specific questions requiring use of nanotechnology *e.g.* medical studies or in clean energy or filter application; or
- Investigate possible consumer issues after large scale introduction of nano-products in society (false claims, health effects, etc).

Objective	**Examples of questions**
Communication about nanotechnology, its application and impacts	**Is your aim:** Information exchange Exchange of experiences/good practices around nanotechnology and current developments Understanding opinions Exploring a specific aspect of nanotechnology Other?
Monitoring or evaluation	**Are you engaging in:** Monitoring of public attitudes to nanotechnology Evaluation of an awareness-raising campaign Counting audience figures (*e.g.* TV) Other?
Exploration of a specific issue	**Is your need for:** Debate on a scientific issue or application of nanotechnology to a sector or issue (*e.g.* nanomedicine, nano and energy, nano and food) Other?
Developing capacities	**Are you seeking to develop**: Capacities in science and innovation, networking capacity? Other?
Achieving a specific goal	**Is your target:** Achieving a specific level of knowledge amongst the target group, benefiting from local knowledge exchange Developing or implementing a new practice Gathering views on a proposal or initiative (*e.g.* gathering public input for policy-making)?

Point 3: Identify the participants

Public engagement activities do not seek to engage the same public. Useful questions to answer will include "Who is the public?", "How will they be identified and recruited?", "How will organisers decide to target a 'general public' versus a representative subset of the 'general public'?", "What factors about participants are most important when recruiting participants?". For example, participants in public meetings are often interested, self-selected audiences. The organiser might therefore want to insure that the audience is as broadly representative as possible by expanding and diversifying their recruitment efforts to include uninformed, disinterested people. For citizen conferences, the public should be a representative panel. It is then important to ensure a statistical balance of the panel. If the objective is to discuss specific regulations with non-governmental organisations (NGOs), then some participants should be from the NGOs most active in the field. In addition to the participant groups with vested interests, it will be important to ask "Who are the other participants in the activity? What are their expected roles and responsibilities?" For example, scientists may be asked to provide scientific knowledge prior to discussions, while other representatives may be asked to explain the national social or economic policy and regulation contexts.

Objective	**Examples of questions**
Engage the right public for the activity	What is your public? • Broad public • Special interest groups • NGOs • Scientists (*e.g.* nanoscientists, social scientists, technologists) • Business sector and representative organisations • Media, journalists, communicators (experts/ practitioners) • Government, parliamentary representatives, ministries, agencies • Other
Match the size of group to the purpose	How many people should participate? In how many groups? Of what size?
Balance the group	What sort of balance do you need of: • Demographics • Age profile • Gender profile • Level of scientific engagement • National or international • Types of social groups you need to talk to (*e.g.* Industrialists, NGOs, scientists, etc.)

Point 4: Plan the process

Public engagement activities can be resource-intensive. Resource issues that include funding, materials, and personnel must be given sufficient consideration at early stages. For example, in the preparation phase, development and distribution of preparatory information prior to the event may require personnel, raw materials, and the actual development and dissemination of materials. For instance, a citizen conference may require disseminating written materials to participants. In the case of preparation for the Australian forums, invitations for key stakeholders and interest groups, preparing media materials, venue logistics, press advertisements and email alerts to potential audiences, having fact sheets and follow-up information available at the venue were essential to the success of the forums. Other cases may involve other specific logistic issues (*e.g.* travel expenses).

Planning activities	**Examples of questions**
Preparation before the activity	Will there be: 1. Preparatory material? 2. Information to participants before the activity? 3. Information activities? 4. Discussions / consultations? 5. Events? 6. Other?
A practical and realistic timeframe	What will the time frame be? Does this allow sufficient time to allow the audience to grasp the subject?
Optimal use of resources	What budget will be required? How many staff will be needed? Which staff are available? What time allocation is required? How much will facilities cost? Is travel involved? Will participants be paid? Are consultants/facilitators required?
Follow-up	Will you monitor? Will you evaluate? Will you seek feedback from participants? How do you plan to use this follow up information? Will you publicise the follow up information? Will it inform future public engagement activities? Will you inform the policy process? Other?

Point 5: Select the activity

Member countries have planning and implementation experiences using several forms of public engagement in nanotechnology The format selected will depend on a variety of issues, including the objectives, intended audience(s), scale, and outputs. It is important to that each mechanism for public engagement produces specific outputs: if groups of people engaged in the activity are narrowly defined, their possible actions during the public engagement activity may be limited; or, may provide other specific opportunities for discussion and input from them as a public member for the public engagement activity. For instance, a discussion at a science museum between scientists and self-selected participants may attract people mostly familiar with the activities of the museum. While not expecting to directly influence policy, these activities can offer alternative venues as ways to obtain input from the public when asked for their opinion.[2] In contrast, a dialogue between civil society organisations and policy-makers can be designed with the objective of directly influencing the governance of the issue being discussed.

Objective	**Examples**
Select the activity	Are you planning to use an existing format? Or to experiment with an innovative one? • Public lectures • Consensus conferences • Debates • Public hearings • Dialogue with civil society organisations to inform policy-making • Games, internet / web-based activity, blogs • Art, drama, narratives, etc. • Science festivals, science cafés, science weeks • Science and technology museums, interactive science centres • New ideas/ original processes • Other How can the features of the activity help reach the objectives assigned to it (see point 2)? How can the features of the activity contribute to engage the expected public (see point 3)? How do the selected activity fit with the existing organisational possibilities and constraints (see point 4)?

2. For example, some US-based National Informal Science Education Network (NISE Net) public forums about nanotechnology ask participants to discuss nanotechnology issues and propose inputs.

Point 6: Identify the organisers

Organisers are often diverse and varied in their levels and knowledge of expertise in conducting and evaluating public engagement activities. Policy-makers often rely on external experts or consultants to help organise an activity. For instance, the Australian Office of Nanotechnology partnered with local agencies in holding the Public Forums on Nanotechnology (see Annex 2). These included state governments, universities and research institutions. In such case, it is important to plan the process and co-ordination. In other instances, organisers might be specific bodies which are devoted to public dialogue in science and technology (*e.g.* The French Commission Nationale du Débat Public) and/or technology assessment (*e.g.* The Dutch Rathenau Institute).

General issues	**Examples of questions**
Who are the organisers?	Who are the organisers? To what task(s) are they asked to contribute? • Government, parliamentary representatives, ministries, agencies • NGOs • Scientists (both nanoscientists and social scientists) • Business sector and representative organisations • Special interest groups, broad public • Media, journalists, communicators (experts/ practitioners) • Others
Why are you choosing these specific partners rather than others?	Which other organisations share our goals in public engagement? Which have complementary goals? Who can contribute complementary skills and knowledge to our activity? Who will have a positive, critical, or different approach/opinion? Who can contribute resources? Who would improve the activity, engage or carry the message to a wider group of participants? Will part of the work be contracted to another organisation or individual? What additional skills and experience will they bring?

Point 7: Know your goals/ evaluate and success/ engage in follow up

The success of any public engagement activity depends on matching the type of activity to the objective of the engagement. For instance, a positive outcome for a science café might be that participants have a deeper and more complex understanding of nanotechnology issues. A positive outcome of a citizen conference might be a detailed set of recommendations for policy-makers. A positive outcome for a science centre might be increased interest in science as measured by increased purchase of science-related magazines in the surrounding area. For broader and longer term outcomes, a science shop process may be 'best described as empowerment - to be more capable of achieving civil society organisation goals and to participate on an equal basis in debates' (see Annex 1).

Measures of success	**Examples of questions**
Outputs Outcomes	What do you see as the optimal: – Types of outputs/outcomes (including process outcomes)? – Use of the outputs/outcomes? – Dissemination of the outputs/outcomes? – Feedback and evaluation, including monitoring processes? – Long-term impacts? What actually happened? – Types of outputs/outcomes (including process outcomes)? – Any unexpected outputs/outcomes? – Any negative outputs/outcomes? – Use of the outputs/outcomes? – Dissemination of the outputs/outcomes? – Feedback and evaluation, including monitoring processes? Who will use the outputs/outcomes? How will they use them? If you are not using them, how will you ensure knowledge transfer?

Point 8: Learn and adapt

Evaluation and monitoring are important aspects of public engagement. They provide opportunities to learn from past experiences and to build upon more successful efforts. In this way, feedback mechanisms are essential (*e.g.* mechanisms to ascertain participant and organiser experiences, impact of outputs, etc.).

Evaluation should thus be planned from the beginning, reflecting the objectives being set, and may require specific methods that use qualitative and/or quantitative criteria. The evaluation of a given public engagement activity should be measured by how well the objectives are met. It will be important to clearly state objectives and define specific evaluation criteria before the activity begins. For instance, vocal opposition during public meetings should not necessarily lead to a negative evaluation of the process if the activity aims to explore the variety of social positions regarding a particular issue.

Engagement activities by nature are a continuous and iterative process that policy-makers can capitalize on to learn and adapt from past experiences. The evaluation of a public engagement process should build in methods for formative and summative methods to ensure that past and current activities will inform future activities.

The learning process	**Examples of questions**
Define evaluation instruments for the activity	What criteria will be used to evaluate – The public engagement process? – Its outputs and outcomes? – The impacts on policy? – Who will do the evaluation(s)? How are these criteria related to the objectives of the activity? How will you identify and use any unintended outcomes?
Create a system for learning from and improving your engagement process	How will you use the evaluation of the activity to improve future engagement processes?

The guide: Tables to assist planning and evaluation

This section contains the tables for you to complete as you plan your public engagement process.

You may find benefit in completing the tables throughout the planning and implementation processes (*e.g.* at the beginning, at an appropriate interim stage and at the end of the activity) particularly where the public engagement activity and its planning is a long-term process.

Point 1: Identify the context

Contextual factors	Your context and the factors affecting it
Social, cultural, historical, political and/or economic context	
Institutional and organisational context	
Context of the issue itself	
Who is commissioning the activity? What is their status?	
Who are the interested groups?	

Point 2: Be clear about your objective(s)

Objective	Your objectives and the factors affecting them
Communication about nanotechnology, its application and impacts	
Monitoring or evaluation	
Exploration of a specific issue	
Developing capacities	
Achieving a specific goal	
Others	

Point 3: Identify the participants

Objective	Your participants and how they are balanced
Match the size of group to the purpose	
Balance the group	
Engage the right public for the activity	

Point 4: Plan the process

Planning activity	**Your planning process and any issues**
Preparation before the activity	
A practical and realistic timeframe	
Optimal use of resources	
Follow-up	

Point 5: Select the activity

Objective	**Your activity and why you selected it**
Select the activity	

Point 6: Identify the organisers

Organisers	**Your organisers and why they are needed**
Who are the organisers	
Why are you choosing these specific partners rather than others?	

Point 7: Know your goals/ success

Measures of success	**Your measures of success and how you evaluate them**
Outputs Outcomes	

Point 8: Learn and adapt

The learning process	**Your process for using the experience and how it can inform future engagement activities**
Define evaluation instruments for the activity	
Create a system for learning from and improving your engagement process	

ANNEX 2: CASE STUDIES

Case study 1: NanoDiscussion-online, a project of the Dutch Nanopodium initiative

Point 1: Identify the context

Contextual factors	Your context and the factors affecting it
Social, cultural, historical, political and/or economic context	The discussion on nanotechnology in the Netherlands has to date been limited to a small circle of specialists and organizations. Therefore the Dutch government has appointed the independent Committee for the Societal Dialogue on Nanotechnology in the Netherlands (CMDN) in 2009. As an independent organization, Nanopodium facilitates and finances a broad range of public engagement projects. Our organization (NCWT, National Centre for Communication on Science and Technology) sees nanotechnology as an important emerging technology that needs public awareness en attention.
Institutional and organisational context	Nanopodium Cooperation of three main partners: Kennislink.nl, W24.nl and science centre NEMO. All partners share a common goal: public
Context of the issue itself	
Who is commissioning the activity? What is their status?	Nanopodium
Who are the interested groups?	Government, industry, NGO`s, special interest groups (*e.g.* environment, health, poverty).

Point 2: Be clear about your objective(s)

Objective	Your objectives and the factors affecting them
Communication about nanotechnology, its application and impacts	Our project aims at three general objectives. These are based on the programme lines defined by Nanopodium. 1. Inform the general public and raise awareness by producing a media-mix of content (articles, webTV, multimedia, radio broadcasts and a live discussion at the science center NEMO) and use different media (webTV, web, print, live sessions) 2. Engage them in dialogue (the actual online discussion) 3. Study changes in public opinion related to their knowledge on the subject matter Besides these objectives we also find it important to learn from these projects and improve the quality of future projects.
Monitoring or evaluation	All activities are monitored: 1. Outreach and statistics 2. Number of participants in online discussion (the forum) 3. Scientific study on the change of public opinion using a peer group
Exploration of a specific issue	We address different issues in all our activities. Main themes are health, environment, risks, new materials, privacy, international aspects, food, sustainable energy and growth.
Developing capacities	Build a good practise for future projects on dialogue. Use experience with project partners in future projects. Use developed network and operations as a base for future projects.
Achieving a specific goal	We work according to the lines defined by Nanopodium. Therefore the overall goals are basically set. Besides these goals, we intend to communicate the subject matter to a broad audience by using different platforms that already reach a large audience. By communicating on these platforms to a large audience we hope to achieve a mindset amongst the public: Whenever I have questions regarding nanotechnology I will turn to these platforms for objective and balanced information.
Others	

Point 3: Identify the participants

Objective	Your participants and how they are balanced
Match the size of group to the purpose	We use existing statistics of used media in the project to estimate our outreach. Since we are linked to a great number of different media our content will reach a substantial part of the Dutch public. Number of participants in the actual discussion is hard to estimate. By having a substantial outreach we try to engage as many people as possible in the discussion. We do not use panels, so the number of participants is not predictable. Projects like these will produce data on the willingness of the general public to participate in discussions on new technologies.
Balance the group	We target a broad audience, however by using a mix of media and media platforms we are channelling in on specific (mainly age based) subgroups.
Engage the right public for the activity	Broad public and special groups within broad public. We target special groups (for example 20- 45yr old) by using specific media and specific media formats. The group of 20–45 year old is mainly interested in video content. We provide them with video.

Point 4: Plan the process

Planning activity	Your planning process and any issues
Preparation before the activity	The project plan that contains all necessary elements for good project management, including all steps for preparation.
A practical and realistic timeframe	Timeframe is set by Nanopodium.
Optimal use of resources	We use different project partners with highly specialized skills. Kennislink is the main Dutch popular science website and provides articles, news, and multimedia. W24 is the main Dutch popular video portal and linked to Dutch television broadcasters.
Follow-up	

Point 5: Select the activity

Objective	Your activity and why you selected it
Select the activity	• Online information (*e.g.* articles and news). • Online multimedia • Online videos • The Forum • Broadcast on radio and WebTV • Live session at science centre NEMO We use different kinds of content that appeal to specific audiences. We use formats that have proven to be highly appreciated by the public. We use these formats in a coherent way. We work with project partners that have proven their skills on the production of these formats (W24, science centre NEMO).

Point 6: Identify the organisers

Organisers	Your organisers and why they are needed
Who are the organisers	The project was commissioned and financed by Nanopodium. We work with several project partners: Kennislink, W24 and science center NEMO, University of Amsterdam.
Why are you choosing these specific partners rather than others?	They have proven their skills on the production of different formats used in the project. They are already part of our network and therefore the operation will have a short "learning curve".

Point 7: Know your goals/ success

Measures of success	Your measures of success and how you evaluate them
Outputs Outcomes	Production of a substantial archive on nanotechnology informational products (print, video, forum). Exposure in different media. Participation in the forum. A study on a possible shift in public opinion. Enough participation in the forum and study in order to produce statistically relevant data on public opinion.

Point 8: Learn and adapt

The learning process	**Your process for using the experience and how it can inform future engagement activities**
Define evaluation instruments for the activity	Related to the objectives of Nanopodium: • Statistics on use of informational products. • Number of participants in the forum. • Outcome of studies. • Related to the process and operations: • Project operations; how did the project operation evolve. • Did project management succeed?
Create a system for learning from and improving your engagement process	Evaluation report. Evaluation session with project partners.

Case study 2: The critical thinker session in South Africa

Point 1: Identify the context

Contextual factors	Your context and the factors affecting it
Social, cultural, historical, political and/or economic context	Nanotechnology is fairly new in the country, and is virtually unknown to the majority of the population. Its development in the country is, however, supported by the government and in particular the Department of Science and Technology (DST) after the approval of the National Nanotechnology Strategy (NNS) by the country's cabinet in 2005. With it being fairly new, the technology is not widely discussed in the country.
Institutional and organizational context	The activity is implemented by the South African Agency for Science and Technology Advancement (SAASTA), an agency responsible for science and technology awareness. The organization has an extensive experience in science awareness.
Context of the issue itself	The NNS prescribes that the society be kept abreast of the developments around nanotechnology in the country. As such, and as part of the implementation of the strategy, the DST has developed a Nanotechnology Public Engagement Plan (NPEP) and the Critical Thinker Session forms part of the roll-out of the plan. Thus far, the development of nanotechnology in the country, as guided by the strategy implementation plan, has not paid attention to informing, educating and engaging the public, with the consequence that very little is known about the technology by the broader society. The planned activity will piggyback on the NanoSchool, which is being organised in the country and expected to attract local and international participants.
Who is commissioning the activity? What is their status	The activity, which is part of the Nanotechnology Public Engagement Programme, is funded by the DST, a government department championing the development of nanotechnology in the country. As an agency implementing NPEP, SAASTA is responsible for ensuring that the activity is carried out. The organization is renowned for its vast experience in science awareness.
Who are the interested groups?	The activity targets mainly the media, interest groups and professionals in the field of nanotechnology.

Point 2: Be clear about your objectives

Objective	Your objectives and the factors affecting them
Communication about nanotechnology, its application and impacts	The primary objective of the activity is to provide a platform to discuss nanotechnology and its potential societal impact. The focus during the session, to be titled *"Nanotechnology: From Fiction to Reality"* will be on the potential benefits of nanotechnology. The focus of the discussion will also be on informing the public on the role the government is playing in the development of the technology. The activity also aims to inform the media about nanotechnology and encourage responsible reporting about it. The presence of the media at the session should result in the dissemination of information through media channels to the broader public.
Monitoring or evaluation	
Exploration of a specific issue	
Developing capacities	
Achieving a specific goal	
Others	

Point 3: Identify the participants

Objective	Your participants and how they are balanced
Match the size of group to the purpose	The activity targets students and academics who will participate at the Nanoschool. This group will also have international participants. Open invitations will be sent to the media and no limit will be placed on the number of media representatives to participate. The minimum target number of participants is 80.
Balance the group	Effort will also be made to invite civic organisations and other interest groups.
Engage the right public for the activity	The activity mainly targets media, academics and policy makers, taking advantage of the organized NanoSchool which will have gathered academics. The broader public is a secondary target group, as they will receive information of the session through the media.

Point 4: Plan the process

Planning activity	Your planning process and any issues
Preparation before the activity	The following needs to be finalized before the activity: • Identification of the host (preferably one of the media power houses) and finalisation of its appointment • Identification of the facilitator • Identification and invitation of an expert (preferably international) to lead the discussions • Identification of target audience and issuing of invitations
A practical and realistic timeframe	The session will run over four hours. This should be sufficient to allow for a presentation by the expert and engagement by the audience.
Optimal use of resources	As part of optimising the use of resources, • Use will be made of the facilities used for the Nanoschool, *i.e.* there will be no need for the booking of a separate venue. • Use will be made of the established Nanoschool organising committee to handle some aspects of the activity (*e.g.* invitations, etc.) • A host will be selected on a quotation basis
Follow-up	Bi-weekly meetings are to be organised to review progress

Point 5: Select the activity

Objective	Your activity and why you selected it
Select the activity	The activity that is decided upon for the realisation of the objectives is the Critical Thinker Session.

Point 6: Identify the organisers

Organisers	Your organisers and why they are needed
Who are the organisers	The organising committee of the Nanoschool, together with the service provider, to be selected later, will be the primary organisers of the session. SAASTA as an implementing agency will also be involved.
Why are you choosing these specific partners rather than others?	Since the session is organized to piggy back on the Nanoschool, it will be prudent to use the existing nanoschool structures to organize the session. This is also done to also optimise on the use of resources. Furthermore, a service provider who will partner with the organising committee will be drawn from the existing SAASTA database. As such, it will be an organisation known and having previously rendered a service to SAASTA. This guarantees a certain level of quality of work.

Point 7: Know your goals/recognise success

Measure of success	Your measure of success and how you evaluate them
Outputs Outcomes	The following are some of the objectives • Attracting at least 80 people to the session • Disseminating the outcome of the session through print media to broaden the reach The activity was carried out exceptionally well. • A request for quotation was sent to service providers registered in SAASTA's database. Mail and Guardian quotation was selected to develop the concept and model for the critical thinker session. Thus Mail and Guardian was chosen on the basis of their experience and credibility in organising an effective critical thinkers' session in the past, in addition to their attractive price. Their facilitation of the session was of very high standard. Their involvement also led to this newspaper, with a very high readership, publishing an article in one of its publications. Their involvement rendered the session extremely successful. • The services of a high profiled radio personality, to facilitate the session, were secured well in advance. She was used as a draw card in inviting targeted audience and this proved very effective. • An international expert was identified and contacted, and his services were secured well in advance. He led discussions with excellence, providing information and opinions that helped shape discussions. The session which was highly interactive, lasted for about four hours. Attendance figures exceeded the original target of 80. This is attributed to the excellent marketing programme Mail and Guardian put together. The meticulous planning of the event by SAASTA together with the NanoSchool organising committee also contributed to ensuring that the activity was carried out successfully. The outcome of the session was published in the issue of Mail and Guardian, which is a weekly paper with a good readership.

Point 8: Learn and adapt

The learning process	Your process for using the experience and how it can inform future engagement activities
Define evaluation instruments for the activity	Evaluation instruments: • Self Assessment - Assessing the extent of realizing the targets set (*e.g.* attracting more than the target of 80 participants). • Creation of an evaluation form to be completed by participants in evaluating the activity.
Create a system for learning from and improving your engagement process	With this being the first Critical Thinker session for nanotechnology, the above evaluation instruments should provide a good guidance on how to improve on similar sessions in future.

Case study 3: Your science, your say: Nanotechnology, online forum in Ireland

Point 1: Identify the context

Contextual factors	Your context and the factors affecting it
Social, cultural, historical, political and/or economic context	Ireland moved very quickly from an agricultural country to a knowledge-based economy where science, technology and innovation (STI) – ICT and life sciences in particular – became foundation stones. Following a Technology Foresight exercise in the late 90s, there have been strategic decisions made by Irish governments in the last 15 years that have sped this process up, thereby increasingly politicising science. Despite the current economic downturn, felt acutely in Ireland, STI is high on the political agenda. While public engagement takes the form of education and outreach programmes designed to reverse the trend – also seen elsewhere – of decreasing student interest in science, there are few mechanisms for formal public discussion or debate about science and technology. However, socio-scientific issues such as genetically modified organisms (GMOs) and stem cells do mobilise groups to resist against new technologies. There are political concerns that, in future, nanotechnology may meet similar resistance. This project in some way addresses these concerns, specifically for health, society, and environment, but it also investigates how such resistance and tension may be a sign of a healthy democracy, producing a more responsible and 'socially-robust' science (Nowotny, *et al,* 2001)[3].
Institutional and organisational context	Forfás is Ireland's national policy advisory body for enterprise and science. It was established in 1994 as a public agency in the Department of Enterprise, Trade and Employment (DETE). Forfás provides independent research, advice and support in the areas of enterprise and science policy, informing DETE and wider Government in its responses to the fast-changing needs of the global business environment; ensures the coherence of policies across the development agencies supporting enterprise; evaluates enterprise policy interventions; provides research and administrative support to independent advisory groups. Among its other functions is the managing of the national awareness programme, Discover Science and Engineering (DSE) and shared corporate services for IDA Ireland, Enterprise Ireland and Science Foundation Ireland, as well as hosting the Office of the Chief Scientific Adviser to Government. Forfás has begun a process of best practices for nanotechnology commercialisation and governance, and this includes issues of public engagement. The nanotechnology public engagement activities, collectively called 'Nanotalk' are part of a research fellowship at the School of Communications, Dublin City University (DCU), funded by the Environmental Protection Agency (EPA). DCU is a young university of 10,000 registered students and over 80 teaching programmes situated in Dublin's north side. It was initially set up to fulfil the national requirement for a highly-trained workforce with skills in the areas of business, science and electronics, computer technology, communications and languages and as an agent for change in its local community. DCU has now developed its own research specialities, creating a number of national centres of excellence that collaborate with other universities and industry internationally, including interdisciplinary scientific and social science projects. DCU continues its commitment to engage with its local community through its Civic Engagement Strategy and its many educational and outreach programmes. The EPA is the independent public body established in 1992 to monitor Ireland's natural environment resources. It has a wide range of policing functions including environmental licensing, waste management, enforcing law, analysing samples and regulating CHCs. The project which these activities fall under is part of a wider strategy of environmental research development, in this case looking at

3. Helga Nowotny, Peter Scott, Michael Gibbons (2001) Re-Thinking Science: Knowledge And The Public In An Age Of Uncertainty (Cambridge: Polity Press)

	public response to environmental and health issues. The Science Gallery, Trinity College Dublin, opened in 2008, announcing itself as the world's first such gallery. It operates at an intersection between art and science, between technology and creativity, where innovation flourishes. Since it opened, it has had installations, exhibitions, shows and debates that presents science in unique ways, and has been hugely popular. The Science Gallery receives public and private funding, and is adjacent to CRANN, Ireland's first dedicated nano facility, from which the Gallery emerged. CRANN and the Science Gallery have strong links, making this an ideal, and receptive, space for nanotechnology public engagement
Context of the issue itself	Nanotechnology has been d as a "key enabling technology" at policy level in Ireland. To see how best to interact with the area, the Irish Council for Science, Technology and Innovation established a Nanotechnology Task Force which recommended a national forum on the technology. In an address to a major nanotechnology symposium in 2005, the then Minister for Enterprise, Trade and Employment said "Nanotechnology is a perfect example of a transformational technology which we all must engage with." The project with which the public engagement activities are associated will assess, within its own context, where nanotechnology is in public consciousness in the current economic situation.
What is the strength of the question?	While not all S&T public engagement programmes need have a particular question to be answered, in this case there are questions, given that the activities are embedded in a research fellowship at DCU. The research project: *i*) looked at 'local knowledges' of nanotechnology in various practice groups, whether members of a community, in education or nanoscientists; and *ii*) tested models of public engagement.
Who is asking? What is their status?	The terms and parameters of the research are set by a post doctoral researcher and team at Dublin City University, supported by the EPA. Leading nanotechnology, social science and science communication experts in their fields form the supervision committee. As science policy-makers in Ireland, Forfás will have a special interest in the findings.
Who are the interested groups?	• Dublin City University, the host institution for the research fellowship • The Environmental Protection Agency, funders of the project and stakeholders for environmental issues • Forfás, Ireland's national policy advisory body for enterprise and science • Stakeholders such as businesses, academia, CSOs and consumer health organisations • So-called members of the 'general public', but in reality various publics who have different levels of engagement in emerging sciences and the development, regulation and consumption of future hi-tech products, and who have varying degrees of interest or concern depending on the context of the activity. • The Science Gallery, where the installation was housed • The multimedia production company which facilitated the online forum.

Point 2: Be clear about your objective(s)

Objective	Your objectives and the factors affecting them
Communication about nanotechnology, its application and impacts	The research project set out to map the complex relationships between 'local knowledges' about the amorphous term nanotechnology, and then develop and evaluate public engagement activities, using various models of science communication. A decision was taken not to bluntly introduce risk factors immediately; introduce theme subtlety or allow them to emerge from expert/non-expert discussion. *Your Science Your Say: Nanotechnology* utilised unique and 'newer' models of communication, *e.g.* Science Gallery installation and Web 2.0 forum.
Monitoring or evaluation	Criteria for public engagement are established from the outset. This project benefitted from an extensive literature review on which to base these criteria. It was decided, following Gavelin, Wilson and Doubleday (2007)[4], that public engagement must be *deliberative, inclusive, substantive* and *consequential*, and after the recommendations of Nowotny et al (2001)[5] and Stirling (2005)[6], the substantive part must be *socially robust*, in that technical issues are also open to external, societal/public issue questions.
Exploration of a specific issue	The Science Gallery installation and YouTube/Web 2.0 forum which make up this dual-space activity are perfect examples of how the public engagement objectives could be obtained; that is, the intention is not to speak down or present too much technical information about either nanotechnology or the issues involved, but allow a 'broadcast yourself' ethos to allow scientists and non-scientists to participate on an equal footing. There are no detailed articles about nanotechnology on the website except introductory materials and links. Rather, four very different types of scientist speak about their work, that happened to involve the nanoscale. The particular nanotechnology areas are biomimicry, pharmacogenetics using nanochips, porous polymer films, semi-conducting nanowires. The director of the video elements of the scientists' explanation of their work encouraged the scientists to also raise what potential environmental, social or ethical risk their particular technology might raise. In the end, while not all scientists saw much risk, public respondents in the Science Gallery, and through a text-based forum, were more inclined to see the 'social risks' associated with the technologies.
Developing capacities	As a science centre installation, *Your Science Your Say: Nanotechnology* was relatively expensive to produce, but is reusable for the purposes of public interaction. What gives added value is the range of perspectives and level of engagement that can be encouraged through the web forum, YouTube and Twitter feed parts of the operation. This can continue, adding more groups and individuals to the public engagement process after the installation has been removed from the Science Gallery. In producing this, the installation also serves as a connection point between university, science centre, the public, and an environmental agency.
Achieving a specific goal	*Your Science Your Say: Nanotechnology* had two elements: the Science Gallery installation and a Web 2.0 forum. YSYS then had two goals: *i*) as a means of tactile engagement for Science Gallery visitors *i.e.* touch the installation, run videos, view interviews, experience it as an exhibit; and *ii*) engage with the content on a more discursive level online through reflection on what are, broadly, the risks and benefits of each of the types of technologies presented.
Others	The use of a multi-platform, multi-sited public engagement tool means there can be an expectation among the designers and facilitators of unintended outcomes from the process.

4. Gavelin, K., Wilson, R. and Doubleday, R. (2007) *Democratic Technologies? The Final Report of the Nanotechnology Engagement Group (NEG)*, Involve, London.
5. Helga Nowotny, Peter Scott, Michael Gibbons (2001) Re-Thinking Science: Knowledge And The Public In An Age Of Uncertainty (Cambridge: Polity Press)
6. Andy Stirling in "Science and citizens: globalisation and the challenge of engagement": in Melissa Leach, Ian Scoones and Brian Wynne (eds) *Science and Citizens:Globalisation and the Challenge of Engagement*. London: Zed Books.

Point 3: Identify the participants

Objective	**Your participants and how they are balanced**
Match the size of group to the purpose	This activity was an open public engagement exercise. During an exhibition – and during the summer school holiday months when this activity was run – the Science Gallery can have over 300 visitors coming through a day. As a 'science centre' booth, these are all potential participants. The activity is not intended to have outcomes or conclusions from participants – it is open, discursive, allowing as many contributors as possible. The online part of the activity will also capture online browsers.
Balance the group	As with the previous comment, because of the openness of the activity, there are more uncertainties and unknowns about the composition of the public participants. Balance was therefore not an issue. However, balance was needed for the technical presentations by nanoscientists. There were four presenters. The criteria used for their selection was on the basis of scientific topic, gender, willingness to participate, communication abilities, higher education institution, and scientific experience.
Engage the right public for the activity	The Science Gallery targets the 14-35 age group. This is the ideal target group for this activity, complementing other activities which reach out to a young, technologically aware audience, more likely to have heard about nanotechnology and offer an opinion about it. These are not the only publics interested in the activity (groups of children attend Science Gallery and were observed engaging with the YSYS exhibit) but they are the main focus.

Point 4: Plan the process

Planning activity	**Your planning process and any issues**
Preparation before the activity	The YSYS activity had many preparatory steps before considering the activity, for example: • Developing the concept – leading into the design the phase. In this case, the basic concept was to present to the public 4 types of nanoscience with health and environmental implications for public view comment through text format and video • The design phase – realising project goals • Installation planning – Selecting and liaising with the science/centre museum space, and proposing the project, in this case the Science Gallery for development of installation space/'voting booth' including plinth at Science Gallery • Outsourcing – public procurement criteria for hiring private media production company to public-funded research • Media/event/activity elements – Deciding how many elements the activity would have. In this case, there were several: installation, videos, online forum, website, YouTube publication • Media production – pre-production, production and post-production of presentation videos • Recruitment – Criteria were established for scientific topic, gender, willingness to participate, communication abilities, higher education institution, and scientific experience. • Finance and administration (in this case, from state research funds, administered from a university)

A practical and realistic timeframe	Four months were scheduled for the *Your Science Your Say: Nanotechnology* including development of website, media elements, installation and running of the exhibition during one summer month. The exhibition ran for an extra month, meaning five months in total from conceptualisation to end of exhibition.
Optimal use of resources	Besides the procurement procedure required to meet quality and expertise requirements as well as cost optimisation, several aspects of the project overlapped during the four development months. The installation and website are sustainable, in the sense they can be reused and re-purposed (see *www.yourscienceyoursay.com*)
Follow-up	The web forum and Twitter feed remained after the installation. There were plans to re-erect the installation for Nano Week, Dublin, December 2009, but this did not take place.

Point 5: Select the activity

Objective	**Your activity and why you selected it**
Select the activity	*Your Science Your Say* had been a successful student installation the year before using a similar concept to cover a range of scientific topics. Learning from this activity, the eventual activity that became *Your Science Your Say : Nanotechnology* was set up as a public engagement forum that combines an installation (housed in the Science Gallery, Trinity College Dublin) with Web 2.0 and YouTube. In the installation part, computers show the *www.yourscienceyoursay*.com website. On this webspace, four nanoscientists from different areas (biomimicry, pharmacogenetics, nanowires, and porous membranes) and institutions (CRANN, Tyndall Institute, UCD) participated the potential risks and benefits of nanotechnology. Short video presentations of each scientist were prepared in which the researchers explained their work and talked about potential risk as well as benefits. Each participating research video was about three minutes long, recorded and edited by Agtel Communications, and also broadcast on YouTube. An especially constructed installation in Science Gallery displayed the videos. A special 'voting booth' was installed for visitors to respond, on camera, to the researchers and discuss implications explaining which research presents the highest risk to society and which the most benefit. Passers-by and Science Gallery attendees were encouraged to watch the videos in the booth installation and record a short message as feedback. These messages and the original scientists' videos were also broadcast on YouTube. There was also a facility for online respondents to leave a written comment and Twitter updates. The multi-platform nature of the combined activity was selected to allow multiple perspective interactions over a finite period of time.

Point 6: Identify the organisers

Organisers	**Your organisers and why they are needed**
Dr. Padraig Murphy, STRIVE Research Fellow and supervision team	Co-producer; planning; theoretical, methodological; project management, budget;
Ian Brunswick , Producer, Agtel Productions	Main producer; director; web master
Science Gallery, Trinity College Dublin	Public space; Installation management

Point 7: Know your goals/ success

Measures of success	Your measures of success and how you evaluate them
Outputs Outcomes	As this was a research project, several chapters and research papers emerged from this project, as well as a final report for funders, available at *http://www.epa.ie/downloads/pubs/research/health/*. As a public science centre installation, *Your Science Your Say: Nanotechnology* was a success. Up to 100 visitors a day would engage with the exhibit, in at least a superficial way. There was a modest amount of users of both types of online response. The Science Gallery installation in particular requiring 'mediators' to entice browsers to leave a message. Gallery staff and researcher observations showed there were many visitors, particularly young people viewing the scientists' videos, but left no message. Participants spoke less about the environmental and health impacts of nanotechnology than anticipated but raised questions about knowledge equity and possible overuse in the developing world. The measure of success from a public engagement perspective was not just numbers who visited the installation – it was ultimately the Gavelin, Wilson and Doubleday model that public engagement must be deliberative, inclusive, substantive/socially robust and consequential.

Point 8: Learn and adapt

The learning process	Your process for using the experience and how it can inform future engagement activities
Create a system for learning from and improving your engagement process	For increased range of participation, and depth of issue engagement, there would need to be support for another type of activity or process, such as face-to-face models it needed extra incentive through face-to-face exchanges and extra publicity. The Science Gallery operates by having three to four week large shows with a short break – the installation 'fell between shows' and so was promoted as a single event to one or two journalists. There are important complexities and considerations here from a science museology perspective for levels of engagement. Face-to-face dialogue would also help drive traffic onto the online forum.

Case study 4: "Nanotechnology for Green World in Ilsan/Korea": Nano Korea 2010 Symposium

The "Korea Nano Technology Research Society (KoNTRS)" has organised "Nano Korea Symposium" every year since 2003. The symposium is accompanied by an exhibition of the research centres and business ventures, which are engaged in the nanotechnology research.

The 'Nano Korea 2010 - Symposium' was held this year from 18-20 Augustin KINTEX (Korea International Exhibition Center) with a slogan "Nanotechnology for the Green World" as a Joint Symposium with "IEEE NANO 2010", the 10th IEEE International Conference on Nanotechnology. It also had Research Frontiers, R&BD seminars and educational programs for the youth as supporting programme.

'Nano Korea 2010' – symposium and exhibition – had 8212 participants in total (including 1177 for the symposium) and 107 middle and high school students attended the educational programme.

Point 1: Identify the context

Contextual factors	Your context and the factors affecting it
Social, cultural, historical, political and/or economic context	There is a general consensus in the Korean society that the nanotechnology is one of the very important emerging technologies in the 21st century. But there are also vague concerns about the influences that the nanotechnology could bring in the future society. The symposium and exhibition have been held every year since 2003. This year the Nano Korea 2010 was a success in the sense, that the size of the symposium was increased by 40% compared to 2009. Nano Korea has had a growth rate of 34% per year since 2003 and, as the second biggest international event in the world it is now considered as a very important place of conversation for the nano experts.
Institutional and organizational context	Nano Korea is a very well-known event in Korea and the political environment is very friendly, nevertheless to get financial support from government is somewhat difficult. A lot of nano products are already in the market and the discussion on the role and the status of the nanotechnology in the society is going on, especially on the environmental and safety subjects. Many universities and R&D centers have a positive attitude to the issues, but some governmental officers, who are working on environmental and safety issues have difficulties with the issues. The "Korea Nano Technology Research Society (KoNTRS)" is an organisation of researchers in nano science and technology. As the organiser, organisation limitations of the symposium are present for sure, but not too much of a concern.
Context of the issue itself	

Who is commissioning the activity? What is their status?	Nano Korea is supported by governmental organisations: MEST = Ministry of Education, Science and Technology & MKE = Ministry of Knowledge Economy. Nano Korea is commissioned by KoNTRS and its staff members office accomplish the organizational work. As an organisation of researchers, KoNTRS contributes a big part of nanotechnology R&D and its application, and as such it enjoys high confidence from the public. One of KoNTRS' strengths is that staff members are working with the spirit of the society service on their own initiative.
Who are the interested groups?	Researchers, universities and business ventures show great interest and contribute to the NANO KOREA. Also the government and the public (CSOs) are present in the events.

Point 2: Be clear about your objective(s)

Objective	**Your objectives and the factors affecting them**
Communication about nanotechnology, its application and impacts	Exchange of experiences, good practices around NT and current developments; Exchange of the opinions and mutual understanding.
Monitoring or evaluation	Estimation of the feedback from the participants
Exploration of a specific issue	Discussion about the application of NT in nanomedicine, nano and energy, nano and food, etc.
Developing capacities	Capacities in science and innovation, networking capacity.
Achieving a specific goal	Achieving a specific level of knowledge amongst the target group, benefiting from local knowledge exchange.

Point 3: Identify the participants

Objective	**Your participants and how they are balanced**
Match the size of group to the purpose	1000 participants at its minimum and about 200 institutions.
Balance the group	The participants are mainly scientists and businessmen. The balance of level of scientific knowledge is needed.
Engage the right public for the activity	Scientists (nano scientists, social scientists, technicians).

Point 4: Plan the process

Planning activity	Your planning process and any issues
Preparation before the activity	There will be: • Preparatory material • Information to participants before the activity • Information activities like meetings and e-mail • Regular meetings for discussions • Events like forums
A practical and realistic timeframe	One year is needed for planning and preparation, but it's still insufficient to allow the audience to grasp the subject.
Optimal use of resources	Budget: USD 600,000 The number of staff: 30 persons The staff are: researchers and professors The required time allocation: 1 year The rent cost of KINTEX: USD 40,000 The staffs are paid for transportation expenses. Consultants/facilitators are required.
Follow-up	Monitoring, evaluation, feedback from participants – This follow-up information will be used for evaluation. No publication of the result, no interaction with other public engagement activities or the policy processes.

Point 5: Select the activity

Objective	Your activity and why you selected it
Select the activity	Using existing formats: public lectures, consensus conferences

Point 6: Identify the organisers

Organisers	Your organisers and why they are needed
Who are the organisers?	Organisers: researchers and professors, mainly nano-scientists. They are asked by government.
Why are you choosing these specific partners rather than others?	Researchers and professors would improve the activity, engage or carry the message to a wider group of participants.

Point 7: Know your goals/recognise success

Measures of success	Your measures of success and how you evaluate them
Outputs Outcomes	The optimal outputs will be productive conversation and learning process between the participants. The optimal outcomes will be that it could contribute to a better awareness of the participants about the environmental and societal consequences.

Point 8: Learn and adapt

The learning process	Your process for using the experience and how it can inform future engagement activities
Define evaluation instruments for the activity	Long term methodology of the evaluation will include the public engagement process, outputs and outcomes, the impacts on policy, but no evaluation instruments are introduced after the Nano Korea immediately. A brief opinion survey is accomplished among participants.
Create a system for learning from and improving your engagement process	The result of the opinion survey will be accounted for improving future engagement processes.

ANNEX 3: QUESTIONNAIRES TO EXPLORE NATIONAL EXPERIENCES OF CHALLENGES AND PRACTICES ADDRESSING THE TOPICS OF NANOTECHNOLOGY-SPECIFIC PUBLIC ENGAGEMENT

QUESTIONNAIRES CIRCULATED MAY 2008

QUESTIONNAIRE 1

OECD – Working Party on Nanotechnology
OUTREACH, COMMUNICATION AND PUBLIC ENGAGEMENT
(to be filled in by country delegates)

Purpose

The OECD Committee on Scientific and Technological Policy (CSTP) established a Working Party on Nanotechnology (WPN) in March 2007. The Working Party aims to promote international co-operation that facilitates research, development, and responsible commercialization of nanotechnology in member countries and in non-member economies.

The WPN has been engaged in work on communication and public engagement around nanotechnology since the beginning. In May 2007, the WPN supported a workshop on nanotechnology Outreach at IMEC in Leuven, Belgium (see *www.imecexpo.be/images/wrapupNOW.pdf* for a summary of this workshop). The work has continued since and now aims at gathering experience from member countries in communicating nanotechnology to the public and fostering a dialogue among the many stakeholder communities involved in this area (including industry, researchers, policy makers, and the public). The steering group for this project has decided to consider the following issues:

- Surveying the challenges in communicating nanotechnology to the public, examining and developing good practices and developing a comprehensive approach to the communication of nanotechnology.

- Surveying the challenges in public engagement in nanotechnology, developing good practices and a policy framework that can support policy development in member countries.

This questionnaire is intended to help provide information on both sets of issues. In order to facilitate the work, the steering group is working on a synthesis of the similarities, differences and main challenges that characterise communication and public engagement issues related to nanotechnology in OECD countries. This synthesis will provide comparable information on present and possible future policies in the field. This synthesis will be followed by a closed workshop on public engagement on nanotechnology and its consequences, if possible before the end of 2008.

Please note that, for the purpose of this questionnaire, "Nanotechnology" has to be understood as covering both nanosciences and nanotechnologies. *We have also chosen to define Outreach and Communication activity as "the activity or process of expressing ideas and of giving people information". (Exhibitions, conferences, work by science centres, media campaigns, etc. are all to be considered as outreach and communication activities) and Public*

engagement as "the involvement of specialists listening to, developing their understanding of, and interacting with, non-specialists" (Citizen juries, focus groups, town meetings, deliberative forums, and science cafes, dialogue opportunities and debates, etc. are typically such processes.)

The information that is collected will be complemented with more detailed publicly available information that can be accessed independently. Information that can be used for comparative analysis will be of particular interest. In responding to the questionnaire, you may indicate that some information is to be treated confidentially. In this case, the OECD will not disclose the information and will treat it with great care.

Guidelines

In completing the questionnaire, countries are kindly requested to provide written responses. These responses can be relatively brief and should focus on the most significant issues and developments in the respective countries.

The target of the questionnaire (D1) is policy makers in charge of nanotechnology or broader science, technology and innovation issues, in your country. A second questionnaire (D2) is specifically aimed at agencies involved in communicating nanotechnology to the public, such as agencies providing financial support to nanosciences or nanotechnology. National delegates have already provided the names and contact persons for some of these agencies in responding to previous questionnaires (project B and E joint questionnaire), which will be contacted separately by the OECD secretariat. Further information on such agencies would be welcome, to ensure that the second questionnaire covers all the relevant national agencies, organisations and institutions.

The questionnaire is divided into two main sections. The first section covers communication and the second one covers public engagement in the area of nanotechnology. The questionnaire is primarily aimed at national policies for communication and public engagement related to nanotechnology. Where a different focus (regional, local) is considered by respondents for certain questions, respondents are requested to indicate this.

REQUEST FOR INFORMATION

Contact details of the primary respondent (this will help in contacting you in case of questions)
Country :
Name:
Professional affiliation:
Position:
Area of responsibility:
Telephone number:
E-mail address :

I- OUTREACH OR COMMUNICATION ACTIVITIES IN THE FIELD OF NANOSCIENCE AND NANOTECHNOLOGY

This section of the questionnaire focuses on communication or outreach activities related to nanotechnology. It can be defined as "the activity or process of expressing ideas and of giving people information". Exhibitions, conferences, work by science centres, media campaigns, etc. are all to be considered as outreach and communication activities

1- Is there a coordinated strategy concerning the outreach of nanotechnology in your country?
Yes ☐
No ☐

If not,

1.1- Are you working towards such a strategy?

Yes ☐
No ☐

1.2- Can you please describe the progress in developing such a strategy?

If Yes,

1.3- Could you tell us about the background for this strategy?

1.4- When was this strategy put in place?

2- Which organizations/institutions are involved in your country's communication of nanotechnology?

Name of the organization/ institution	Type (public or private)	Functions (funding agencies, think tanks, …)	Size or significance (number of people employed by the institution for example)	Targeted audience

3- Could you give us an idea of how much the public sector in your country (*i.e.* Government, research agencies, funding agencies, etc.) has spent on these activities over the past three years (in your national currency)?

4- Are you aware of specific training programme for teachers and researchers that universities or high level education institutions in your country have introduced to support good practices in outreach related to nanotechnology?
Yes ☐
No ☐
Are there other approaches you are using to find or develop good "nano-communicators"?

5- Have there been communication campaigns in your country in the area of nanotechnology?
Yes ☐
No ☐
If yes, please provide us with any available documents and indicate, if possible:

At which level these campaigns have occurred (national, regional, institutional, etc.)?
What were the aims/objectives of these campaigns?
What were the key target audiences?
What was the length of each campaign?
Which media or other forms of communication methods were used as part of these campaigns?
Who were the major initiators of these campaigns?

6- Have the results of these campaigns been analyzed and evaluated?
Yes ☐
No ☐

If yes, what has been the result of this evaluation?

7- To what degree have companies been involved in promoting outreach on nanotechnology? Please give some examples.

8- What types of media have paid attention to nanotechnology? Please provide some ranking (to the extent possible), details and, if possible, some extracts (written press, radio, TV, Internet.)

TYPE OF MEDIA	RANK	DESCRIPTION	FREQUENCY
Specialized Web Sites			
Popular Web Sites (*i.e.* blogs, etc.)			
Broadcast Media (Radio/TV)			
Local Written Press			
Specialized Written Press			
National Written Press			
Other (please specify)			

9- Has the media's coverage of nanotechnology been typically positive, negative or neutral in tone? Please precise if you have had a study on this issue or if you just give, here, your personal feeling.

TYPE OF MEDIA	POSITIVE	NEUTRAL	NEGATIVE
Web Sites			
Broadcast Media (Radio/TV)			
Local Written Press			
Specialized Written Press			
National Written Press			
Other (please precise)			

10- Which type of issues have been raised by these independent media campaigns?

Could you please give some details on :

10.1- What has typically been highlighted in the positive coverage of nanotechnology?

10.2- What has typically been highlighted in the negative coverage of nanotechnology?

10.3- Has the neutral coverage highlighted both positive and negative points or remained very broad (e.g. focusing on the technical aspects only)?

II – PUBLIC ENGAGEMENT REGARDING NANOSCIENCE AND NANOTECHNOLOGY

Public engagement is a term that has recently been used to describe "the involvement of specialists listening to, developing their understanding of, and interacting with, non-specialists" (as defined by England's university funding agency, HEFCE, in 2006). Citizen juries, focus groups, town meetings, deliberative forums, and science cafes, dialogue opportunities and debates, etc. are typically such processes.

1-Have any initiatives in the area of public engagement in nanotechnology been undertaken in your country?
Yes ☐
No ☐

If yes, please list, as extensively as possible, these initiatives and provide additional information as indicated in the following table:

Scope of the initiative (national, regional, local, in a school, etc…)	Name of the initiative	Hosting institution	Form of the initiative (including the number of people involved)	Main stakeholders involved (as experts or directly involved in the delivery)	Targeted audience (students, citizens, women/men, children, etc…)

2- Please briefly describe the main outcomes of these nanotechnology public engagement initiatives in your country?

3- Could you provide us with a list of key recommendations that emerged from these initiatives in your country ?

4- Have the results from public engagement initiatives in your country been implemented in policies related to nanotechnology?
Yes ☐
No ☐
If yes,

4.1- Please provide a few examples of the implementation of these initiatives:

4.2- Have the implementations of these initiatives been effective in enhancing your policies related to nanotechnology?
Yes ☐
No ☐

If it has not been effective,
4.3- What do you consider as the main reason? (i.e. the policy environment: the engagement process; the quality of the results?, etc.)

5- Does your country intend to undertake further initiatives in public engagement related to nanotechnology?
Yes ☐
No ☐

If so:

5.1- Why will you undertake such initiatives?

5.2- What do you hope to achieve?

6- Do you know if your awareness activities are visible in other countries ?
Yes ☐
No ☐
If yes:

6.1 - What types of activities are visible ?

6.2- In which countries are they visible ?

7- Do you know of any impact of your public communication and public engagement activities in other countries?
Yes ☐
No ☐
If so:

7.1-How could you describe this impact?

7.2- What types of activities have such an impact?

7.3- In which countries do they have such an impact?

8- Do you know of any activities by other countries which are visible in your country?
Yes ☐
No ☐
If so

8.1- What activities ?

8.2- What countries ?

8.3- What impacts?

9- Are you considering changes in your approach to public engagement in nanotechnology over the next few years?
Yes ☐
No ☐
If so, why?
10. What have you learnt from public engagement processes that could be of particular interest to other countries?

11. Can you please provide the OECD secretariat with any studies on public engagement and public perceptions of nanotechnology?

12. Finally, are there any areas which are not covered in the questionnaire that you would like to tell us about ?

Many thanks for your help.

QUESTIONNAIRES CIRCULATED MAY 2008

QUESTIONNAIRE 2

OECD – Working Party on Nanotechnology
OUTREACH, COMMUNICATION AND PUBLIC ENGAGEMENT
(to be filled in by communication managers in organizations/institutions/agencies dealing with nanotechnology)

i.e. : Funding agencies, museums which have been organizing a "nanoexhibition", science foundations, think tanks working on nanotechnology, etc.

A brief introduction to the OECD

The Organisation for Economic Co-operation and Development (OECD) was founded in 1961. Today the OECD has 30 member countries. Its principal aim is to promote policies for sustainable economic growth and employment, a rising standard of living, and trade liberalization.

The OECD brings together its member countries to discuss and develop both domestic and international policies. It analyses issues, recommends actions, and provides a forum in which countries can compare their experiences, seek answers to common problems, and work to co-ordinate policies.

Work in the OECD is carried out by specialised committees, and under these, working parties and working groups. The Committee for Scientific and Technological Policy, for example, oversees work related to science and technology. The OECD's committees and subsidiary groups are composed of government representatives from all member countries and some non-member economies.

Purpose

The OECD Committee on Scientific and Technological Policy (CSTP) established a Working Party on Nanotechnology (WPN) in March 2007. The Working Party aims to promote international co-operation that facilitates research, development, and responsible commercialization of nanotechnology in member countries and in non-member economies.

The WPN has been engaged in work on communication and public engagement around nanotechnology since the beginning. In May 2007, the WPN supported a workshop on Nanotechnology Outreach (NOW) at IMEC in Leuven, Belgium, see *www.imecexpo.be/nl/story14.aspx*. This workshop served as an information gathering tool and helped establish challenges and best practices in communicating science to the public. The NOW attracted over 140 professionals from media, science museums, educational institutes, research institutes, industry, art, government, etc. The workshop was spread over two days (May 7-8, 2007), and preceded the first official meeting of the Working Party on Nanotechnology, allowing OECD delegates to participate in the workshop.

The work has continued since and now aims at gathering experience from member countries in communicating nanotechnology to the public and fostering a dialogue among the many stakeholder communities involved in this area (including industry, researchers, policy makers, and the public). The emergence of nanotechnology in the economy and society at large will have a tremendous effect. A better understanding of today's perception by the public of this new

technology wave is critical to ensure proper use and wide acceptance of nanotechnologies in new products and services.

The steering group for this project has decided to consider the following issues:

- Surveying the challenges in communicating nanotechnology to the public, examining and developing good practices and developing a comprehensive approach to the communication of nanotechnology.

- Surveying the challenges in public engagement in nanotechnology, developing good practices and a policy framework that can support policy development in member countries.

This questionnaire is intended to help provide information on both sets of issues. In order to facilitate the work, the steering group is working on a synthesis of the similarities, differences and main challenges that characterize communication and public engagement issues related to nanotechnology in OECD countries. This synthesis will provide comparable information on present and possible future policies in the field.

Please note that, for the purpose of this questionnaire, "Nanotechnology" has to be understood as covering both nanosciences and nanotechnologies. We have also chosen to define Outreach and Communication activity as "the activity or process of expressing ideas and of giving people information". (Exhibitions, conferences, work by science centres, media campaigns, etc. are all to be considered as outreach and communication activities) and public engagement as "the involvement of specialists listening to, developing their understanding of, and interacting with, non-specialists" (citizen juries, focus groups, town meetings, deliberative forums, and science cafes, dialogue opportunities and debates, etc. are typically such processes.)

The information that is collected will be complemented with more detailed publicly available information that can be accessed independently. Information that can be used for comparative analysis will be of particular interest. In responding to the questionnaire, you may indicate that some information is to be treated confidentially. In this case, the OECD will not disclose the information and will treat it with great care.

Guidelines

In completing the questionnaire, you are kindly requested to provide written responses. These responses can be relatively brief and should focus on the most significant issues and developments in the respective countries. This questionnaire is specifically aimed at agencies (organizations and institutions as well) involved in communicating nanotechnology to the public, such as agencies providing financial support to nanosciences or nanotechnology.

The questionnaire is divided into two main sections. The first section covers communication and the second one covers public engagement in the area of nanotechnology.

REQUEST FOR INFORMATION

Contact details of the primary respondent (this will help in contacting you in case of questions)
Country :

Name:

Professional affiliation:

Position:

Area of responsibility:

Telephone number:

E-mail address :

I- OUTREACH and COMMUNICATION ACTIVITIES IN THE FIELD OF NANOSCIENCE AND NANOTECHNOLOGY

This section of the questionnaire focuses on communication or outreach activities related to nanotechnology. It can be defined as "the activity or process of expressing ideas and of giving people information". Exhibitions, conferences, work by science centres, media campaigns, etc. are to be considered as outreach and communication activities

1- What are the main characteristics of your organization/institution/agency?

Name of the organization/ institution/agency	
Type (public or private)	
Functions (funding agencies, think tanks, …)	
Size or significance (number of people employed by the institution for example)	
Targeted audience	
Others (please give some details)	

2- Has your organization/institution/agency developed or implemented strategies to address the communication of nanotechnology?
Yes ☐
No ☐
If yes, could you please tell us:

2.1- What specific issues your organization/institution/agency has focused on?

2.2- What approaches to communication of nanotechnology have you used?

1- Using experts in the science field	Yes ☐ No ☐ Why ? :
2- Using experts in the communication field	Yes ☐ No ☐ Why ? :
3- Involving experts from human and social sciences	Yes ☐ No ☐ Why ? :
4- Involving industry representatives	Yes ☐ No ☐ Why ? :
5- Others	Which (please specify)? Why ? :

3- Could you give us an idea of how much (in your national currency) your organization/institution/agency has spent on "nano-communication" activities over the past three years?

4- Are you aware of specific training programs for teachers and researchers that universities or high level education institutions in your country have introduced to support good practices in outreach related to nanotechnology?

Yes ☐
No ☐

Are there other approaches you are using to find or develop good "nano-communicators"?

Do you face shortages in finding effective "nano-communicators?

5- To what degree have companies been involved in promoting outreach on nanotechnology in collaboration with your organization/institution/agency? Please give some examples.

6- Based on your knowledge, what types of media have paid attention to nanotechnology? Please provide some ranking (to the extent possible), details and, if possible, some extracts (written press, radio, TV, Internet.)

TYPE OF MEDIA	RANK	DESCRIPTION	FREQUENCY
Specialized Web Sites			
Popular Web Sites (i.e. blogs, *etc.*)			
Broadcast Media (Radio/TV)			
Local Written Press			
Specialized Written Press			
National Written Press			
Other (please specify)			

7- Has the media's coverage of nanotechnology been typically positive, negative or neutral in tone? Please precise if you have had a study on this issue or if you just give, here, your personal feeling.

TYPE OF MEDIA	POSITIVE	NEUTRAL	NEGATIVE
Web Sites			
Broadcast Media (Radio/TV)			
Local Written Press			
Specialized Written Press			
National Written Press			
Other (please precise)			

8- Which type of issues have typically been raised by these independent media campaigns?

If possible, could you please give some details on :

8.1- What has typically been highlighted in the positive coverage of nanotechnology?

8.2- What has typically been highlighted in the negative coverage of nanotechnology?

8.3- Has the neutral coverage highlighted both positive and negative points or remained very broad (e.g. only highlighting technical issues)?

9. Based on your experience/the experience of your agency, please indicate a few key features of an effective communication activity in the field of nanotechnology?

II – PUBLIC ENGAGEMENT REGARDING NANOSCIENCE AND NANOTECHNOLOGY

Public engagement is a term that has recently been used to describe "the involvement of specialists listening to, developing their understanding of, and interacting with, non-specialists" (as defined by England's university funding agency, HEFCE, in 2006). Citizen juries, focus groups, town meetings, deliberative forums, and science cafes, dialogue opportunities and debates, etc. are typically processes.

1- Have any initiatives in the area of public engagement in nanotechnology been undertaken by your organization/institution/agency?

Yes ☐
No ☐

If yes, please list, as extensively as possible, these initiatives and provide additional information as indicated in the following table:

Scope of the initiative (national, regional, local, in a school, etc…)	Name of the initiative	Hosting institution	Form of the initiative (including the number of people involved)	Main stakeholders involved (as experts or directly involved in the delivery)	Targeted audience (students, citizens, women/men, children, etc…)

2- Please briefly describe the mains outcomes of these public engagement initiatives by your organization/institution/agency?

3. What have you and your organization learnt from public engagement processes that could be of particular interest to other countries?

4- Do you know if your awareness activities are visible in any other institutions or any other countries ?
Yes ☐
No ☐
If yes:

4.1 - What types of activities are visible?

4.2- In which institutions or countries are they visible ?

5- Do you know of any impact of your institutional communication and public engagement activities in other countries?
Yes ☐
No ☐
If so:

5.1-How could you describe this impact?

5.2- What types of activities have such an impact?

5.3- In which countries do they have such an impact?

6- Do you know of any activities by other countries which are visible in your institution or in your country?
Yes ☐
No ☐
If so

6.1- What activities ?

6.2- What countries ?

6.3- What impacts?

7- Could you describe the main motivations of institutions for organizing communication or public engagement activities around nanotechnology ?

8. Can you please provide the OECD secretariat with any studies on public engagement and public perceptions of nanotechnology you know?

9. Finally, are there any areas which are not covered in the questionnaire that you would like to tell us about ?

Many thanks for your help.