

Unpacking the grand challenges of nanotechnology



Colette Bos
Harro van Lente & Alexander Peine

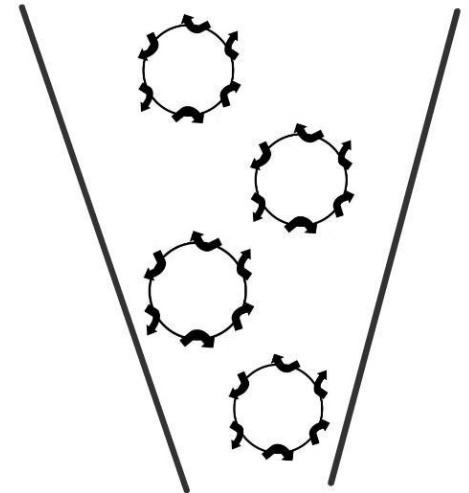
Introduction

- Nanotechnology = new field with many expectations for possible applications
- Large societal problems by EU referred to as “Grand Challenges” (Lund Declaration, 2009)
 - Moral component > “Good to address”
 - Necessity > “Have to address it now”
- Unpacking grand challenges in a technological field



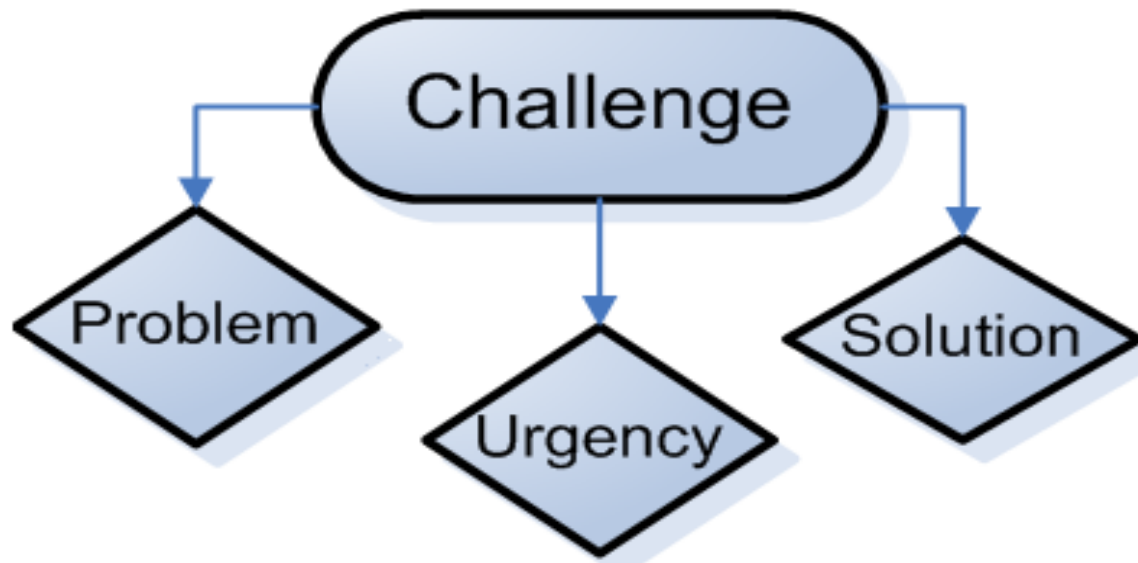
Conceptual work

- How are grand challenges filled in?
 - Articulations, specification and legitimacy (Van Lente & van Til, 2007)
 - Sustainability and ageing society
- Science system: many different actors on different levels are articulating
- Translations
 - **Texts**
 - Money
 - Human resources
 - Technological artefacts



What makes a challenge?

- Grand challenges do not just pose a problem, but imply a solution
- Sense of urgency is included



Unpacking challenges

- Analysing:
 - 4 research policy/strategy texts from European Research Area or European Commission
 - 6 research policy/strategy texts on nanotechnology from Norway, UK, Netherlands (each 2)
- Analysing articulations of sustainability and ageing
- Looking for the word ‘challenge’
- Unpacking challenges in problem, solution and urgency

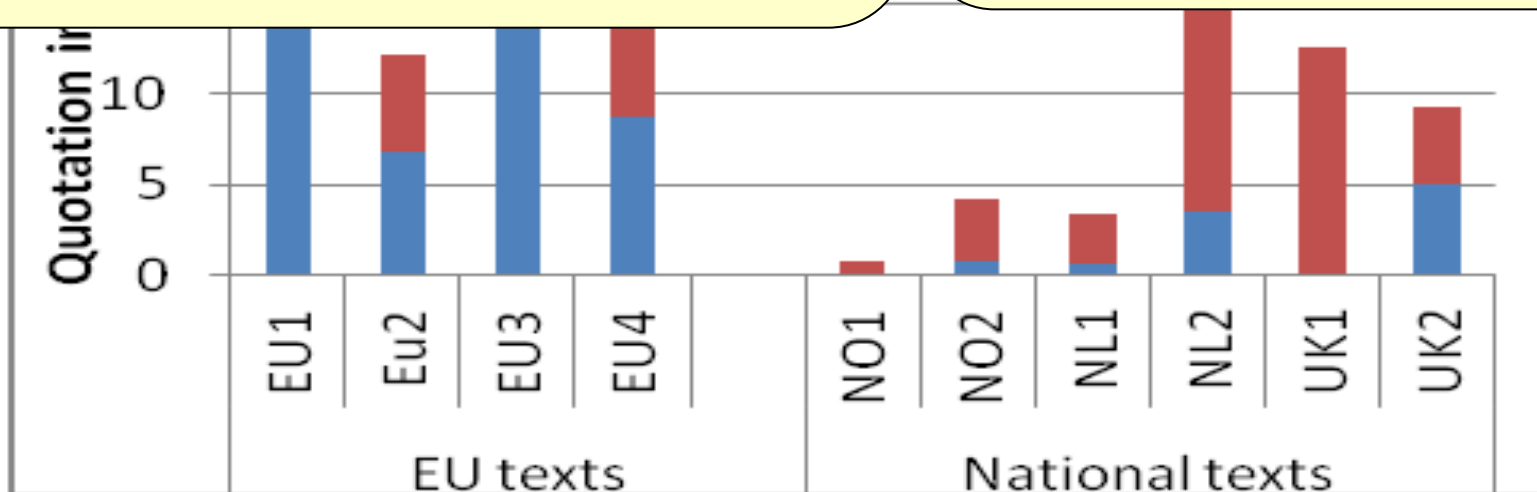


Grand and specific challenges

- Grand versus specific challenges

...the challenges such as the effects of global warming, depletion of resources, an ageing European population and competition in a multi-polar world...

...the challenges and applications of nanotechnology...”



Sustainability and ageing

- EU texts:
 - Sustainability and ageing in economical terms
 - EU needs common denominator for large problems

Improving resource efficiency would help cut emissions, save money and boost economic growth”

“meeting the clean energy goals could result in € 60 billion less in oil and gas imports”

“Innovations in new materials are often a precondition for progress in energy and the environment...”

...most employment through labor reforms and embark on ambitious pension reforms in order to keep finances under control”

“The steadily ageing population, health care costs, etc., provide a pressure for innovations to prevent health problems arising (preventive health care) and contribute to the quality of life.”



Problems and solutions

- EU Texts
 - Problems

“Mobilising R&D to address Grand Societal Challenges”

nanotechnologies could also help address universal challenges such as global warming and food sustainability

The main technology challenge can be formulated as follows: How can we understand and control the physics and chemistry of fabrication and inspection within the enabling equipment at atomic dimensions”

- National texts
 - Solutions
 - Start with grand challenges in introduction...
 - ... but lose track of what the grand challenges are along the way



Urgency

- EU texts:

- Very urgent

- Economic crisis
'new beginning'

- National texts

- Not so urgent

- Busy with finding solutions

“2010 must mark a new beginning. I want Europe to emerge stronger from the economic and financial crisis (...)

How Europe responds will determine our future. The crisis is a wake-up call (...)
This is Europe's moment of truth.”

“The challenge now is to further develop the collaboration within the universities and colleges and institute sector on the basis of quality and strategic priorities in order to develop robust groups with international quality”



Conclusions

- From conceptual to empirical:
 - Specification > necessary for addressing solutions
 - Legitimacy > rhetoric of challenges
- Unpacking of challenges
 - EU: urgent large problems without clear solutions
 - National: not so urgent specific solutions while sometimes losing track of overall problems



Rest of PHD work

- Looking further into these dynamics of grand challenges
- Add other entities than texts, such as money, human resources and technical artefacts
- What will happen with these words of hope?

