



## Increase the probability of success of your Advanced Material related Horizon 2020 projects by including Risk Management

**Steinbeis Advanced Risk Technologies Group** is a group of interlinked Steinbeis units dealing with multiple aspects of risks, risk engineering and risk management primarily in the areas of:

- ❑ petro chemical and process plants
- ❑ power plants
- ❑ material technologies, especially advanced/new material technologies
- ❑ new emerging technologies (e.g. CO<sub>2</sub>, H<sub>2</sub>, advanced materials, nanotechnologies, new energy technologies, risk)

Main topics of risks dealt with are:

- ❑ risks in/of innovation (e.g. risks of unexpected side-effects), especially in new technologies oriented projects
- ❑ risk of non-performance or performance below expectations (e.g. risks of system or component failures)
- ❑ risk of adverse/unexpected effects and impacts (e.g. on public health and/or environment)
- ❑ risks over the life-cycle of products and technologies (e.g. unexpected problems in decommissioning or recycling phase)

In the area of NMP in Horizon 2020 projects Steinbeis R-Tech will bring in its large experience resulting from a number of preceding and running projects (see below). R-Tech activities in these projects were primarily dealing with the (a) qualitative and quantitative risk assessment, (b) uncertainty and sensitivity analysis, (c) risk assessment, (d) life cycle analysis and (e) other specific risk related topics such as standardization and knowledge management.

### [OTHER]

R-Tech together with EU-VRI ([www.eu-vri.eu](http://www.eu-vri.eu)) offers support in assessment of innovation process risks, dissemination and exploitation phases including the risks in the supply chain and technology acceptance in public, as well as structuring the knowledge about the related projects, activities, technologies, stakeholders, etc.

### [QRA] Qualitative and Quantitative Risk Assessment, including management

The risk assessment involves the evaluation of the TRL which supports the go/no go decision to the next stage of development, including SWOT analysis, elaborating exploitation and business plans.



### [UNC] Uncertainty and Sensitivity analysis

R-Tech performs Risk Assessment, looking at the possible root causes of possible aberration from nominal product characteristics. Uncertainty and sensitivity analysis determine the influence of various factors (tornado diagrams) and allows the mitigation of the unwanted consequences.

NOTE: For material testing R-Tech has established strategic alliances with material testing institutes such as MPA Stuttgart or those in KMM-VIN and EMIRI.

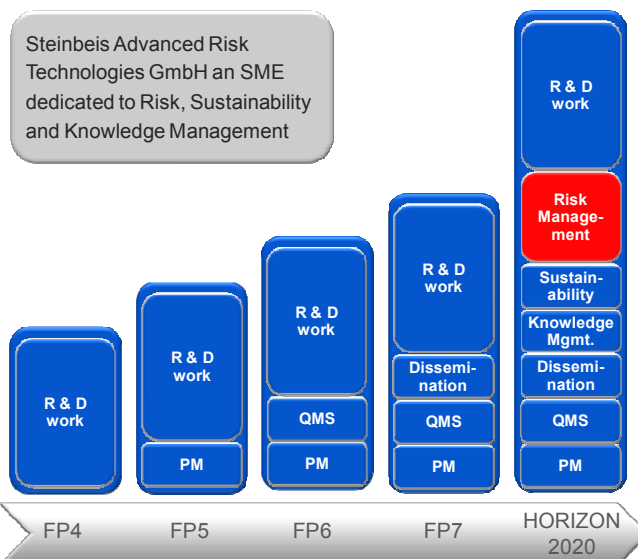
### [HSE] Health, Safety and Environmental Risk Assessment

R-Tech has applied risk assessment techniques for health, safety and environment issues of "pure" nanotechnology projects, but also for projects dealing with nano-enhanced advanced engineering materials.

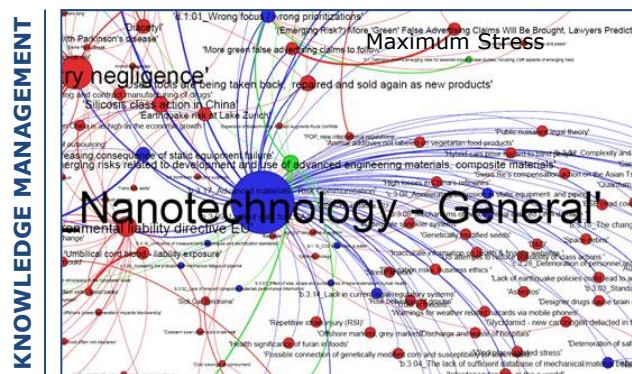
NOTE: For advanced modeling activities R-Tech has established strategic alliances with specialized institutes such as BioIRC or those in KMM-VIN.

### [LCA] Life Cycle Assessment

The combined application of Life Cycle Assessment (LCA) and Life Cycle Costing techniques (LCC) together with Risk Assessment (RA) guarantees cost effectiveness and sustainability of the product/process development.



Risk Management component necessary in R&D projects with TRL5 and more



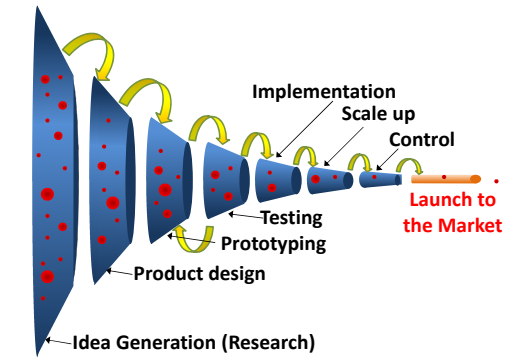
Example of semantic analysis of interconnectedness among approx. 2,000 nano-projects financed by the EU: Looking for GAPS, CLUSTERS and OVERLAPS

## Examples of R-Tech projects of Advanced Materials

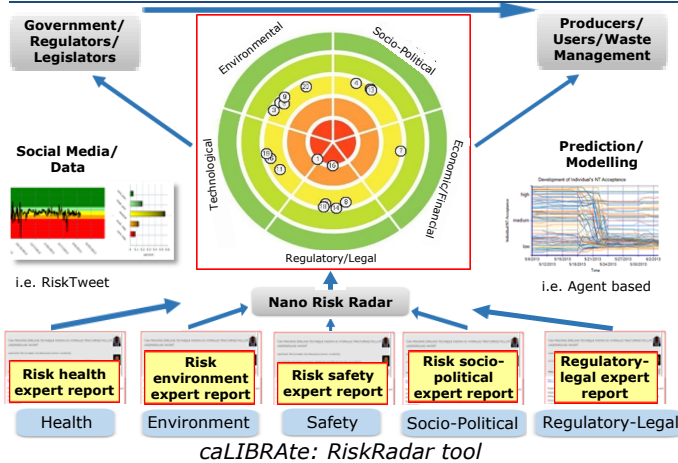
The Horizon 2020 project will profit from R-Tech results and experience in preceding and running projects as below:

<b>EXOMET</b> – Physical Processing of molten light alloys under the influence of external fields - <a href="http://exomet-project.eu/">http://exomet-project.eu/</a>	QRA	<input type="checkbox"/>
	UNC	<input checked="" type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>
<b>FIRE-RESIST</b> – Developing novel fire-resistant high performance composites - <a href="http://fire-resist.eu">http://fire-resist.eu</a>	QRA	<input checked="" type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input type="checkbox"/>
<b>caLIBRAte</b> – Performance testing, calibration and implementation of a next generation system-of-systems Risk Governance Framework for nanomaterials	QRA	<input checked="" type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

### INNOVATION PROCESS RISKS



*FIRE-RESIST: Innovation risk funnel for new product/process development.*



*caLIBRAte: RiskRadar tool*

<b>HELM</b> – High-frequency electromagnetic technologies for advanced processing of ceramic matrix composites and graphite expansion. - <a href="http://helm-project.eu/">http://helm-project.eu/</a>	QRA	<input checked="" type="checkbox"/>
	UNC	<input checked="" type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>

<b>iNTeg-Risk</b> – Early Recognition, Monitoring and Integrated Management of Emerging, New Technology related Risks - <a href="http://integrisk.eu-vri.eu">http://integrisk.eu-vri.eu</a>	QRA	<input checked="" type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

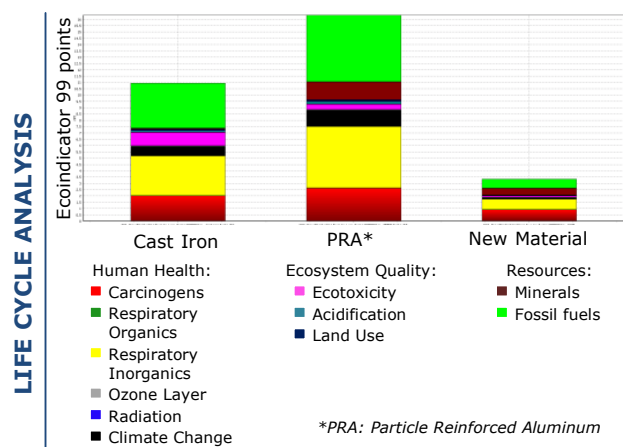
<b>NANODEVICE</b> - Novel Concepts, Methods, and Technologies for the Production of Portable, Easy-to-Use Devices for the Measurement and Analysis of Airborne Engineered Nanoparticles in Workplace Air Grant Agreement – <a href="http://www.nano-device.eu/">www.nano-device.eu/</a>	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>Bio4Self</b> – Biobased self-functionalised self-reinforced composite materials based on high performance nanofibrillar PLA fibres	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input type="checkbox"/>

<b>M-RECT</b> – Multiscale reinforcement of semi-crystalline thermoplastic sheets and honeycombs - <a href="http://mrect.risk-technologies.com/">http://mrect.risk-technologies.com/</a>	QRA	<input type="checkbox"/>
	UNC	<input checked="" type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>

<b>MUST</b> – Multi-level protection of material for vehicles by “smart” nanocontainer - <a href="http://sintef.no/Projectweb/MUST/">http://sintef.no/Projectweb/MUST/</a>	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input checked="" type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>MATRANS</b> – Micro and Nanocrystalline Functionally Graded Materials for Transport Applications - <a href="http://kmmvin.eu/node/134">http://kmmvin.eu/node/134</a>	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>



*MATRANS: Comparative LCA of the new materials used for car brake disks*

<b>NanoMILE</b> – Engineered nanomaterials mechanisms of interaction with living systems and the environment: A universal framework for safe nanotechnology - <a href="http://nanomile.eu-vri.eu">http://nanomile.eu-vri.eu</a> (R-Tech Art.10 Partner)	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>STABALID</b> – Stationary batteries li-ion deployment - <a href="http://stabalid.eu-vri.eu">http://stabalid.eu-vri.eu</a> (R-Tech Art.10 Partner)	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
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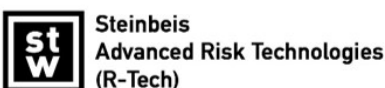
<b>NanoSTAIR</b> – A platform to support standardization, innovation and research in the field of nanotechnologies - <a href="http://nanostair.eu-vri.eu">http://nanostair.eu-vri.eu</a>	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>POEMA</b> – Production of Coatings for New Efficient and Clean Coal Power Plant Materials	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>SCAFFOLD</b> – Innovative strategies, methods and tool for occupational risks management of manufactures nanomaterials in the construction industry - <a href="http://scaffold.eu-vri.eu">http://scaffold.eu-vri.eu</a> (R-Tech Art.10 Partner)	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

<b>PARTICOAT</b> – New multipurpose coating systems based on novel particle technology for extreme environments at high temperatures - <a href="http://particoat.risk-technologies.com">http://particoat.risk-technologies.com</a>	QRA	<input type="checkbox"/>
	UNC	<input type="checkbox"/>
	HSE	<input type="checkbox"/>
	LCA	<input checked="" type="checkbox"/>
	OTHER	<input checked="" type="checkbox"/>

Contact:



**Steinbeis Advanced Risk Technologies**, [www.risk-technologies.com](http://www.risk-technologies.com)

Director: Prof. Aleksandar Jovanovic, [jovanovic@risk-technologies.com](mailto:jovanovic@risk-technologies.com)

Nano-Project Coordination Team: Ms. Flor Angela Quintero, [fq@risk-technologies.com](mailto:fq@risk-technologies.com)

Haus der Wirtschaft, Willi-Bleicher-Straße 19, 70174 Stuttgart, Germany