HUMAN EXPOSURE ASSESSMENT

eNanomapper hands-on workshop, Feb 2016, Basel

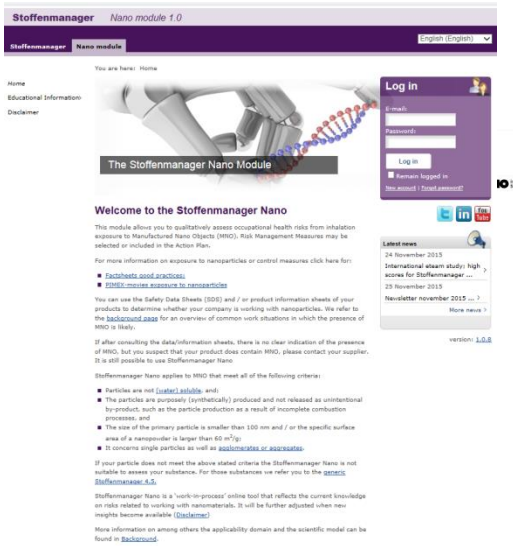
Wouter Fransman

TNO innovation for life

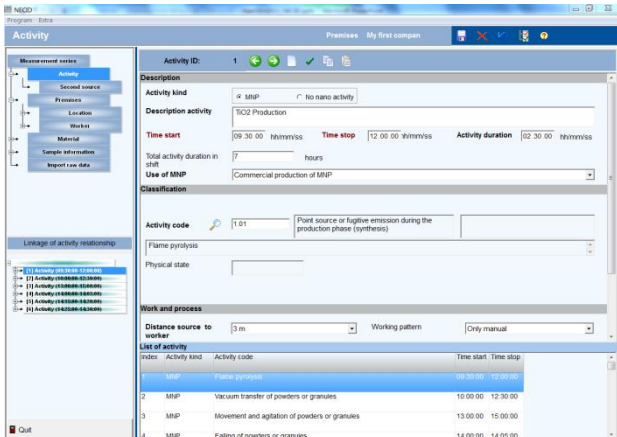
WORKSHOP OUTLINE

- LICARA NanoSCAN

- Stoffenmanager Nano



- **N**ano **E**xposure and **C**ontextual **I**nformation **D**atabase



LICARA nanoSCAN: evaluating benefits and risks over the life cycle of nanoproducts

LICARA project

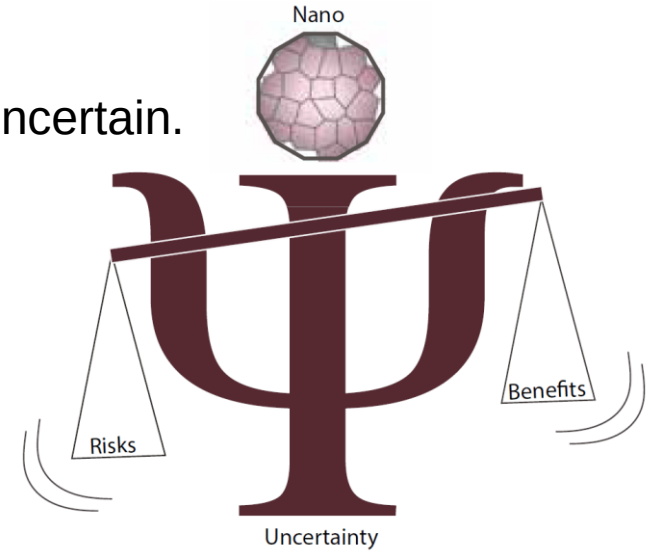
- **Li**fe **C**ycle **A**pproach and human **R**isk **A**ssessment, product stewardship and stakeholder risk/benefit communication of nanomaterials

- **Aims** to develop an approach for SMEs to assess over the life cycle
  - the human and environment risks
  - and the economic, environmental and social opportunities.

- **Deliverables**
  - Guidelines
  - Case studies with in-depth assessments
  - Framework and first version of a tool LICARA nanoSCAN

Present situation on nano technology development within SMEs

- Nano products provide benefits and business opportunities
- However, the possibility of human and environmental risks may spoil the party
- It is (too) difficult and costly to assess these risks
  - Risk Assessment and Life Cycle Assessment are complex and costly to perform
  - data are scarce and if available highly uncertain.
  - it is difficult to “repair” data gaps

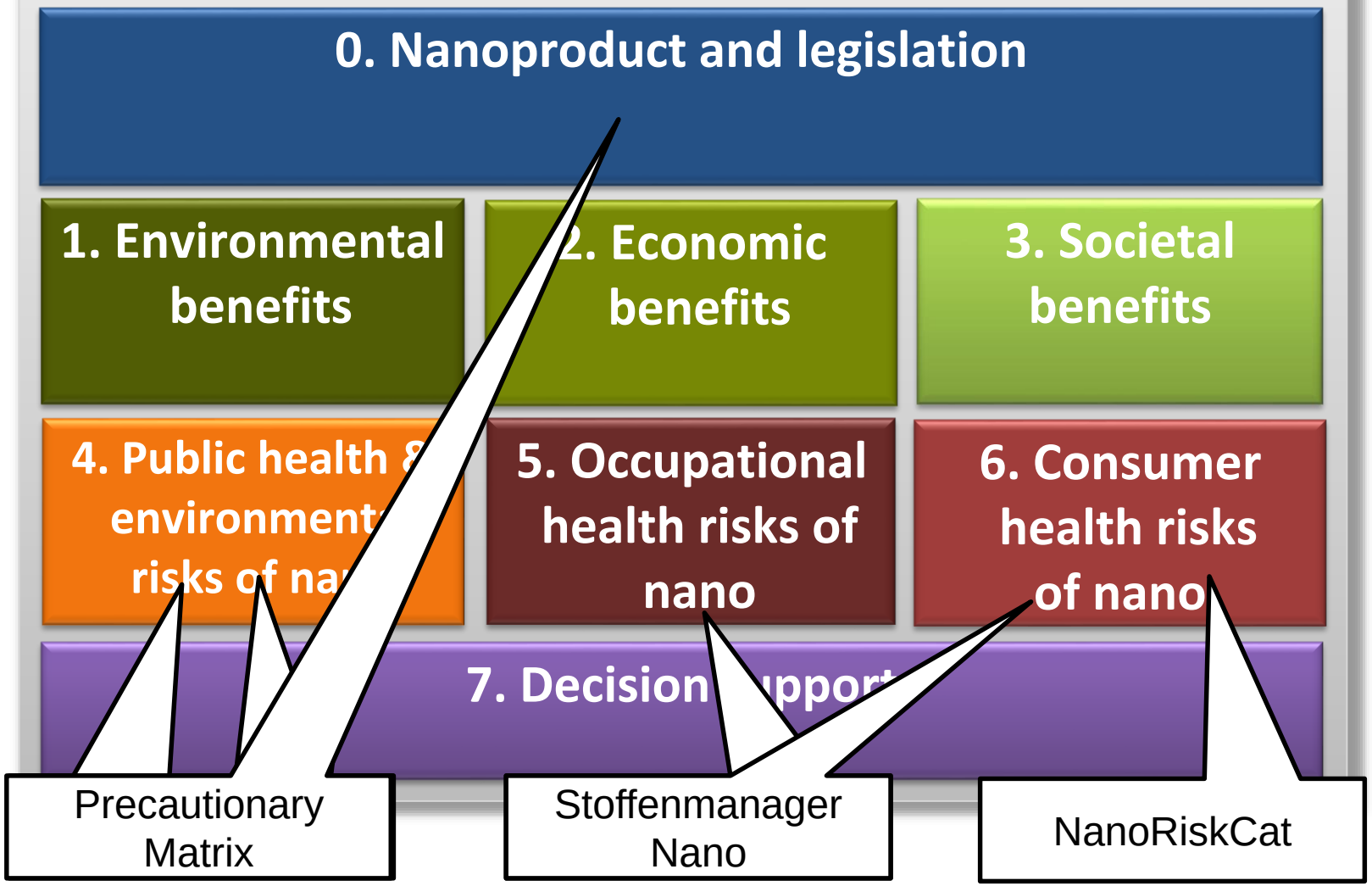


Need to support SMEs on decision making in uncertainty on nano product development

- Including both benefits and risks
- Translating present available scientific knowledge into understandable information
- Tapping on specific know-how of SMEs
- To sketch the pros and cons of a nanoproduct in relation to a conventional product and over the full life cycle

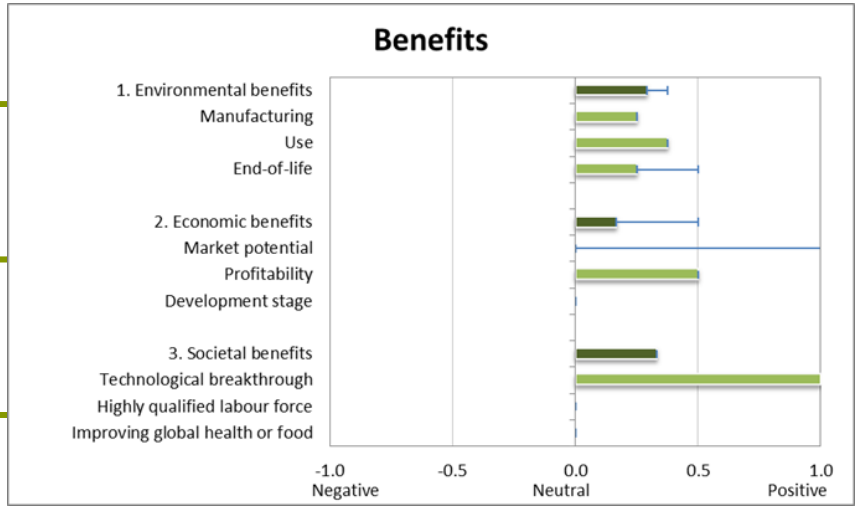
- Qualitative / semi-quantitative giving the fact that little quantitative data is available with high uncertainties
- Using existing tools
- Doing it yourself in a modular approach
- Next to guidelines a simple first version of a tool LICARA nanoSCAN

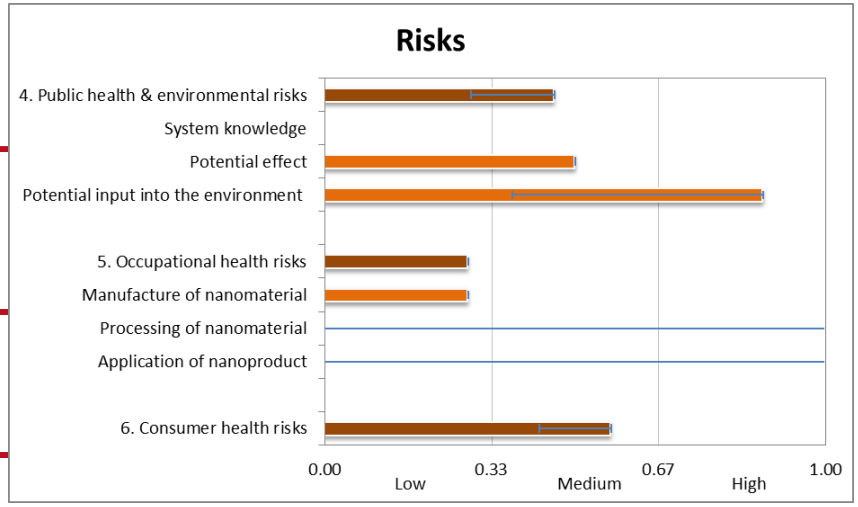
Conceptual framework on nano benefits and risks



nanoSCAN

- Benefits
  - Environmental
  - Economic
  - Societal
- Risks
  - Public health & environmental
  - Occupational health
  - Consumer health

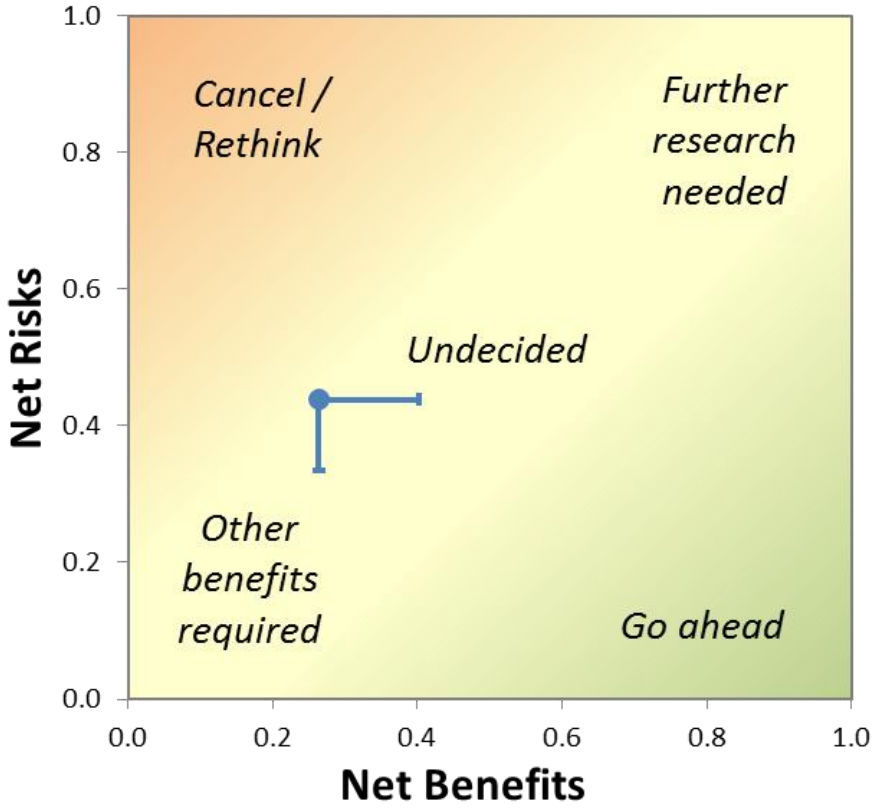




Weighed results

Example: scratch and corrosion resistant nano silica coating

The product seems to have no high risks



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Stoffenmanager

Working safely with hazardous substances

Stoffenmanager Nano 1.0

eNanomapper workshop

Basel, February 2016

Wouter Fransman
wouter.fransman@tno.nl

Ministerie van Sociale Zaken en Werkgelegenheid

TNO

Arbo Unie

BECO
RETURN ON SUSTAINABILITY

Stoffenmanager Nano 1.0

- Exposure measurements are complex and therefore expensive and time-consuming
  - Control banding / Risk banding: first Tier for qualitative risk assessment => Work in progress…
- Assists producers, formulators and end users to prioritize health risks of working with MNO
  - Hazard x Exposure = Risk
- Applicability domain:
  - Only inhalation exposure
  - All types of MNO and all processes with MNO
- Education (PIMEX, good practices), community portal
- Result: Freely available IT-tool for prioritizing nano-specific risks

Home

Educational Information›

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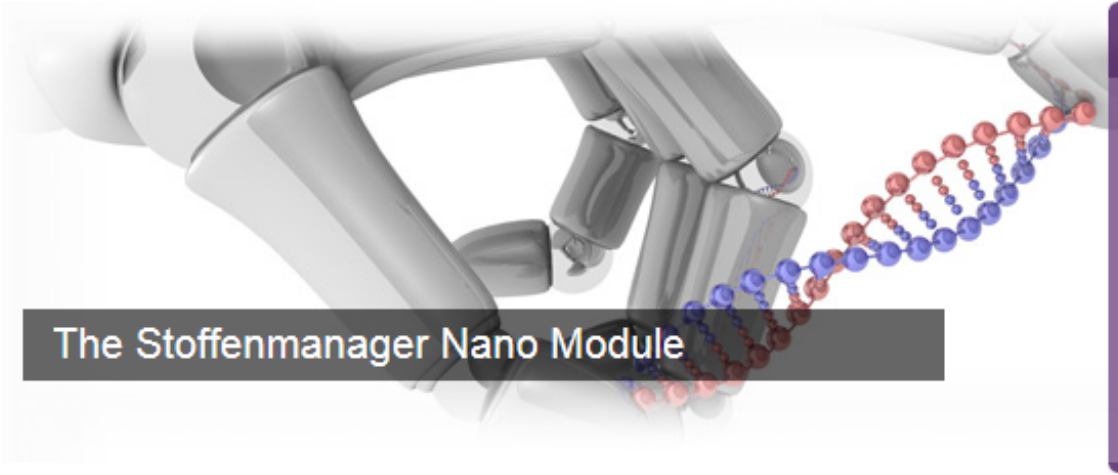

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Welcome to the Stoffenmanager Nano

This module allows you to qualitatively assess occupational health risks from inhalation exposure to Manufactured Nano Objects (MNO). Risk Management Measures may be selected or included in the Action Plan.

For more information on exposure to nanoparticles or control measures click here for:

- Factsheets good practices;
- PIMEX-movies exposure to nanoparticles

You can use the Safety Data Sheets (SDS) and / or product information sheets of your products to determine whether your company is working with nanoparticles. We refer to the background page for an overview of common work situations in which the presence of MNO is likely.

If after consulting the data/information sheets, there is no clear indication of the presence of MNO, but you suspect that your product does contain MNO, please contact your supplier. It is still possible to use Stoffenmanager Nano

Stoffenmanager Nano applies to MNO that meet all of the following criteria:

Latest news

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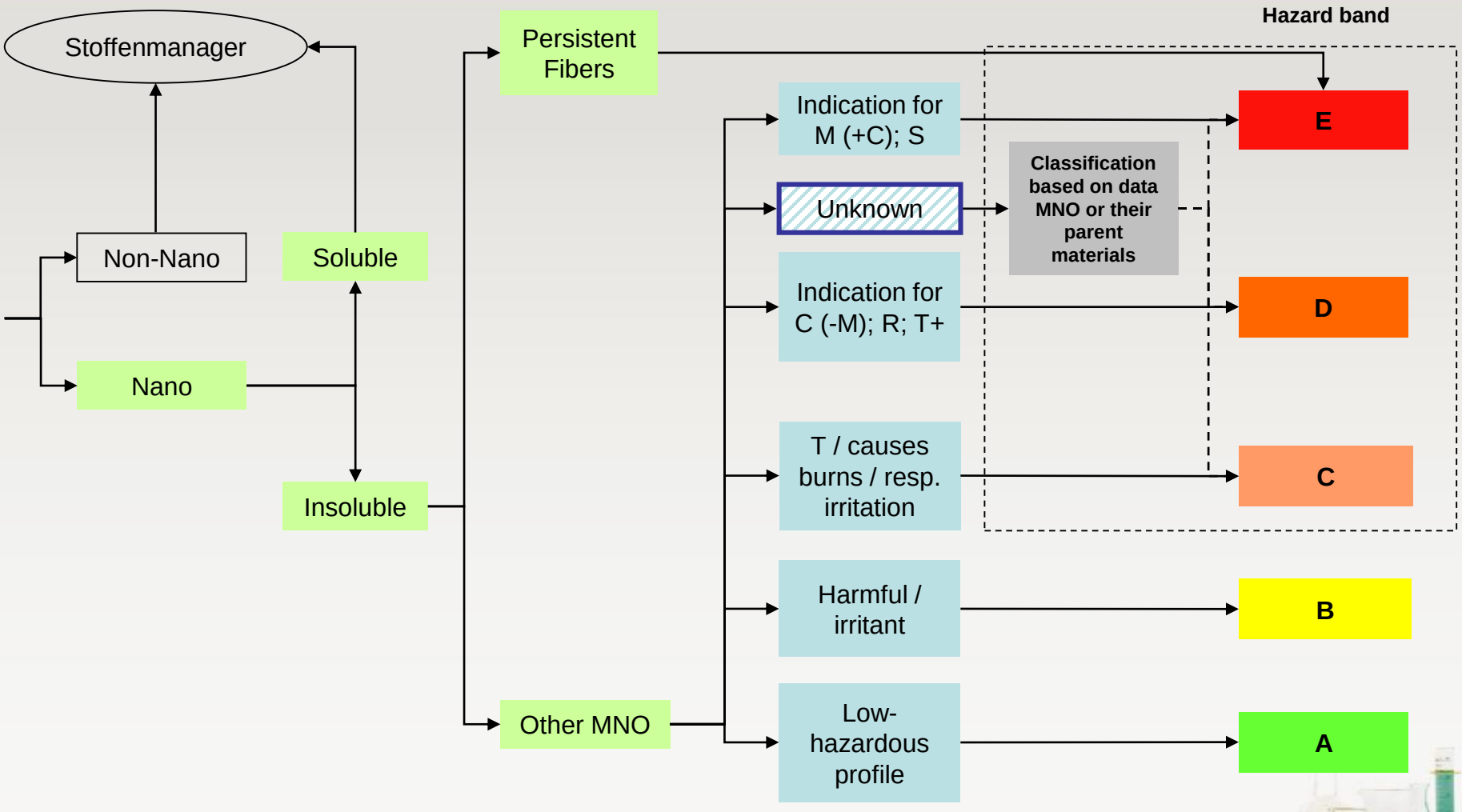
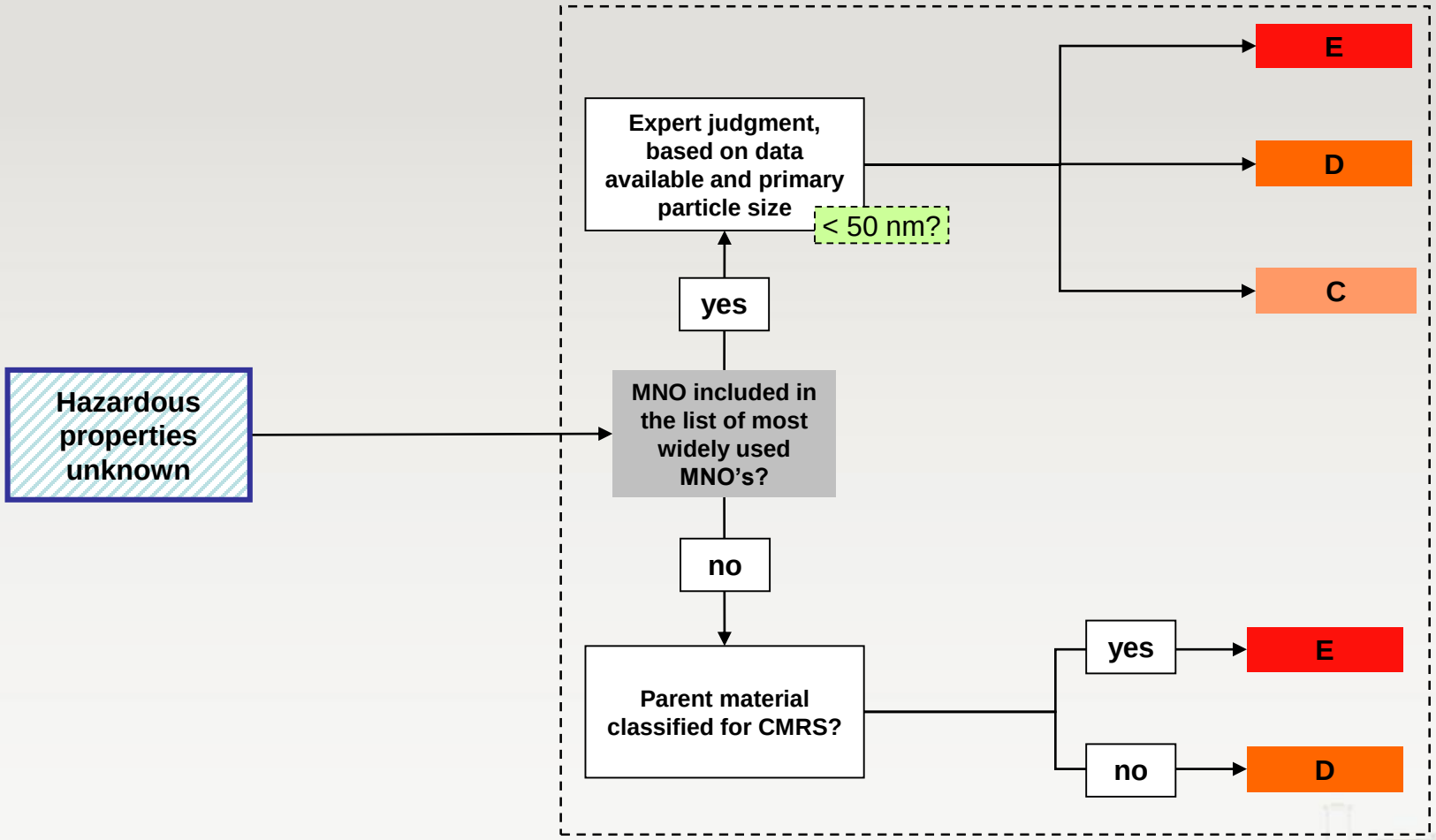
More news ›

Stoffenmanager Nano 1.0: Hazard banding



Stoffenmanager Nano 1.0: Hazard banding



Stoffenmanager Nano 1.0: Exposure banding

Source domains (Schneider et al., in press)

1. Point or fugitive emission during the production phase prior to harvesting the bulk material

2. Handling and transfer of bulk powdered MNO

3. Dispersion of (solid or liquid) intermediates or ready-to-use MNO-containing products

4. Activities resulting in fracturing and abrasion of MNO-containing end products

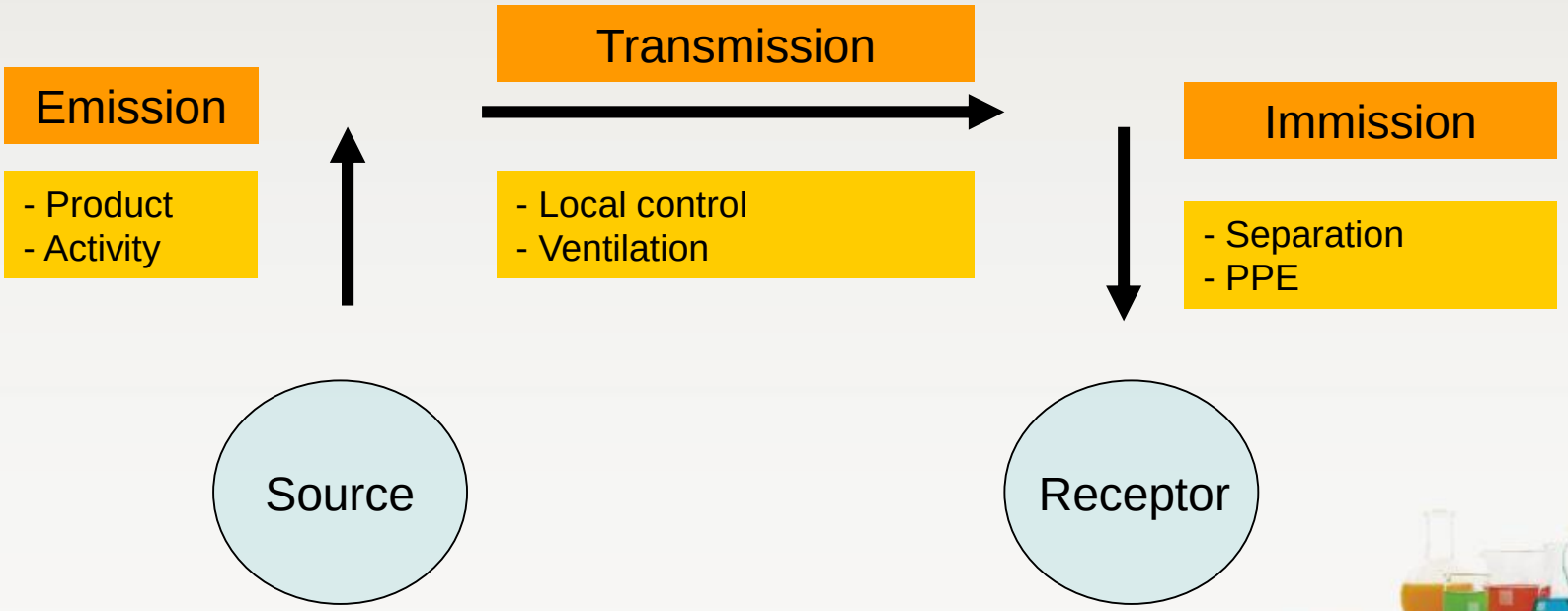
Stoffenmanager Nano 1.0: Exposure banding

Model → **Input parameters** → **Multiplier** → **Exposure band**

Based on source-receptor approach (Schneider et al., in press)

e.g.: activity, dustiness powder, concentration liquid, local controls

4 categories



Stoffenmanager Nano 1.0: Risk banding

Exposure band \ Hazard band	A	B	C	D	E
1	3	3	3	2	1
2	3	3	2	2	1
3	3	2	2	1	1
4	2	1	1	1	1

Future plans

- Empirical data collection
  - Measurements at the workplace
  - Experiments under controlled conditions
  - Harmonizing measurement strategies
  - Database development (NECID)

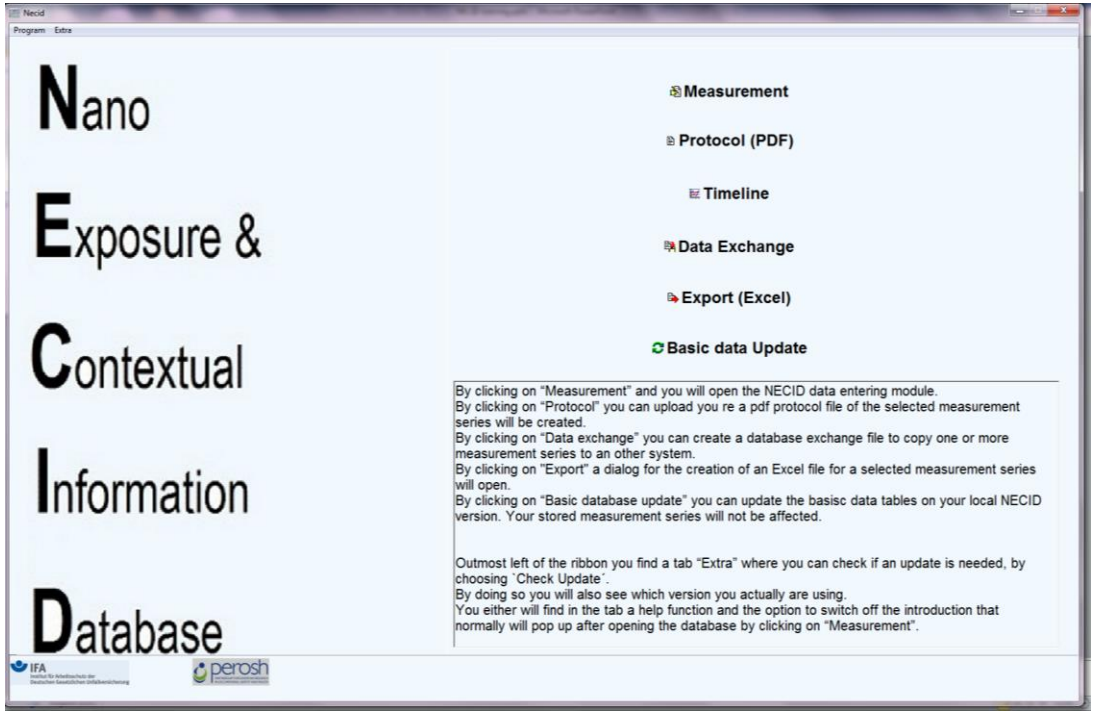
- Expert elicitation
  - Develop nano specific activity emission potential multipliers
  - Extend to other parameters in the model

- Use any source of information that comes publicly available in the near future

Towards a quantitative risk assessment !

An introduction to NECID

eNanomapper workshop, Basel, February 2016



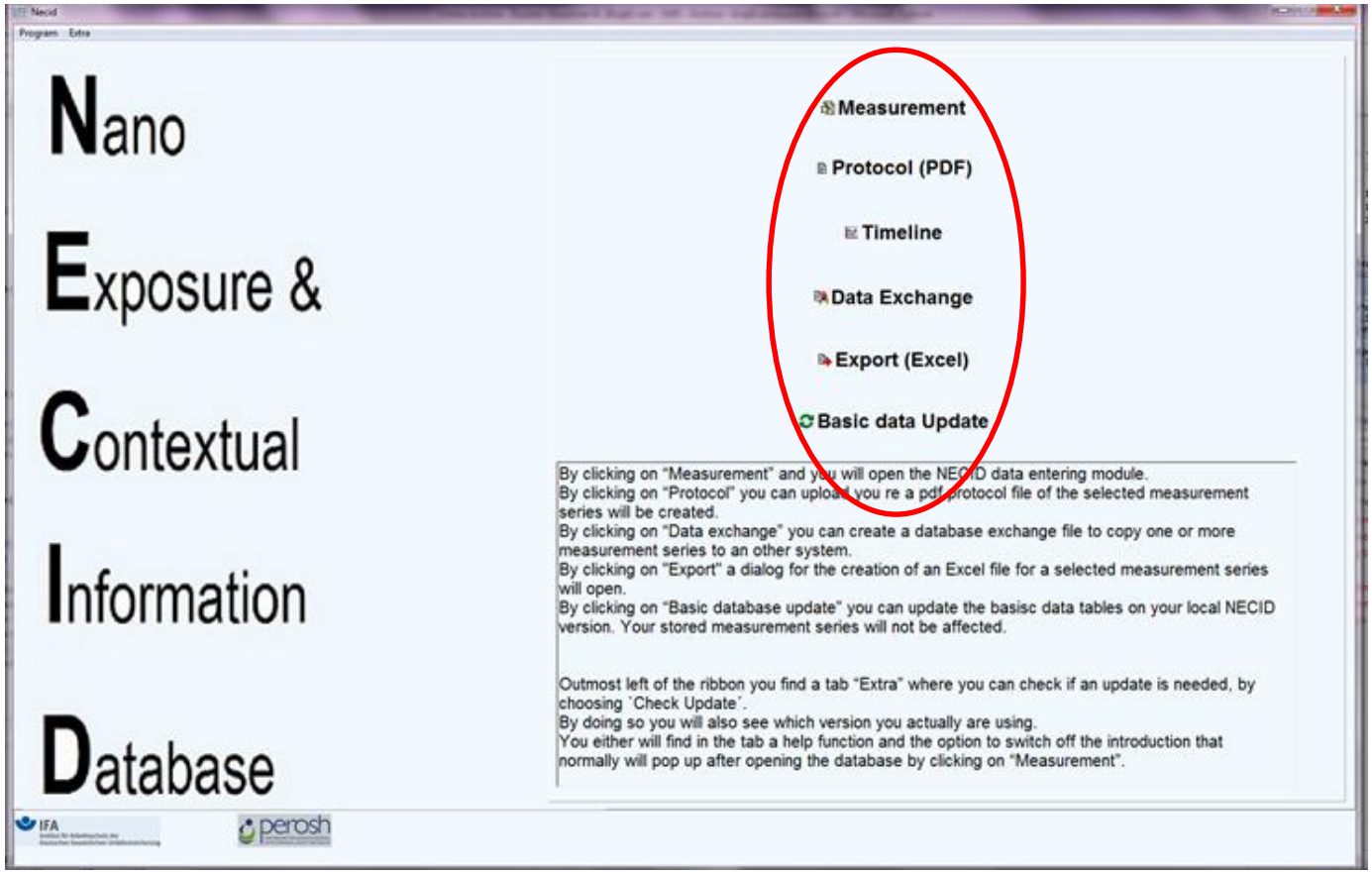
NECID - Background

- Developed by

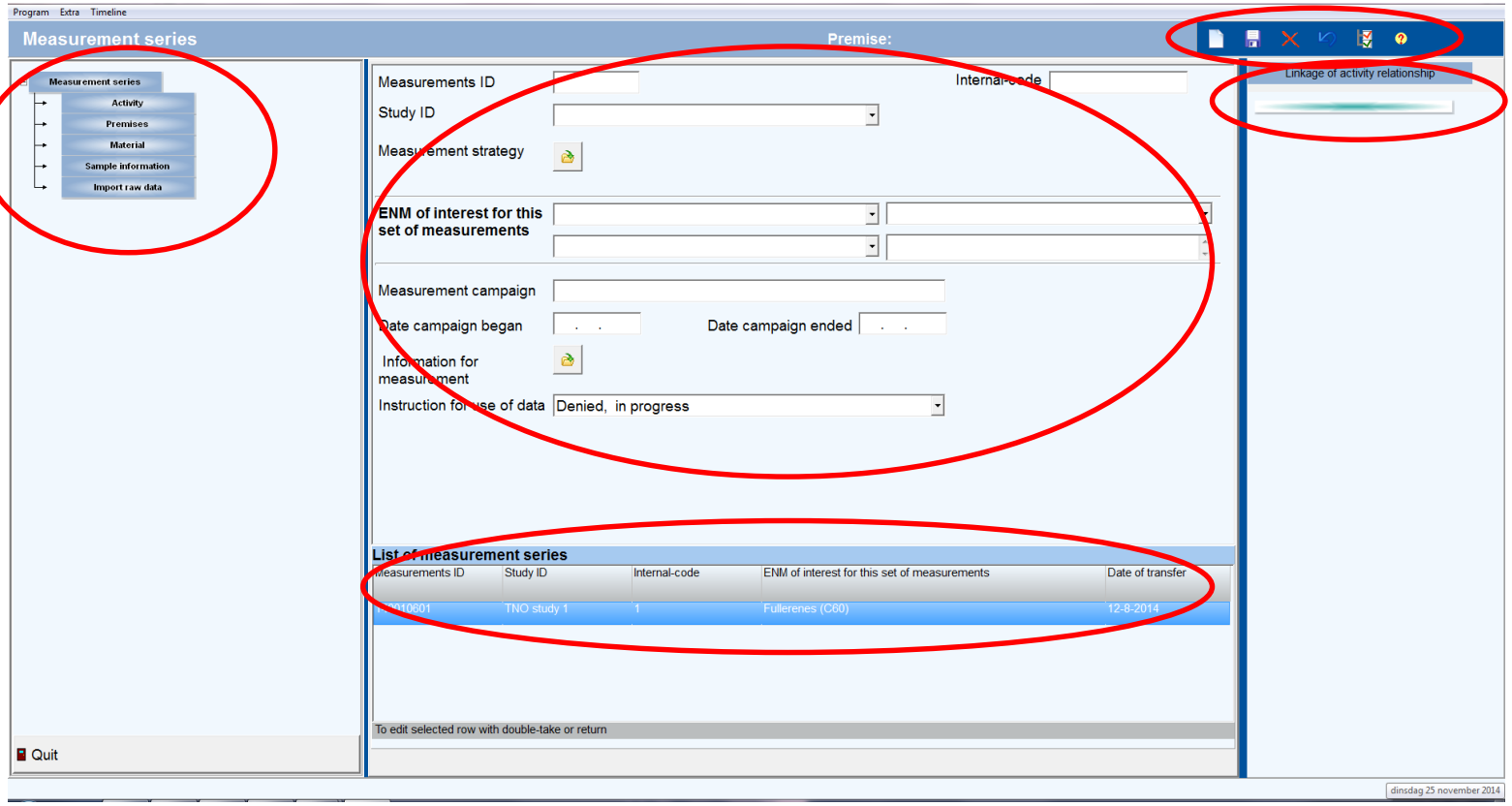
- Actively supported by 8 institutes + external partners

- Aim: Harmonized collection of nano exposure data to enable sharing of data and provide a sustainable source of information for research, risk management and the development of occupational exposure benchmark levels/limits.

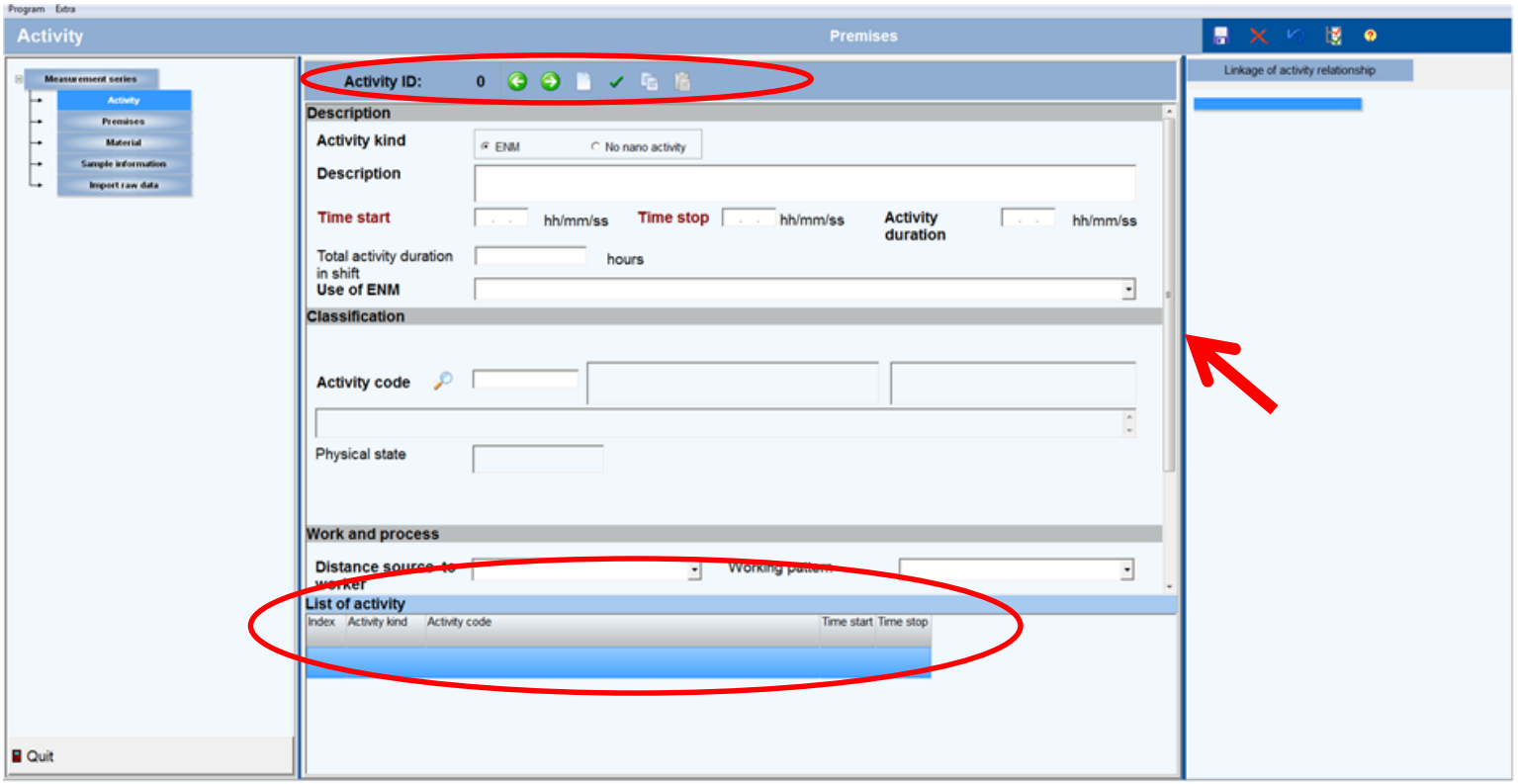
Get started with NECID



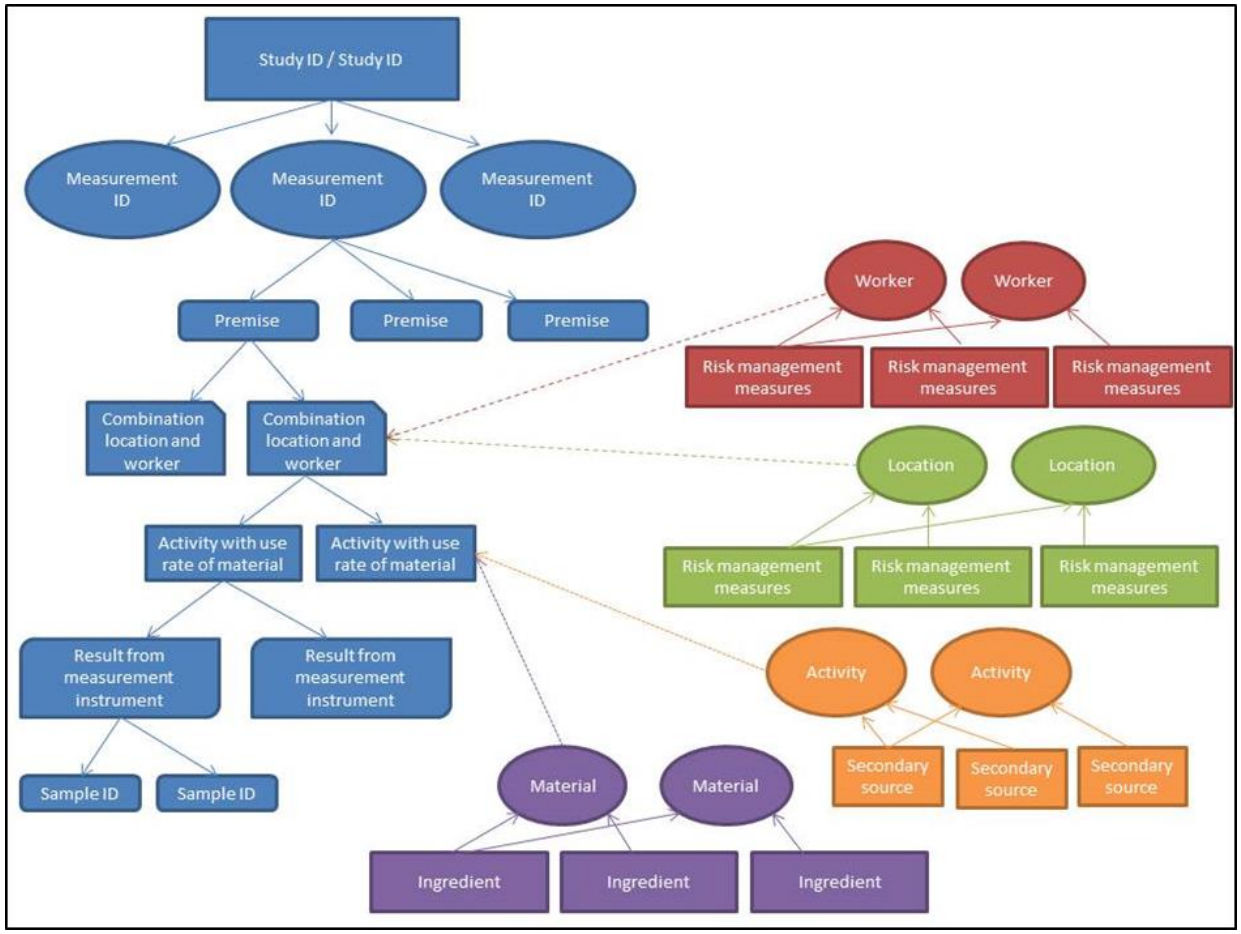
Measurement – General information



Measurement – Activity



Measurement- information to include



THANK YOU FOR YOUR ATTENTION

Wouter Fransman **wouter.fransman@tno.nl**

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