



EUROPEAN
COMMISSION

Community Research



Pro**GR**eSS

Minutes Kick-off Meeting

Scientific Part

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Proposal acronym:	Progress
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Name of the Coordinator:	Prof. Doris Schroeder (dschroeder@uclan.ac.uk)

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Scientific Sessions - 20 March 2013

Opening Speech

Ms Pilar Álvarez-Laso, Assistant Director-General,
Social and Human Sciences Sector, UNESCO

Speech added in full.



Dear Colleagues, Ladies and gentleman,

I would like to warmly welcome you to the Kick-off Meeting on Promoting Global Responsible Research and Social and Scientific Innovation. This project represents an important step forward in further advancing the concept of Responsible Research and Innovation in Europe and at the global level.

“The promotion of responsible research and innovation has been and continues to be a significant preoccupation for UNESCO.”

The promotion of responsible research and innovation has been and continues to be a significant preoccupation for UNESCO, especially within its actions in bioethics, ethics of science and technology and human rights. The pertinence and urgency of this concept, unsurprisingly, is most embedded in the Organization’s bioethical reflections, including in its most recent normative instrument within this field, the *Universal Declaration on Bioethics and Human Rights* of 2005. This is unsurprising because the logical and rational linkage between research and development in medicine and life sciences, to the health, bodily integrity and human dignity of the person and the community is readily accepted in the public imagination. This linkage is in no small way illustrated by numerous tragic instances in modern human history, which highlighted the adverse effects of irresponsible research in these fields on society, often resulting in gross violations of human rights.

In the past two decades, as technologies converge for increasingly complicated interventions, the public psyche has gradually expanded its awareness to include the impacts of other areas of scientific and social innovation on human life and human society. It is important to note at this point that innovation should not be viewed purely from the perspective of applicable scientific knowledge and technologies, but should also include innovations in both the governance and social processes related to science and technology, including the social sciences. In this sense, modern global society has evolved in such a way that scientific knowledge and technology now has a direct and evident impact in the everyday lives of human beings around the world, either in terms of enabling the realization of certain benefits and advantages, or the deepening of divides, discrimination and stigmatization between those that “have” and those that “have-not”. Science and technology is now a critical component in the complex environment of social organization and human welfare, with the power to shift the destinies of many one way or another.

Ladies and Gentlemen,

This is a compelling reason to consider the promotion of responsible research and innovation as critical for the future of humanity. The need to ensure ethically acceptable, sustainable and socially desirable innovation processes through interactive, transparent and mutually responsive mechanisms between societal actors and innovators forms the underlying motivation for our meeting this week. The project's purpose of identifying a framework for defining societal desirability is indeed timely, and I am heartened to note that one of the two common goods to be focused upon at this stage is health.

There are currently some 1.7 billion people having inadequate or no access to life-saving medicines, 80% of whom are living in developing countries. Furthermore, 95% of the global expenditure of health is directed at the disease problems of developed countries, and from the total world expenditure on health research by the public and private sectors, only 10% is devoted to the health problems of 90% of the world's population. These are stark realities that we all have to keep in mind when defining responsible research and societal desirability in health-related innovations. UNESCO, together with our colleagues in the World Health Organization, have been advocating for a more socially responsible and ethical global model in terms of health and life sciences research, and the outcomes of this project could potentially provide governments with a comprehensive governance tool to promote the aspirations of the human right to enjoy the highest attainable standard of health as a socially desirable goal. In this regard, I would also like to underscore the relevance of the principles enshrined in UNESCO's *Universal Declaration on Bioethics and Human Rights* to the purposes of this project. These consensus-based principles outline the fundamentals of a desired relationship between the sciences, especially life sciences, and society as a whole. They include outward-looking perspectives of how health-related scientific interventions and technologies should relate to the social good.



On the second common good of security, it is obvious that this must be conceived in a much broader sense than just physical and national security, and the holistic concept of human security could form a sound foundation upon which we build our reflections.

Responsible research and innovation should help secure the social, biological and environmental future of human civilization, including the eco-systems within which it exists and thrives. This aspect is not merely a societal desirability but also more importantly a survival necessity for the human race. More than just scientific and technological innovations, we would need to call upon social and governance innovations in order to effectively address some of the pressing security concerns plaguing human existence, such as climate change and food, water and security, just to name a few. Security in this sense is intricately linked with the capacity of innovations to ensure sustainable development of human societies.

Distinguished Colleagues,

A framework for defining societal desirability would go a very long way in guiding research and innovation towards outcomes that can improve human lives by tackling societal challenges. Indeed, many of these societal challenges are global by nature, and as a consequence, such a framework would have international implications. It is this characteristic of our collective work that I want to draw your attention to the imperative need to base our reflections on the human rights framework. Of course, the determination of societal desirability should draw from the constitutional values enshrined within each country, but we must also be careful not to slide into cultural relativism nor reinforce cultural impositions. This must and can only be accomplished by stressing that these constitutional values must not run counter to fundamental human rights, and should be subjected to constant ethical review. Even if consensus is not always possible, ethics can provide an adequate foundation for demands concerning accountability, responsibility and transparency of scientific work. There is no doubt that human rights are directly related to ethics because they are based on assumptions about what is good.

"The determination of societal desirability should draw from the constitutional values enshrined within each country, but we must also be careful not to slide into cultural relativism nor reinforce cultural impositions."

Whereas human rights are often discussed in the context of politics, ethics allow these constitutional values to be discussed at a distance from politics and in a much more critical manner. The ethical approach allows governments to constantly re-evaluate the human rights standard-setting process.



Progress and UNESCO co-hosted Kick-off Meeting - All delegates

Here, I would like to also recall the deliberations within the UN system on the right to enjoy the benefits of scientific progress and its applications, as elaborated in Article 27 of the Universal Declaration of Human Rights and Article 15 of the International Covenant on Economic, Social and Cultural Rights, which will be further developed during the second day by Dafna Feinholz. This often neglected right should be a pivotal obligation to be taken into consideration by all States when defining societal desirability within the context of responsible research and innovation. In order to implement this right, it has been emphasized that major decisions about policy priorities in the sciences should be made in consultation with the people and not only by experts or civil servants. There is also a need to make major changes in the way scientific practices are conducted, including the environment in which scientists operate. Scientists rarely regard their own work in terms of social responsibility. The reason is apparently that the criteria for scientific innovation, established by the scientific institutions, are usually based on a purely academic perspective. The Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications, stemming from an expert meeting co-organized by UNESCO in 2009, further stated that, and I quote:

“The relationship between human rights and science is further complicated by the fact that private and non-State actors are increasingly the principal producers of scientific progress and technological advances. It is the responsibility of States to ensure that all relevant interests are balanced, in the advance of scientific progress, in accordance with human rights.”

For example, major transnational pharmaceutical corporations have more resources than the governments in most developing countries. Majority of funds in the area of medicine are currently coming from the private sector, the research agenda is mainly profit-driven, rather than needs-based – it reduces incentives for innovation in these areas, and undermine the process of making science more responsive to people’s needs. In countries where the government’s role in identifying priority research areas, undertaking research, and disseminating the products of research has been reduced, the private sector’s influence has increased.

Ladies and Gentlemen,

It is obvious that the power of scientific and social innovation to directly impact the destinies of individuals and the collective welfare of global society hints at a branch of governance that is increasingly being shifted outside the competence of the State apparatus. While States remain the appropriate actors under international law, and are thus legally obligated to protect the human rights of their citizens, the increasingly transnational and privatized nature of scientific and social innovations also strongly suggests at the existence of an ethical responsibility of the custodians of scientific knowledge in this regard. In other words, there may already exist an implied ethical duty for non-State actors, such as private companies, professional organizations, NGOs and research institutes engaged in scientific and social innovations to ensure that not only the right to enjoy the benefits of scientific progress, but also all relevant human rights, are appropriately respected and advanced. This idea should be carefully explored and further elaborated in our collective work to define societal desirability.

Dear Colleagues,

Before closing, I would like to take this opportunity to thank the European Commission for funding this project under its 7th Framework Programme, to which UNESCO will certainly contribute in its advisory role.

I also wish you all a productive meeting, and look forward to hearing your reflections on the interesting issues to be discussed in the coming days.

Thank you.

Project Introduction

by Dr Karen Fabbri (KF),
European Commission and
Prof. Doris Schroeder (DS),
Centre for Professional
Ethics, Uclan, UK



DS introduced KF to the group, explaining that KF is the European Commission (EC) project officer for the ProGRess project. KF started by stating that it was a great pleasure to be present for the kick-off of the ProGRess project, a project that will address RRI in an international context. She commented on how fitting it was that the UNESCO should host the first meeting, given the international nature of the project. She noted that today marks the start of great new work between different institutions that are all committed to achieving a common good. She highlighted that a lot of work has already been undertaken to reach today's kick-off meeting, and that work on the proposal commenced more than a year ago. She emphasized that RRI is a concept which is still evolving and can mean different things to different people. On behalf of the EC she wished the ProGRess team a successful and enlightening workshop, and stated that she looked forward to taking part in the workshop.

Doris Schroeder (DS): Project Co-ordinator *Progress*, Uclan

Innovation has been placed at the heart of Europe 2020 as it provides the best means of successfully tackling major societal challenges.

European Commission to European Parliament on Innovation Union

DS explained the link between RRI and tackling major societal challenges. RRI aims to achieve (1) ethical acceptability, (2) sustainability and (3) societal desirability. Using innovation to tackle major societal challenges falls under the societal desirability criterion of RRI. All three criteria require a science literate public.

Responsible Research and Innovation



Ethical acceptability



Sustainability



Societal desirability

Science literate public

A variety of terms are used for societal desirability or related topics around the globe (e.g. broader impact, pro-poor innovation, bench-to-bedside). *Progress* is an international network, supported by a high-profile Advisory Board, which will undertake a major fact-finding mission on how societal desirability can be achieved through research funding and innovation policies. Case studies in the area of synthetic biology, nanotechnology and ICT will illuminate the work. DS ended by wishing the Paris participants a good collaboration.



Keynote

Pro-Poor Innovation

Prof. David Kaplan (**DK**), University of Cape Town,
South Africa



The term "pro-poor innovation" is used widely by international financial institutions, donors, academia, research organisations and business. Two related terms are "inclusive innovation" and "frugal innovation". The essence of the term is:

Innovation, which serves extreme affordability users.

As the share of poorer consumers in the market rises and emerging economies become stronger, pro-poor innovation is interesting to businesses as well. As a result the most innovative businesses are no longer found exclusively in the West. According to Business Week 2010, the majority of "most innovative companies" is now found in Asia. South – South Trade is also a growing phenomenon. The gains to the poor are:

- ▶ More appropriate products
- ▶ Better functioning products, attuned to the environment

The gains to the producers are:

- ▶ Cheaper labour for more employment intensive processes
- ▶ New firm entry for products that were not hitherto developed
- ▶ More dynamic firms

However, in most cases the market still fails the very poor and private-public partnerships and government funding for pro-poor innovation are required to mitigate complete market failure. Even this can be detrimental to the poor as in the case of GM innovation, which displaces small scale farmers in Kwa Zulu Natal, to give an example from South Africa.

- ▶ Identifying the needs of the poor is a vital first step
- ▶ Making the case for increasing public research support to meet the needs of the poor and marginalised
- ▶ Ensuring coherent governance for innovation is important with government departments working together

Summary of discussion following presentation by DK

FC thanked DK for a very interesting presentation, and asked him about the need for a 'filter' on knowledge transfer when bringing innovation to his part of the world. She asked if we needed to be careful in transferring knowledge. DK explained that transfer of knowledge can be a significant problem for poor consumers because they are often isolated from knowledge. DK rooted the issue in human rights – everyone has the right to education, and knowledge transfer, innovation and education are all inter-connected. He linked this part of the discussion to Pilar's opening comments about setting the scene for ProGRESS on a human rights foundation.

SC stated that recent papers have been published that show how South Africa has emerged as an actor in the high technology sector. SC asked why these pockets of high-end technological sector producers from the South were not taken into account in DK's presentation. He also asked about high-end products being exported to the North from the South. DK responded by highlighting that much is being produced that appears similar to products from the North, but that is actually designed for a different market. He pointed out that not all technology from the South is appropriate to the North.

On behalf of the group, DS thanked DK for his presentation.

Broad Impact of Innovation – An overview from the US

Kelly Laas (KL), Illinois Institute of Technology,
United States of America



At the outset, KL introduced the Center for the Study of Ethics in the Professions (CSEP) at the Illinois Institute of Technology:

- ▶ Interdisciplinary (philosophers, engineers, social scientists, etc.)
- ▶ The first center for ethics to focus on the professions
- ▶ Still one of the US's leading centers for practical and professional ethics
- ▶ Leading center for engineering ethics

She continued to talk about societal desirability and the broader impact criterion in the US. The majority of US Funding Agencies encourages socially desirable research through specific calls for proposals. However, one federal agency – the National Science Foundation (NSF) - requires social desirability as a component of all funded research. The Broader Impacts Criterion **encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes**. It has been used by the NSF to evaluate proposals since October 1997. It is one of two criteria on which funding decisions are based. The other one is intellectual merit.

The criterion is contentious. It is said to be confusingly vague, offering little guidance about the kinds of projects or activities that would fulfil this criterion. Some scientists argue that it is a waste of time and funding, as scientists often do not have the background to design adequate activities that address broader impacts –especially in areas of education and public outreach. Assessment of broader impact activities has also proved to be problematic, as conventional peer review is not up to the task of ensuring adequate judgements about social impact, and currently the NSF has no standardized way of assessing the success of broader impact activities after a project has been completed. Instead, they rely on proposers to develop their own assessment measures and report back their results. NSF has sought to address these criticisms since 1997 and from 2010-2012 has been revising how it requires proposers to address broader impacts in research and how the merit review criteria are used in evaluating proposals.

“The weakness of the Broader Impacts criterion is [that] it is mysterious to people; it is not understood by principal investigators, prospective principal investigators, or panelists.”

IIT will undertake further work on how the societal desirability criterion is realised in US funding, both at the NSF and other U.S. funding agencies, and by private philanthropic organizations who fund research and innovation.

Summary of discussion following presentation by KL

DS clarified for the group that the ProGRESS project will look at funding policies as well as innovation policies.

Ahmed Fahmi (AF, UNESCO) asked KL whether she could shed some light on the dynamics between the major NGOs in the US that support a large amount of science research that is related to societal desirability. He asked whether there is any coordination between them and some of the funding bodies in the US. KL informed the group that this is an area in which she is hoping to undertake more research. She has already done some work reviewing the different criteria used by NGOs such as the 'Gates Foundation', but that this area needs more exploration. To this, DS added that the major difference between the Gates Foundation and the NSF is that the Gates Foundation addresses societal impact mainly through calls for proposals and tends to stipulate very specific requirements and specific goals to achieve.

Stephan Lingner (SL) argued that the 'broad impact' criteria need to be defined more clearly. Additionally, he suggested that we should maybe also make allowances for some 'blue sky research', which, although it can be perceived as lacking defined aims, can nevertheless facilitate a greater degree of creativity. We therefore should not forget about this more 'basic' approach to research. DS added that physicists and astronomers would struggle most with the 'broad impact' criteria.

Michael Davis (MD) discussed the 'broad impact' criteria in the context of engineering. He advised that to engineers it is always very important that their work has a broader impact. MD told the group how the NSF is now intending to also review large projects after their completion, in order to ascertain whether they have succeeded in achieving what they set out to do - the best way in which to measure success is currently being reviewed. It is therefore important not only to consider criteria to apply when investigators are proposing research (initial assessment) but also to consider criteria to apply during the final assessment of project outcomes. There are also ways in which investigators can work with organisations during the research – this would be deemed formative assessment. DS informed the group that some funders are already assessing final outcomes, for example the Wellcome Trust now assess whether research projects have delivered on their goals. Projects funded by the European Commission are also monitored closely with regards to their 'deliverables'. DS asked whether there is a tendency in the US to fund only a few larger projects rather than many smaller projects. MD advised that the size of projects that are funded varies.

Robert Terry (RT) stated that the area of monitoring and evaluation of research projects is not new, but is attracting a lot of interest at present. It can be difficult because time frames for outcomes of research can be varied and often long. For example, it can take a long time for the results of basic scientific research to have an impact on real life problems – the lag time is typically 17 – 20 years. During the set-up phase of projects, it is possible to predict impact to a certain extent but this can still be a real challenge. In the UK there has been a study on the return in perpetuity of cardiac research funding. It has been found that the research produces a 39% return on the original funding. DS suggested that even slightly inefficient funding is better than no funding at all in areas of market failure.

John Weckert (JW) provided an Australian perspective on the topic. He described how there are two basic types of funding provided by the Australian Research Council. One type of funding is for 'blue sky research' and for this work, especially for scientists, it can be quite difficult to demonstrate social impact. Additionally, some scientists may argue that it is not their responsibility to do this. The other type of funding is for grants that are linked to industry, for which a joint proposal is submitted with the involvement of at least one industry partner. In these cases it is much easier to state the predicted impacts on industry, but the broader social impacts are still often not clear. JW emphasized that an ability to specify impact generally is different from an ability to identify specific social goals and outcomes arising from the research. The speaker, KL agreed with this point, highlighting that there are different types of impacts. She explained that there is often a divide of opinion between those who view the scientific knowledge generated as a sufficient social good in itself and those who argue that there is still a need to focus on the broader impacts (societal goods).

DS provided a British perspective on the topic. She explained how, in the British system, there is now a requirement for research to demonstrate impact outside of both academia and education [Research Excellence Framework], and therefore in this context collaboration with industry partners could be considered highly.

David Kaplan (DK) talked about the phrase 'advancing knowledge' and how it should not be narrowly defined. He suggested that, if research findings will have implications for other cognate fields, then this demonstrates the broader applicability of the research, which is one step of the way towards demonstrating broader impact. KL agreed that it is recognized that research findings should have a wider impact beyond their own discipline. However, she classed this as 'intellectual merit' rather than 'impact' per se. MD and DK queried whether this in fact should be deemed 'impact'.

DS thanked KL for her presentation on behalf of the group.

Guiding Funding to Address Grand Challenges – The Wellcome Trust

Paul Woodgate (PW), The Wellcome Trust, England



The Wellcome Trust is an independent, global charitable foundation dedicated to achieving **extraordinary improvements in human and animal health**. The foundation was set up in 1936 by Sir Henry Wellcome and is currently worth around 15 billion pounds, of which approximately 700 million pounds are spent yearly. Five strategic challenges are:

- ▶ Maximising the health benefits of genetics and genomics
- ▶ Understanding the brain
- ▶ Combating infectious diseases

- ▶ Investigating development, ageing and chronic disease
- ▶ Connecting environment, nutrition and health

Assessment criteria of the Trust are:

- ▶ The track record of the candidate
- ▶ The quality and importance of the research question
- ▶ The approach to solving these questions
- ▶ The suitability of the research environment
- ▶ How the proposed research addresses our Strategic Challenges

Strategic funding is used for large-scale collaborative projects, centres, or themed initiatives, of which the Wellcome Trust Sanger Institute near Cambridge is an example or the Major Overseas Programmes for global health in Kenya, Malawi, South Africa, Thailand, Vietnam, and Laos.

For more information on the Wellcome Trust and its funding opportunities, please see:

www.wellcome.ac.uk.

Guiding Funding to Address Grand Challenges – The World Health Organization

Robert Terry (RT), WHO, Switzerland



The World Health Organization provides leadership on global health matters on behalf of 194 countries, administered through 100+ country offices. RT's unit is heavily involved in the global debate on intellectual property (IP), public health and innovation. To improve access to medicine in low income countries, local production is supported. At the same time, the unit develops and disseminates good practice for health priority setting and runs a program on the social determinants of health.

IP, public health and innovation

The gap between market provision of pharmaceuticals and access for the poor has been debated for more than 10 years. New thinking is required to promote and support R&D where there is no market. Improvements are needed in (a) mapping health research and development, (b) identifying coordination mechanisms between the different actors (public, private, philanthropy etc.), (c) finding new ways to promote priorities and (d) examining new forms of incentive and funding mechanisms such as prizes, milestone awards, pooled funding, and open innovation. More information is available at:

<http://www.who.int/phi/en/>.

Good practice for health priority setting

Nine common themes of good practice were introduced by RT, relevant to (1) context, (2) comprehensive approach, (3) inclusiveness, (4) information gathering, (5) planning for implementation, (6) criteria, (7) methods for deciding priorities, (8) evaluation and (9) transparency). An open access paper is available at:

<http://www.health-policy-systems.com/content/8/1/36>

Social determinants of health

The WHO invited Heads of Governments, Ministers and government representatives to agree the Rio Political Declaration on Social Determinants of Health on 21 October 2011. The declaration can be downloaded at:

<http://www.who.int/sdhconference/declaration/en/>

A future meeting of *Progress* will be co-hosted by the WHO in Geneva.

Summary of discussion following presentations by PW and RT

MD asked PW how the Wellcome Trust knows whether it is succeeding in assessing the societal impact of research, especially in areas in which this is less obvious (such as 'history of medicine' grants, for example). PW responded by providing an overview of two ways in which the Wellcome Trust tries to address this. Firstly, the Trust keeps in contact with researchers during the course of their work. Secondly, the Trust insists on being provided with a written report at the end of the funding period. This report should state what has been undertaken, and includes not only the publications that have arisen but also the potential influences on policy and practice in a particular field if appropriate. The Wellcome Trust acknowledges that it is not always possible to measure these impacts, but it is continuously reflecting on how best to do so when appropriate. Generally, overall impact is best measured by publications and outputs.

DK addressed RT, asking for his opinion on the topic of conflict between industry objectives and health objectives when medicines (e.g. HIV drugs) are manufactured locally in developing countries. A health ministry will inevitably want to obtain supply at the cheapest rate – which then leads towards importation rather than development of local capacity – whereas for local industry it is better for drugs to be manufactured locally. RT agreed that this is an issue with which the WHO is currently grappling. He described how in some African countries, for example, it has often been found that there are huge political drivers to create a national pharmaceutical company, but that the public health impact has been assumed and not measured. There is little benefit to be gained in supporting local industry if health needs are not addressed. For example, in the case of local manufacture of drugs, it is essential to also consider whether a regulatory authority needs to be set up. There is very rarely a single solution to an issue.

Karen Fabbri (KF) posed a question to both PW and RT on the topic of public engagement. She asked whether they had examples or case studies that clearly showed the added benefit of launching public engagement programmes. Is this assessed after the grants are given? PW provided the perspective of the Wellcome Trust on this. He explained that most of their public engagement funding tends to be related to smaller scale projects (for example putting on an exhibition or producing a film or TV programme), rather than broader engagement of

the public in policy-making. It is easier to measure public engagement within smaller scale projects, for example by measuring the number of people who tuned into a TV programme or who attended an exhibition.

RT provided a WHO perspective, commenting that public engagement is an area ripe for research. He provided three examples from the UK of significant benefits gained from public engagement in research. Firstly, the UK Alzheimer's Society made the decision to include members of the public on scientific review panels. This has led to a shift in research priorities, from basic science, and finding a cure, to issues around mental health and support for carers of Alzheimer's sufferers. Secondly, large-scale research on diet involved many members of the public over time and this was only able to be achieved due to the significant amount of public engagement work undertaken. Finally, health technology assessment boards that make decisions about the costs and benefits to society of potential interventions and / or drugs now often include members of the public. However, there has been published work that emphasizes the need to provide support to lay members on review boards, in order to enable them to engage with and add value to the process. It is also important that the language used is consistent and appropriate for non-expert members: in the example of the Alzheimer's Society, it has been observed that this has forced scientists to express themselves in lay language, and this has actually had the added benefit of enabling better communication between different scientific disciplines, in addition to better communication with lay members. RT concluded by suggesting that public engagement does need further investigation, and, in particular, more documented examples of good results achieved from involving non-expert, public members in research.

On behalf of the group, DS thanked PW and RT for their presentations.

Innovation in the Twelfth Five-Year Plan China

Dr Han Bing (**HB**) and Dr Li Guoxue (**LG**), Chinese Academy of Social Sciences, China



China started planning its economic progress through Five-Year Plans in 1953. The plans outline key economic and social development targets. The Twelfth Five-Year Plan was approved for 2011-2015 aiming to build "a well-off society in all aspects". Innovation runs as a thread through the entire plan, which includes:

- ▶ A strategy of rejuvenating the country (science education) and improving domestic capabilities in research and innovation in science, technology and administration

- ▶ The promotion of industrial upgrading by focusing funding on industrial core competitiveness
- ▶ Support for innovation policies and basic science

The implementation plan of the Twelfth Five-Year Plan puts special emphasis on the improvement of the general public's living standard. With the plan, China aims to transform from a manufacturer nation into a science and technology innovator nation in order to solve issues in economic and social development.

LG emphasized that both sustainability and ethical desirability are important for innovation, in addition to a focus on societal goals.

On behalf of the group, DS thanked HB and LG for their presentations.

Integrating Science with Societal Concerns in India

Dr Sachin Chaturvedi (SC), RIS, India



Science and Technology Policy Statements (STPS) are the main policy tools in India for providing technology policy objectives and approaches. Past Science & Technology (S&T) policies in India were driven by efforts to satisfy basic needs, achieve national security and self reliance and increase the application of scientific solutions.

The new 2013 Science, Technology & Innovation Policy stresses the promotion of scientific thinking across all sections of society, making careers in science, research and innovation more attractive and establishing a world-class science and technology infrastructure to position India among global science leaders by 2020. To achieve the ambition of the policy, some specific aims are:

- ▶ To develop new products for Indian specific needs and conditions
- ▶ To find new ways of providing services and novel processes of combining product availability
- ▶ To combine more than one technology in product/service development (e.g. use of ICT in medicine)
- ▶ To develop new technologies for old problems (e.g. nanotechnology in water purification)

"The overwhelming success of Indian dairy cooperatives is due to innovations in both production management and organizational structure."

An example of affordable, context specific innovations is a combined Smartphone and scanner to enable illiterate users to use cash machines. As well as focusing on the delivery of locally developed innovations, India is increasing its bilateral collaborations, in particular with Brazil.

On behalf of the group, DS thanked SC for his presentation.

Summary of discussion following presentations by HB / LG and SC

KF commented that SC's presentation provided an interesting and useful overview of what is happening elsewhere around the world. She described how, whilst innovation by the 'big players' such as key institutions is often discussed, much innovation also happens on a much smaller scale, even on an individual level. She asked whether any of the innovation policies presented cover small scale innovations by individuals and how these might be brought into innovation actions. SC acknowledged that this is an important point. He provided an example of a joint proposal between the Indian government and farmers that considered ways in which to provide new technology to farmers.

Emilio Mordini (EM) commented that SC had not mentioned two developments that are key contributions to innovations from India: biometrics and research on cyber security. Cyber security is one of the main areas in which India is progressing. EM asked whether it was a policy decision not to mention this. SC clarified that there was no specific reason for not mentioning this – it was not a deliberate omission. He stated that India has undertaken several rounds of policy debates on the topic of biometrics, as there are many issues with this.

Rene von Schomberg (RvS) observed that many countries have 5 – 7 year funding plans and carry out many long consultation processes to determine the priorities for funding, and yet time after time the priorities appear to be very similar. He observed that similar language is used across countries but different outcomes arise from the processes. It appears that countries collaborate and compete at the same time, but it is poorly understood why and how this happens. He asked the group, how Europeans could learn more from non-European countries such as India and China? Han Bing (HB) suggested that there may be stronger collaborations with China in 10 years from now after economic growth has increased even more. At present in China the focus is on economic development.

RT asked whether, for innovation policies, China or India have considered how they might utilise the networks of Chinese / Indian nationals living and working overseas. SC gave one example of this: the 2011 Indian government provided a special fund for scientists who were returning to India.

RS (Ravi Srinivas) asked whether there was coherence between the policies for the long-term Chinese planning and the 5-year plan for innovation. HB explained that both policies are developed by the Chinese government and aligned with each other.

Miltos Ladikas (ML) commented that the driving value behind Chinese science policy seems to be the desire to be a world leader, and asked about the values system underpinning science policy in China. HB explained that a key value behind Chinese policy is the aim to

build a harmonious society. However, she would need to reflect upon this question in order to provide a more detailed answer.

What is Responsible Research and Innovation?

Dr Karen Fabbri (KF), European Commission

Dr Dr Rene von Schomberg (RvS), European Commission



KF's speech in full:

Horizon 2020 supports in particular the resolution of grand societal challenges that the Union intends to address between 2014 and 2020. Just to quote a few: health, food security, transport, climate change, etc. These are all very concrete concerns for European citizens.

It is good therefore to know that there will be money for investigating the way to tackle these challenges. But money alone may not be sufficient.

1. How can we ensure that outcomes resulting from Research and Innovation will be adequate for society in the long run?
2. How can we be sure that solutions to the societal challenges based on Research and Innovation will correspond to the needs of the various societal actors and will not be rejected?

Since 2000, the Commission has been funding research activities to answer these questions. I will summarize the findings of a decade of research in three short statements:

- Betting on 'technology acceptance' by way of good marketing only, is no longer a valid option;
- Diversity in Research and Innovation is a must for achieving greater creativity and promoting better results;
- Early and continuous iterative engagement of society in Research and Innovation is key to innovation adequacy and acceptability.

In practical terms, all societal actors should work together during the whole Research and Innovation process in order to align both the process and its outcomes with the values, needs and expectations of European Society. This is what we term Responsible Research and Innovation.

Since 2010 the focus of our EU Science in Society activities

“All societal actors should work together during the whole Research and Innovation process in order to align both the process and its outcomes with the values, needs and expectations of European Society. This is what we term RRI.”

has been to develop a governance framework for Responsible Research and Innovation. The time has now come to make the Responsible Research and Innovation concept operational in Europe. This framework, translated for the first time in the Science and Society work programme 2012 will be pursued with even more strength in 2013 and later on in Horizon 2020, as well as in the European Research Area.

In practice, RRI is a package aiming to better engage society in Research and Innovation activities. RRI has itself become a field of experimentation and innovation exploring 6 keys: societal engagement, gender equality and gender in the research and innovation content, open access, science education, ethics and governance.

1. Societal engagement

The joint engagement of all societal actors (researchers, civil society, industry and policy-makers) is the main action line. Research activities that have been funded by the Science in Society programme show that societal challenges can only be solved by involving all the actors at an early stage. Innovation must be developed in a co-building mode in order to ensure trust and co-responsibility between actors.

I would like to mention that a special public engagement initiative has just been launched for the preparation of Horizon 2020. This is the VOICES pilot initiative which has invited citizens from all Member States to define Research and Innovation priorities for the first call for proposals related to the Societal Challenges of Horizon 2020, more precisely on urban waste.

2. Gender in Research and Innovation

Engaging society means ensuring that all actors – men and women – are on board. Gender equality must be upheld in research and innovation institutions, and the gender dimension must be integrated in the research and innovation content. Not doing so would result in a waste of talent and in a missed opportunity to improve the scientific quality and societal relevance of the produced knowledge, technology and innovation. In Horizon 2020 we will address gender by achieving a better gender balance in all Horizon 2020 evaluation panels and expert groups. We will also strengthen the monitoring of Gender activities and ensuring gender expertise of all actors involved in Horizon 2020.

3. Open Access

Fluidity of information is another important element in the ERA [European Research Area]. Scientific results must circulate freely and be easily accessible. This is why we promote Open Access. This means giving free online access to the results of publicly-funded research (publications, data, etc.).

Not only will this boost innovation, it will contribute to creating the transparency needed between actors. The European Commission is committed to making Open access to publications a general principle of Horizon 2020 and has also recommended that Member States take a similar approach to the results of research funded under their national programmes. The Commission will also set up a pilot scheme on open access to data in selected areas of Horizon 2020, taking into due account issues related to privacy, intellectual property, legitimate commercial interests of beneficiaries and security concerns.

4. Ethics

European society is based on shared values. In order to respond to societal challenges, research and innovation must be anchored to the highest ethical standards and fundamental rights. In Responsible Research and Innovation, this is a sine qua non condition for high quality results and impact. Horizon 2020 will therefore ensure that research ethics plays an important role. Furthermore, under Horizon 2020 we will seek active cooperation with relevant national and international ethics bodies, and we will support dedicated ethics training and education for the research community and in all appropriate levels of education.

5. Science Education

Engaging society also means that society is scientifically literate. Democracy is a consensus between able and willing people. Thus (formal and informal) science education is the foundation of RRI. It is important for Europe to increase the number of researchers, but it is also crucial, through education, to equip future researchers and other societal actors with the necessary knowledge and tools to fully participate in and take responsibility for the research and innovation process. The development of new tools for formal and informal science education will be supported via project funding in Horizon 2020.

6. Governance

The last dimension that should be considered is the umbrella for all the others: it is Governance. Through this action line we want to develop effective and efficient governance models for Responsible Research and Innovation and spread good governance practices. A specific toolkit will be developed for training, notably among the beneficiaries of Horizon 2020, in order to mainstream good practices.

I wish you all very fruitful discussions here at the workshop and thank you for your attention.

KF also added that given the complexity of running FP7 projects, she would encourage all partners to support the Co-ordinator in delivering finance and management reports as well the contractual deliverables on time.

On behalf of the group, DS thanked KF for her presentation.

Summary of discussion following presentation by KF

DS added to KF's presentation, emphasizing that the ProGReSS project is being undertaken early on in the evolution of RRI as a global concept, and that we are therefore in the exciting position of being able to frame what happens in the future in the field of RRI, together with other projects. RRI is an evolving paradigm and we are in a position to shape it, she said. Health and security, two key components of the ProGReSS project, are global concerns and therefore collaborative work on these areas is important.

David Coles (DC) asked KF how the EC will ensure the sustainability of data that has been collected during the ProGReSS project and during other similar projects, as often a lot of resources are spent in collecting data but it can then be lost once the project has ended. KF agreed that this is true, and applies to policy documents as well as to research projects. She

emphasized that, whilst she does not have a solution, she does recognise it as an issue. She raised the question of whether 'Open Access' principles could not only be applied to publications, but also to data (when appropriate), and that this is an idea that may be investigated in the future, in order to enable data to be made available from one project to another.

DK asked whether the concept of pro-poor topics are included in any of the six criteria described by KF, and how it fits with the definition of RRI. KF explained that 'pro-poor' terminology is currently not specifically used, but could potentially be used in the future. She viewed pro-poor innovation as most likely fitting with the 'societal engagement' component, and perhaps also with the 'ethical acceptability' component. DS added that published work on 'grand challenges' has included poverty and unemployment within these challenges and so if these are addressed then pro-poor topics will be addressed.

RvS added that public values can be seen as drivers for innovation. And here one could find the value of solidarity in the main European treaty. Solidarity would then be an anchor point to link grand challenges with innovation.

Rene von Schomberg focussed on the challenges for Responsible Research and Innovation at the global level. Responsible innovation includes a new state responsibility to achieve socially desirable outcomes of innovation processes, correcting and going beyond what 'markets' can deliver naturally. This requires mutual responsiveness among state and non-state actors at the global level. RvS discussed the following three challenges:

1. How to achieve that research and innovation are driven by broadly shared public values (though ethical standards at the global level may diverge, and one cannot assume, but has to look for consensus on the "Grand challenges" of our times).
2. How to institutionalize further foresight and technology assessment methodologies and give "ethics" a driving rather than a constraining role in innovation (a potential new role for the Global Research Council and/or the UNESCO?).
3. How to address potential discrepancies between establishing 'credible science' at the global level (including open access policies and ensuring scientific integrity) and responsible innovation through developing common standards and identifying drivers for innovation towards internationally agreed public goods.

For more info and more challenges see <http://renevonschomberg.wordpress.com>

On behalf of the group, DS thanked RvS for his presentation.

Summary of discussion following presentation by RvS

DS commented that she was glad that RvS had made the global nature of RRI clear, and emphasized that it is not a concept that is exclusive to Europe. A discussion then ensued about the best way in which to define 'innovation'. MD asked whether 'innovation' actually refers to 'technological innovation', and raised this as an issue because 'innovation' itself means 'new things' and many scientists would describe their scientific theories as innovations. DS clarified that, from her perspective, the concept of 'innovation' should not be restrictive, as service innovation is a large area and yet might not fall within the category of

'technological innovation'. RvS agreed with this, acknowledging that, whilst the main innovations that pose a problem to RRI are technological, not all innovations are necessarily technologically driven. DS summarised the debate by stating that the concept of 'innovation' within the ProGRESS project should be broadly understood, and that to create a formal definition at this stage is too difficult to do.

The debate continued, moving onto the relationship between technology and innovation. MD pointed out that it may be problematic to translate the concept of 'technology' from Europe to the US, as in the US 'services' would automatically be included as 'technology'. RvS explained how, in modern market economies, innovation has been conceptualised as fundamentally 'good' and the products of innovation conceptualised as necessarily better than those which they replace. He felt that innovation should be viewed as 'steer-less', emphasizing that it is not always possible to predict technological outcomes. DK added his expertise in innovation to the discussion. He reinforced the idea that the term 'innovation' is not confined to manufactured products. For example, the development of new ways in which to deliver public services is innovation. In addition, there can be innovation in management practices, in both the public and private sector. His opinion was that the ProGRESS team should try to keep the definition of 'innovation' as broad as possible at present.

DK raised the issue of the transferability of the concept of RRI, given that it has been developed in Europe and yet the ProGRESS project is intending to apply it to countries outside of Europe. He pointed out that the concept of RRI may be viewed differently in other countries, such as the US, and in the developing world, and thus transferring the concept may be awkward. DS addressed this issue, describing how the work already undertaken on the ProGRESS proposal has revealed that the societal desirability element of the concept appears to exist widely, and appears to be well developed in some countries, such as India and China. She explained that part of the ProGRESS work is to find out what is being done in other countries and to establish whether the 'spirit' of the concept exists elsewhere. She emphasized that the aim is NOT to attempt to 'sell' non-Europeans a new, European concept. RvS agreed that some concepts are not very transferable, for example 'sustainability' and 'multi-functional farming'. However, he suggested that it would not be a problem if a non-European country were to rename the RRI concept, whilst maintaining its meaning. Additionally, he pointed out that some of the issues that RRI attempts to address can actually sometimes be better addressed outside of Europe.

Francesca Cavallaro (FC) asked the panel about the best ways in which to try to embed the values of RRI within innovation. KF suggested that one way forward is to provide concrete examples of occasions on which the implementation of RRI principles has led to better outcomes. She argued that, if these examples are sufficiently convincing, then it may be possible to use them to guide policy decisions in favour of RRI. Without a good number of convincing cases, it is difficult to make progress. She added that any measure that is seen to increase administrative burden will be viewed as detrimental to innovation and therefore it is important that RRI measures are not seen to be slowing down innovation.

Finally, RvS emphasized to the group that the 'grand challenges' offer the opportunity for international collaboration, with the implicit agreement that working together is essential for addressing these challenges. DS finished the discussion by highlighting the fact that the

UNESCO is promoting international collaboration and solidarity – in addition to being the spirit of the UNESCO enterprise, this is also the spirit of the ProGRESS project.

Responsible Innovation at the NWO

Dr Jasper Roodenburg (**JR**), The Netherlands Organisation for Scientific Research, The Netherlands



JR introduced an ambitious program from the Netherlands Organisation for Scientific Research NWO. The program has five main aims:

1. To be proactive and interdisciplinary
All funded research must combine the three major disciplinary strands of Humanities (ethics, philosophy, etc.), Social Sciences (law, psychology, economics, etc.) and Engineering/Medical Sciences. The program's objective is to help ensure that technological and scientific advances become properly embedded in society. To this end the funded projects not only result in scholarly analysis and an understanding of a particular problem, but subsequently also lead to a 'design perspective'.
2. To valorise all research and to use co-programming
All proposals must add the outcome of a debate with a valorisation panel, involving relevant stakeholders including the end users. If funded, the valorisation panel will accompany the project. The research agenda of the overall program is developed in collaboration with external partners (e.g. ministries, the private sector), which is known as co-programming.
3. To achieve societal relevance
Societal relevance is achieved through a call-based system with specific topics, e.g. Virtual reality (cyber bullying) or Healthcare sector (telecare at home). The societal relevance is assessed by the Societal Panel next to the assessment of the scientific quality by the Advisory Board.
4. To achieve an international dimension
The program emphatically involves innovation projects in other countries or parts of the world, in particular in developing countries.
5. To bring together a Responsible Innovation Community
Those in receipt of a grant are enabled to meet on an annual basis. An international conference is organised each year.

For more information on the program see:

<http://www.nwo.nl/en/research-and-results/programmes/responsible+innovation>

For more information on the annual conference see:

<http://www.responsible-innovation.nl/>

On behalf of the group, DS thanked JR for his presentation.

Summary of discussion following presentation by JR

ML started the discussion by asking JR how the review process works in reality, in particular whether the 'societal relevance' review panel has ever rejected a project that has an excellent scientific base but is lacking in societal relevance. JR agreed that it is possible to have a project that has great scientific rigour but poor societal relevance, and vice versa. He stated that such projects have been turned down in the past. He emphasized that the role of this panel is to ensure that the questions being addressed are also relevant to societal issues, and that this is independent of evaluation of scientific rigour (which is reviewed by a different panel).

PW asked about the typical backgrounds of members of the panel for reviewing societal relevance. JR explained that the make-up of the panel varies according to the nature of the project, and members may be from a variety of backgrounds including industry and non-governmental organizations. The crucial factor is that the panel is made up of people who are not related to the research itself in any way. PW clarified whether this meant that the panel does not typically include academic peers, and JR confirmed that this is correct and the panel specifically does not include scientists.

RT asked about the multi-disciplinary nature of the research supported by the NWO: given that it is often difficult to know who the key contacts are in different disciplines, how are these innovative multi-disciplinary synergies typically created? Are the researchers expected to form them themselves? JR explained that the NWO hold 'match-making' events for specific calls: for example, workshops may be held in which engineers present their work and proposals to an audience consisting of researchers from the social sciences and humanities. Different disciplines are therefore brought together. The hope of the NWO is that, with many more responsible innovations now being developed, the multi-disciplinary and responsible aspects of research proposals become second nature to researchers.

MD reflected that JR was describing research programmes that are 'mission-specific', and wondered whether the principles and processes described could be applied to research that is not mission-specific, such as to the work of physicists and astronomers in which knowledge is produced that may be interesting but not necessarily immediately 'useful'. JR confirmed that at present their programme has not been applied to these groups of researchers, as at present it is essential for researchers to demonstrate how their potential results may lead to benefit for society. However, it is something which the NWO could potentially consider.

Finally, KF asked whether the societal relevance panel uses specific criteria to assess whether proposals will be desirable for society. JR confirmed that the NWO does use specific criteria to assess societal relevance. However, the criteria are not fixed and can vary by round depending on the call. One example of a criterion used is the involvement of relevant end-users in the research.

Research and Innovation for the Global Common Good And for a Sustainable Transformation of Societies

Dr Philippe Queau, UNESCO Director of Ethics and Global Change



TO BE ADDED IN FULL

Day 2

21 March 2013



chaired by Dr Milto Ladikas

The Right to Access to the Fruits of Science

Dr Dafna-Feinholz, UNESCO, Chief of Bioethics



Julian Huxley, the first Director-General of UNESCO, pointed out that, in order to make science contribute to peace, security and human welfare, it was necessary to relate the applications of science to a scale of values. In UNESCO's mandate, science is not regarded as an end in itself but as a means towards the development of nations and the resolution of global problems such as poverty, environmental degradation. Due to its specialized mandate within the United Nations the UNESCO is strategically positioned to promote a global ethics framework for science and technology. In this context, the UNESCO has developed three instruments.

- ▶ The Universal Declaration on the Human Genome and Human Rights (1997, endorsed by the UN General Assembly in 1998)
- ▶ The International Declaration on Human Genetic Data (2003)
- ▶ The Universal Declaration on Bioethics and Human Rights (2005)

One of the aims of the Universal Declaration on Bioethics and Human Rights is "to recognize the importance of freedom of scientific research and the benefits derived from scientific and technological developments, while stressing the need for such research and developments to occur within the framework of ethical principles set out in this Declaration and to respect human dignity, human rights and fundamental freedoms".

Art 15 on the Sharing of Benefits is especially relevant for *Progress*:

Benefits resulting from any scientific research and its applications should be shared with society as a whole and within the international community, in particular with developing countries.

The "benefits" of science encompass not only scientific results and outcomes but also the scientific process, its methodologies and tools. In 2012, future actions identified by the Special Rapporteur in the field of cultural rights were identified as follows:

- ▶ A participatory process must be adopted to further enhance the conceptual clarity of the right to science and related obligations
- ▶ National mapping of existing practices must be undertaken, possibly under the collaborative leadership of UNESCO and WIPO.
- ▶ In particular, compilations of good practice should be elaborated on

On behalf of the group, ML thanked DF for her presentation.

Cases Workshop Synthetic Biology

Dr Margret Engelhard, European Academy, Germany

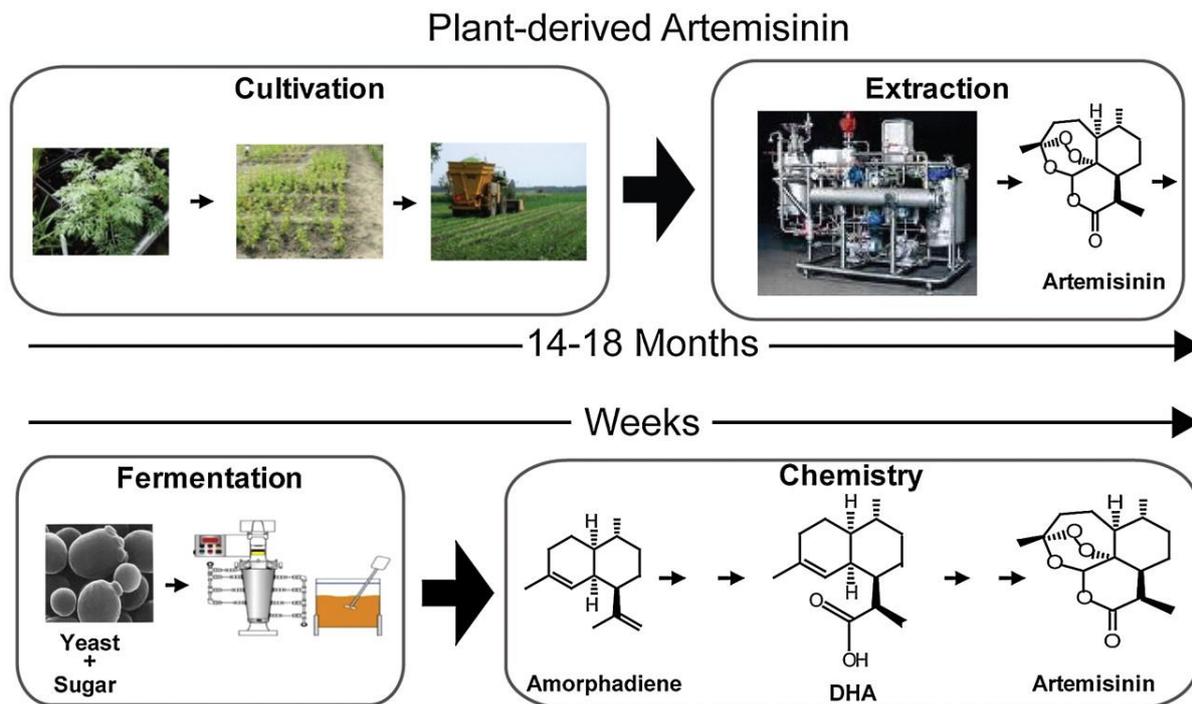


There is no commonly accepted definition of "synthetic biology". However some core characteristics can be described:

- ▶ Synthetic biology is the engineering of biology
- ▶ Synthetic biology is an enabling technology
- ▶ Synthetic biology goes far beyond genetic engineering

Ethical discussion on synthetic biology started very early. Although many ethical conflicts are not specific to synthetic biology and are also found in genetic engineering, cloning etc., they need to be specified for synthetic biology. Debates centre around physical risks, dual use dilemma, social justice and creating life.

An often cited example of synthetic biology is Artemisinin, a drug against malaria. Traditionally, the pharmaceutical industry sources natural Artemisinin from thousands of small farmers, primarily in China, Vietnam, Kenya, Tanzania, Uganda, Madagascar and India. Supported by a \$42.5 million grant from the Bill & Melinda Gates Foundation, researchers engineered the metabolic pathway, which comprised 12 new synthetic genetic parts. The production is due to start in 2013.



Source: Westfall P J et al. PNAS 2012;109:655-656

Artemisinin is a good example for ethical analysis:

- | | |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pro | Better accessibility of malaria drugs, because production is hoped to be cheaper
No shortage of Artemisinin in case of crop failure |
| Con | Only a small number of companies will gain the benefit of the genetic resources
Artemisia producers will lose a source of income
Risk of unintended release: synthetic organisms cannot be retrieved |

Cases Workshop Nanotechnology

Prof. John Weckert (JW), CAPPE, Australia



Nanotechnology is the manipulation of matter at the molecular level. Nanotechnology is an enabling technology. JW explained the difference between Reactive and Proactive Ethics.

- ▶ Reactive Ethics
 - reacts to problems as they arise
 - new technologies create new situations for which there are no policies
- ▶ Proactive Ethics
 - Anticipates problems
 - Makes predictions
 - Foresight

“When we consider materials at the nanoscale we can detect novel properties, and it is this novelty that makes nanotechnology research so exciting to researchers and is driving new technology and manufacturing opportunities in all areas of science.”
Australian Academy of Science 2012

The main ethical issues are:

- ▶ Nanoparticles and risk (e.g. nanoparticles in soil can affect plant growth)
- ▶ Monitoring and surveillance possibilities (e.g. threats to privacy)
- ▶ Human enhancement (e.g. cognitive enhancement)
- ▶ Military uses (e.g. insects with sensor or explosive implants)
- ▶ The nano-divide

Some big questions are: What is human well-being? And how can nanotechnology be harnessed to help achieve it fairly?

On behalf of the group, ML thanked ME and JW for their presentations.

Summary of discussion following presentations by ME and JW

Before the floor was opened for questions, ME emphasized that, whilst many ethical reports on potential outcomes from the field of synthetic biology already exist, these reports are often disconnected from the actual scientific work being undertaken. Her plea is that real discourse on ethical outcomes be integrated into the laboratory work.

SC asked ME about what is currently known about the potential effects of unwanted release of synthetic genes. ME explained that the effects are currently not very well known, as it is not clear how these microbes will behave in a natural environment. In most cases it appears

that they do not survive long, but it is unknown what would happen if one microbe did manage to survive in the natural environment.

MD then raised the issue of responsible distribution of new knowledge, emphasizing that knowledge of potentially adverse effects needs to be shared in addition to the knowledge relating to the potentially 'good' outcomes. He also alluded to the more dangerous effects of distributing knowledge without sufficient forethought, as it can lead to novice researchers trying out potentially dangerous new ideas. He would welcome advice on how to write instructions for an impact statement that could take this into account. ME agreed with his thoughts, and suggested that one solution would be to publish the work in order to disseminate knowledge but not publish details of the material and methods used to create a new product / substance. She referred to the example of the novel creation of the Spanish influenza virus, in which the work was published but the details of the exact DNA synthesis material were not widely disseminated.

JW asked ME about the term 'synthetic biology' and suggested that it is too broad a name, and instead the field could be divided into sub-fields such as 'synthetic human biology', 'synthetic cell biology' and others. ME argued that it is important to maintain the overall name 'synthetic biology' so that it can be widely recognized in societal discussion, and that it is instead possible to point out the different areas of synthetic biology that warrant specific discussion.

DC raised two issues to discuss with the panel. Firstly, he referred to the points made by ME on the 'playing God' argument in relation to synthetic biology developments. He argued that this is not necessarily a religious argument, but can also be used in a non-religious context to highlight the importance of environmental sustainability and the ways in which synthetic biology developments may potentially adversely affect this. For example, our ecosystem is finely balanced and so introducing a new biological entity into the environment, either intentionally or unintentionally, could potentially upset this environmental equilibrium. Moreover, it may be hard to predict the exact effect on the environment and ecosystem that unwanted release may have. ME agreed with this, affirming that this argument is not solely a religious one, but can also refer to environmental sustainability.

Secondly, DC asked JW whether there is currently any evidence that accumulation of nano-materials in either animals or humans is taking place. JW clarified that at present overwhelming evidence has not been produced for this, but the concern is rather that there has not yet been sufficient research into whether or not nano-materials can / do accumulate in animals and humans.

JW commented that there is often a tendency to focus on the negative effects of research and innovation, but that when addressing ethical issues it is also important to consider the potential for benefit as well as for harm. However, we need to establish better methods for assessing beneficial effects. He also pointed out that there are different types of adverse effects. For example, there is a clear distinction between adverse effects of nano-particles used for the treatment of a life-threatening disease (e.g. cancer) versus adverse effects accrued from unintentionally eating a food (e.g. soy bean) that contains nano-particles.

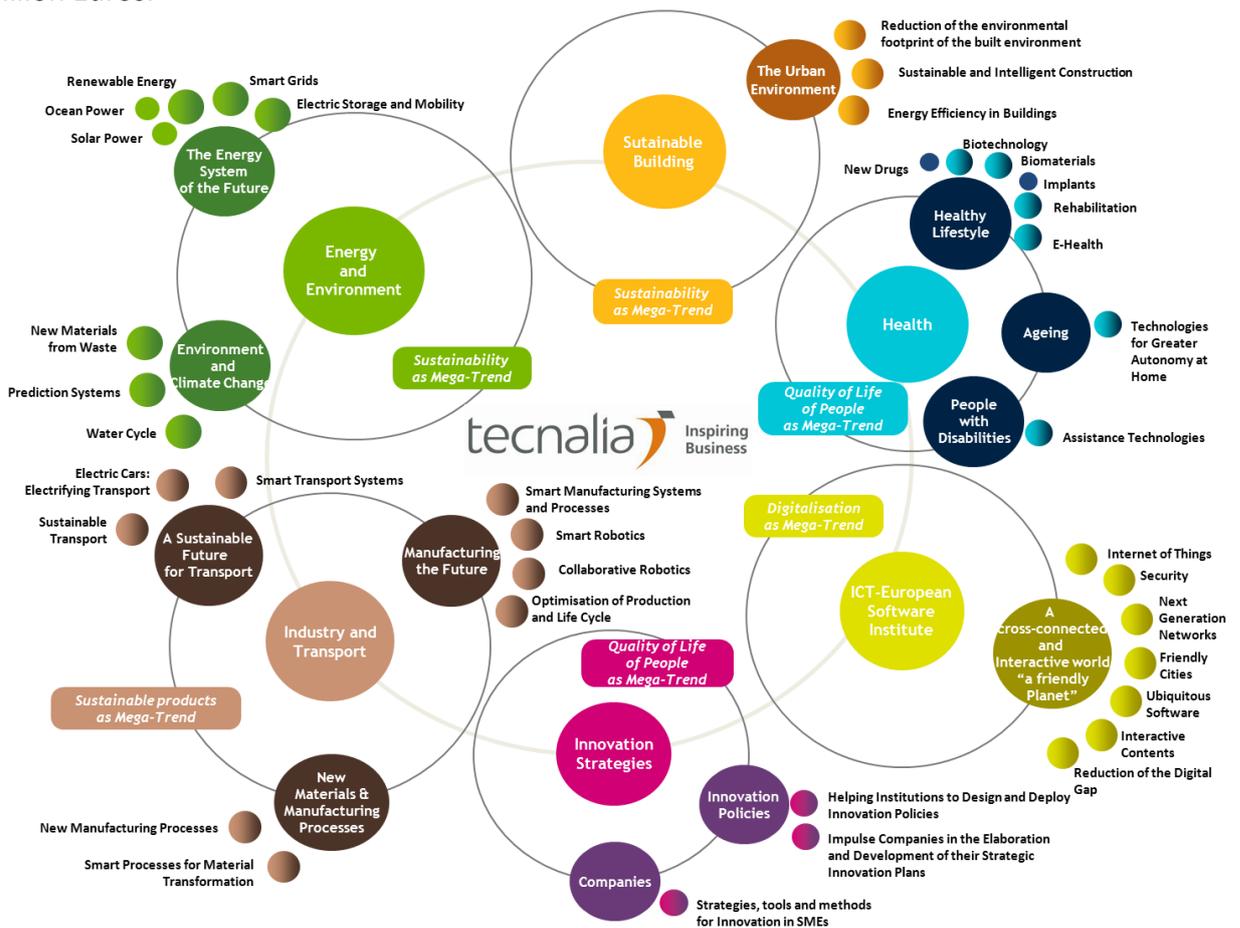
DS finished the discussion by reflecting that this workshop (case studies) had provoked many interesting questions and subsequent discussions. She suggested that this is because many of the group are already working on the issues of 'ethical acceptability' and 'sustainability'. She reminded the group that, whilst the ProGRESS project will certainly not ignore these two key issues, the focus will nevertheless be on the issue of societal benefit, which is far more under-explored.

User Involvement Workshop Industry

Dr Francesca Cavallaro (FC), Tecnalia, Spain



FC introduced Tecnalia, a non-profit Research and Technology Organization, the 5th largest in Europe, with more than 1,500 employees and an annual turnover of approximately 125 million Euros.



Tecnalia's partners in *Progress* can influence decision-making as:

- ▶ Member of the Executive Committee of EARTO (European association bringing together the leading applied R+D companies and groups)
- ▶ Member of EUROTECH, a select group of EARTO's leading organisations
- ▶ Member of the Steering Board of 6 European Technological Platforms and present on another 24
- ▶ Member of the Joint Institute for Innovation Policy (TNO, VTT, Joanneum Research)
- ▶ Through their permanent structures abroad in Mexico, France, Italy, Serbia, Egypt, Columbia and Bulgaria.
- ▶ Through their commercial alliances in Mexico, Colombia, Ecuador, Peru, Brazil, the Ukraine, Poland, Hungary and Portugal.

One of the special areas of expertise of Tecnalia is the development of technologies to serve disabled and elderly people, especially in the area of Rehabilitation, e-Health, Assistive Technologies, Physical prevention for elderly, Orthotics, and Electrotherapy.



User Involvement Workshop Vulnerable End-users

Roger Chennells (RC), South African San Institute,
South Africa



The South African San Institute is an NGO, which was formed in 1996. It has 12 staff and is based in Kimberley, Upington and a rural part of the Kalahari, all in the Northern Cape, South Africa. Its purpose is to assist and support the San Peoples with efforts in culture and

heritage, livelihoods and governance, health, legal rights and intellectual property rights, and youth and special programs.

The hunter and gathering San peoples currently number around 100 000 in five countries in Southern Africa. They can look back on 50 000 years of frugal innovation, developing extensive and "scientific" indigenous knowledge systems. One example are plant medicinal properties, such as:

- ▶ Hoodia (appetite suppressant)
- ▶ Sceletium (mood enhancer)
- ▶ Sutherlandia (cancer cure)
- ▶ Rooihout (pain relief)

Modern problems of access to health care, food, security, dislocation, exclusion, and substance abuse characterizes the community. As a group, they are most vulnerable to climate change. RC emphasised that SASI is keen to engage with *Progress* in two respects; as a test community for ideas on pro-poor innovation and as initiators of innovation based on indigenous knowledge systems.

On behalf of the group, ML thanked FC and RC for their presentations.

Summary of discussion following presentations by FC and RC

RT asked RC about the way in which the San people adapt their behaviour over time – is this a conscious decision-making process? RS asked about the work being done to investigate the knowledge systems of the San people.

RC explained to the group the difficulties faced by the San people. He highlighted the stress that they are under due to their reduced ability to compete in a material world. The material world expects them to change their paradigm, but this is not easy to do. The pressure on the San people can be uncomfortable – many do try to adapt to the urban world that is geographically close by. For example, some of the San children go to school and learn the local language. However, it is a difficult situation because the San people do not really get a choice about the way in which they want to live – society expects the San people to adapt to it, rather than accommodate another way of life.

Dissemination

Prof. Emilio Mordini (**EM**), CSSC, Italy

EM is the leader of the dissemination work package in *Progress*.



EM started with the Parable of the Sower, after outlining the meaning of the word disseminate ("to spread abroad"). He divided activities into the farmer (agent), the tools, the field and the seed. The institute, of which he is the Director, will be the agent/farmer.

The tools he recommended are mostly Internet-based, especially given the rise of Internet use in emerging markets and developing countries through Smartphone use. 42% of Internet users in 2010 were in Asia.



The field is interdisciplinary and the seed depends on all partners within *Progress* and what they can deliver for dissemination. To conclude EM used art to emphasise that "barriers" such as RRI can create opportunities for innovation more splendid than isolated efforts by scientists could dream up.

As part of the dissemination activities, **Tecnia** is going to start a **Wikipedia page on RRI**. Dr Francesca Cavallaro already submitted a basic page to the peer review process of Wikipedia. She also asked, which definitions should be included, which debates summarised, who the audience will be, which EU projects should be mentioned, and which links to other websites/blogs be incorporated.

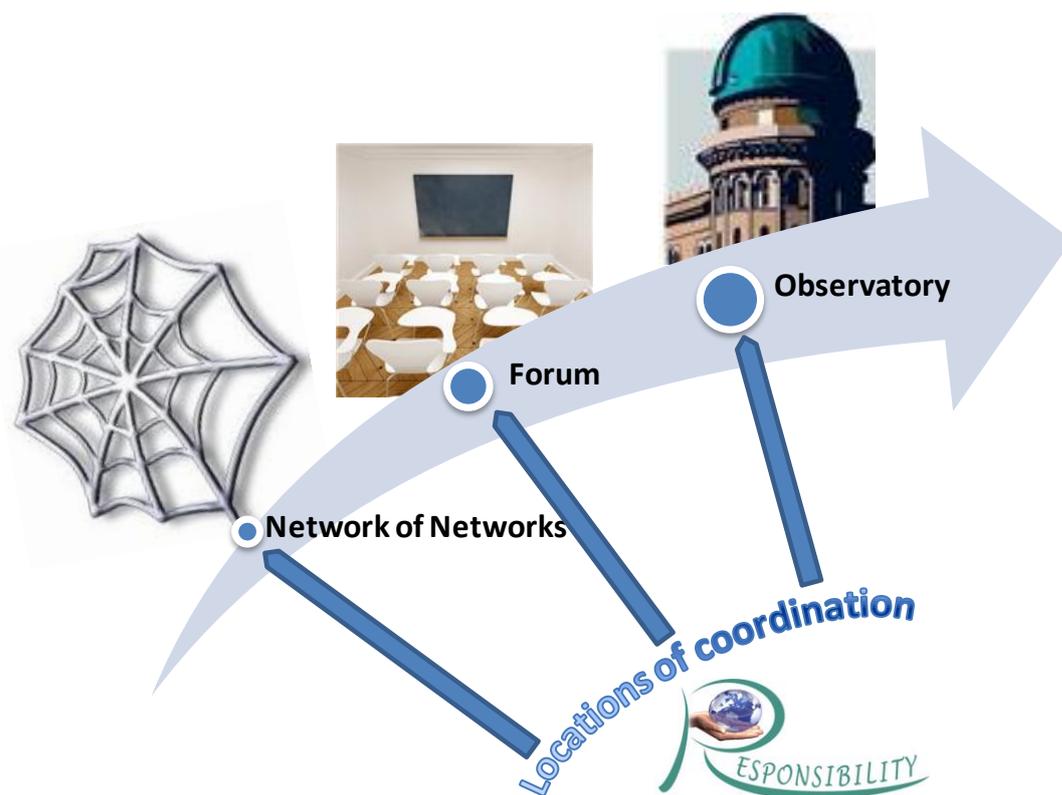
Sister Network: Responsibility

Elena Tavlaki (ET), Signosis, Belgium



ET kindly agreed to attend the meeting to introduce the other international network on RRI funded from FP7 funds and also starting on 1 Feb. 2013.

The RESPONSIBILITY project will create a virtual Observatory of Responsible Research and Innovation as a means to develop a structure to support the enhancement of common understandings and the diffusion of knowledge as well as the deployment of practical tools. It will societal stakeholders to have an organised virtual place where the practical and theoretical information on RRI will be easily accessible.



Responsibility and Progress are looking forward to a fruitful collaboration.

On behalf of the group, ML thanked EM and ET for their presentations.

Summary of the discussion following presentations by EM and ET

Various suggestions were made about the intended Wikipedia page on RRI:

- *To have several different Wiki pages, e.g. 'RRI Junior', 'RRI Scholar' and 'RRI Public' or something similar.*
- *Wiki pages should definitely be comprehensive.*
- *To use either 'Wiki Project' or 'Google documents' to internally work on the Wikipedia page (e.g. to review and edit raw text), before uploading content onto the live Wiki page. (NB. DS did highlight that there can be difficulties in joint editing of documents online – these issues would need to be addressed).*
- *FC clarified that her role is not only to collect information from the group for the Wiki page, but also to redistribute the drafts of the content to the group in order to gather feedback.*
- *To include content on the historical discussion of RRI. For example, this could include how the debate was born; key contributions made to the RRI debate, and 'precursor' phrases to 'RRI'.*
- *To address the distinction between RRI at national, regional and global levels.*
- *To give examples of contributions to RRI from different research areas. How do projects within different research areas reflect the values of RRI?*

An idea was suggested of observing how certain terms are used on the internet, for example through social media. EM agreed that some resources could potentially be devolved to explore the use of RRI-related terms within social media and that this may prove extremely interesting. ET informed the group that the 'Responsibility' project is going to investigate how key terms are used within online communities such as 'Twitter' and 'Facebook'. The 'Responsibility' project will develop the observatory in a direction based in part upon its perception within social media.

Finally DS asked group members to be as supportive as possible to EM in his dissemination work. She thanked Gloria Madriz for all her help both in the preparation of the meeting and during the meeting itself. DS also thanked the four advisors to the project, in particular the European advisors who were due to leave at this point. DS emphasized that the ProGRESS project members are looking forward to collaborating with the advisors as it is clear that their work will be very important to the project.