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**Paper title:**

**Nanotechnology risk – next challenge for the insurance sector**

**Abstract**

Nanotechnology poses a challenge for the modern man. The discovery of nanoparticles has already revolutionized civilizational growth by impacting many aspects of human life. Nanotechnology, or controlled production and creation of atomic and molecular structures in nanoscopic scale, creates unimaginable opportunities in many disciplines including medicine, defense systems or as well as clothing and food industries. Aside from the many benefits that growth of nanotechnology may bring, it exposes our civilization to an increasing number of new risks, creating hazards that are currently difficult to foresee. Developments Nanotechnology may have a negative impact on the natural environment; some researchers claim that they may even jeopardize the very existence of humankind. Therefore, nanotechnology-related risks should be deemed of utmost importance and require further studies and research. If we wish to further develop innovative production methods that will improve our functioning, the negative effects that may impact individuals or whole communities must not be overlooked. Nanotechnology indubitably fits these characteristics. As long as the current state of knowledge does not permit exact ascertainment as regards physicochemical properties relevant in specifying detailed nanomaterial compositions, it is highly unlikely that researchers would be able to establish the potential risk involved. A certain aversion to risk and fear of potential consequences may inhibit growth of nanotechnology-based production methods.

Existence of defined threats opens up space for the functioning of insurance. Answering the need for nanotechnological risk management, the insurance sector should develop a strategy that would offer a reduction of risk aversion (especially among producers) and augment further development of nanotechnology-based production methods. By manipulating the risk connected to nanotechnology, it would be possible to further develop this area while providing protection against financial consequences of defined risk implementation.

However, this leads to questions whether nanotechnology-related risk is an insurable risk and whether it is technically feasible at this time to draft such an insurance offer. The present publication attempts to answer these questions.

The publication consists of four parts. Part one describes nanotechnology as a branch of science. Part two presents options of implementing nanotechnology-based methods in the industry. Part three discusses the hazards that nanotechnology poses for human health and the environment, and evaluates the insurability of risks connected to this production method (in the total lifespan of products containing nanomaterials).

In part four, authors advocate for applying mutual insurance specifics to risk management in conditions calling for nanotechnological use. The essence of mutual insurance creates opportunities for dealing with nanotechnology risk even in situations when no verified actuarial models enabling credible insurance contribution calculations exist.

The publication is based on authors’ own research and analyses of literature pertaining to nanotechnology risk management, including studies of reinsurers and insurance companies (Allianz, Zurich, Lloyd’s of London) as well as the study *The Insurability of Nanomaterial Production Risk,* Nature Nanotechnology 8, p.222–224 (2013), whose authors (Mullins M., Murphy F., Baublyte, L., McAlea Eamonn M.Tofail, Syed A. M.) discuss the possibilities of and auxiliary conditions for transfer nanotechnology risk to the insurance sector.