

Unknown risks

Reviewed by

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What is at stake?

In 1900, forty-five years before the first nuclear bomb exploded, very few could have predicted that atomic energy would be one of the main potential causes of global catastrophe. Climate change is now broadly regarded as an urgent global concern, but when the United Nations was established in 1945, it was very far from public attention. Rapid economic, scientific and technological development – which seems set to continue in the 21st century – brings unforeseen new risks in its wake. It is therefore likely that many future global catastrophic risks are at present unknown.

How much do we know?

There is obviously little that we know about unknown risks, but we do have the capacity to develop better methods for scanning and monitoring them.

Some risks independent from human action, mostly connected to distant cosmic forces, are currently assigned such a low probability that we chose to leave them outside of this report. For instance, if the Earth found itself in the direct path of a gamma ray burst from a distant star, this could result in a mass extinction event, but there is no clear trace of such an event ever occurring, and the risk remains theoretical. Scientific progress may lead us to reconsider the likelihood and expected impact of certain natural risks and bring new ones to our awareness.

As for risks resulting from human activity, they will most likely be related to new technologies and their interaction with existing social and natural systems. We cannot foresee what these risks will be in advance, but we can closely monitor scientific and technological breakthroughs, and assess what their potential impact may be, in order to take appropriate measures in advance.

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What are key factors affecting risk levels?

- A fast rate of technological change increases the chances of a risk rising to global concern before proper governance mechanisms can be put in place. Conversely, foresight work will support our ability to prepare for new risks in advance.
- The probability and impact of unknown risks correlates with the overall fragility of our societies, which in turn depends on the state of our environment, the availability of new technologies, and global governance systems in place.

Nanotechnology – a new emerging risk?

Our capacity to manipulate matter on the nano-scale has made it possible to manufacture materials engineered at the molecular level. These new products display remarkable characteristics and have the potential to address pressing human needs at low cost. Research on nanotechnology shows promise in a range of fields. Nanomedicine could help detect and destroy cancerous tumors more effectively and has the potential to significantly extend healthy lifespans. New solar cells and batteries based on nano-particles could be many times more efficient than those available at present and revolutionize renewable energy production. Nano-materials could exhibit unique capabilities: nano-fibers could also be used as sensors, to create clothing that monitors the wearer's health, or conjoined with nano-particles that prevent the growth of bacteria and eliminate bad smells. The strongest nano-materials like carbon nanotubes could be used to create structures that are extremely lightweight and yet highly strong and durable.

However, we know very little about associated risks. Studies have shown potential side-effects on health associated with the inhalation or ingestion of nano-particles, though very little is known as to potential broader impact on public health or the risk of large-scale pollution. Nano-technology also now raises significant concerns as to the possibility of large-scale surveillance through networks of microscopic sensors and robots – a technology generally referred to as 'smart dust'. Research on risks associated with nanotechnology and development of global governance frameworks in par with development of the technology itself will reduce the chances that materials with high potential impact on human health and the environment get into circulation.