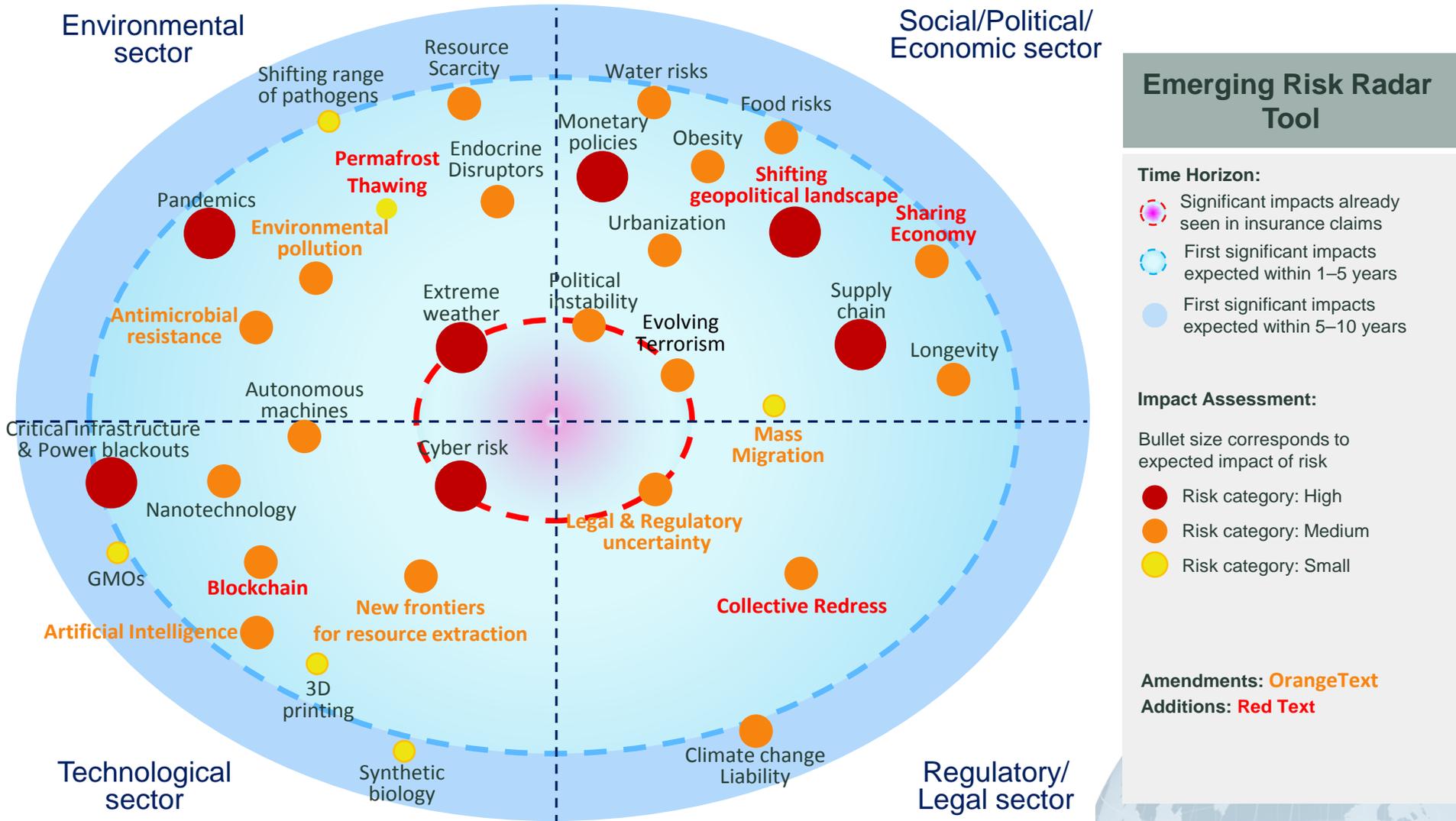




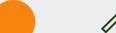
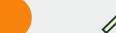
CRO FORUM

Emerging Risks Initiative

Risk Radar update – October 2016



Topic descriptions (1/10)

Topic	Sector Impact/trend	Description	ERI Publication
3D Printing	Technological 	3D printing raises a number of questions mainly with regard to product liability & recall, but potentially also affecting other lines such as worker's compensation and intellectual property rights. Since printing plans are readily available on the internet, the lack of control and product quality assurance is calling for a new legal framework for cases of failure.	2015
Antimicrobial resistance	Environmental 	Drug resistance occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that render certain medications ineffective. When microorganisms become resistant to most antimicrobials they are often referred to as “superbugs”. This is a major concern because a resistant infection may cause significant human and financial costs.	
Artificial Intelligence	Technological 	Progress in Artificial Intelligence (AI) and cognitive computing is leading to the transfer of the decision making process from human operators to machines. The transfer of the decision making process may result in risks, arising from liability issues originating from the decision making process.	2015
Autonomous machines	Technological 	Thanks to new developments in mechatronics and artificial intelligence there has been rapid progress in the field of autonomous machines. Autonomous vehicles in particular are on the upgrade. This includes cars, airplanes and other flying objects. This is likely to change the risk landscape for various lines of insurance business.	
Climate change Liability	Regulatory / legal 	On the legal side: New regulatory developments, increased litigation activity and subsequent liability issues associated with climate change/greenhouse gas emission may lead to large losses under environmental liability, product liability and D&O/professional liability.	2009

Topic descriptions (2/10)

Topic	Sector Impact/trend	Description	ERI Publication
Critical infrastructure Power blackouts	Technological 	In many regions of the world there is a chronic failure to adequately invest in, upgrade and secure infrastructure networks such as electricity provision, water supply, or transport infrastructure. This could lead to a higher than expected frequency and severity of large property losses (incl. BI/CBI). An example includes the risk of solar storms to the electric grid as well as space-based infrastructure, GPS and communications systems.	2008 & 2011
Cyber risk	Technological 	The volume and sophistication of malicious cyber activity has increased substantially, and there are growing concerns regarding the security of proprietary corporate data and critical industrial control systems. The growing request for personal identification and authentication, the use of biometric identifiers and the multiple uses of identifiers will likely increase the risk of identity confusion, fraud and even theft. Cloud computing poses elevated risks due to increased concentration and accumulations.	
Endocrine disruptors	Technological 	Endocrine disruptors are substances which can interfere with hormonal systems. If a direct link between such substances and human health problems could be established, this would have profound consequences for liability insurance throughout the entire value chain.	2012

Topic descriptions (3/10)

Topic	Sector Impact/trend	Description	ERI Publication
Environmental pollution	Environmental 	The International Agency for Research on Cancer (IARC), classified outdoor air pollution as carcinogenic to humans. Water Pollution is an endemic and growing issue. Noise pollution, soil pollution and light pollution too are damaging the environment at an alarming rate. Plastic litter and debris of all kinds is conspicuous on many contemporary shorelines and in other environments on the ground.	2009
Evolving Terrorism	Social / political / economic 	The risk of terrorism has been constantly evolving for the last two decades. This changing nature makes the assessment of this risk difficult and subjective: it is impossible to learn and infer from the past in order to model the future in the same way as we do with Nat Cat perils for instance. This makes any probabilistic modelling on this risk difficult and this is why assessing the plausibility of a specific type of terrorist attack in the future largely relies on expert judgment. Potential threats are NBCR terrorist attacks (Nuclear, Biological, Chemical Radiological) and other non-conventional terrorist attacks on computer systems and industrial installations (Cyber terrorism, Electro-Magnetic Pulse (EMP)).	2007
Extreme weather	Environmental 	Climate change triggers more frequent severe events that are not fully understood. This presents challenges for measurement and modelling. Extreme weather refers to weather phenomena that are at the extremes of the historical distribution and are rare for a particular place and/or time, making their temporal and spatial behaviour difficult to assess. The incidence and intensity of extreme weather events such as massive precipitation events are growing. Climate-related hazards can have huge socio-economic and environmental impacts if they interact with vulnerable ecosystems and societies.	

Topic descriptions (4/10)

Topic	Sector Impact/trend	Description	ERI Publication
Food risks	Technological 	There is a general increase in food safety notices and product recalls worldwide due to tightened regulation and greater supply chain globalisation. Cases such as the melanin scandal in China have shown how local criminal acts can have repercussions around the world.	2013
Genetically modified organisms (GMOs)	Technological 	Genetically modified organisms are organisms whose genetic material has been altered using genetic engineering techniques. Concerns have been raised over their possible ecological impacts, effects on health, ethical issues, the direction of agricultural change and the control of technologies.	
Legal & regulatory uncertainty	Regulatory / legal 	Current regulatory trends have prompted leading companies to re-examine the effectiveness of governance and oversight programs. The continued adoption of new or proposed regulations can lead to compliance challenges and to increasing regulatory complexity. Furthermore, 'non-regulation' has also been identified as a risk in many areas.	
Longevity	Social / political / economic 	Medical advances have increased life expectancy, which poses substantial problems in retirement financing, long-term care and healthcare in old age throughout much of the world. The challenge is not just that people are living longer, but also the fact that how long they live has been significantly underestimated for decades.	

Topic descriptions (5/10)

Topic	Sector Impact/trend	Description	ERI Publication
Mass Migration	Social / political / economic 	Numerous conflicts as well as economic pressure have resulted in large-scale disruptive migration into Western Europe. The arrival of large numbers of migrants translates into increased pressure on welfare systems and infrastructure. This may result in socio-economic and political consequences which are not yet fully understood or identified recognized.	
Monetary policies	Social / political / economic 	Expansive monetary policy may generate inflation, which will increase insurance claims beyond the expectations of the original policy. On the other hand, decisions that favour the shrinkage of sovereign balance sheets might cause deflation, which would result in market liquidity drought and ultimately contraction of insurance business.	
Nanotechnology	Technological 	The manipulation of matter on an atomic and molecular level raises concerns about nanomaterial toxicity as inherent risk exposures are relatively unknown throughout the product life cycle. Similar to the asbestos case, there is potential for long latent large losses across various industries. However, nanotechnology-related advances in medicine and healthcare could have an overall positive impact on mortality and morbidity.	2010



Topic descriptions (6/10)

Topic	Sector Impact/trend	Description	ERI Publication
New frontiers for resource extraction	Technological 	<p>Increased demand for natural resources is leading to exploration in previously unexplored areas, resulting in potential ecological disasters and the destruction of natural habitats (e.g. drilling in the Arctic). Complex technologies applied in extreme situations lead to increased risks. For instance, development and production of unconventional oil and natural gas resources, including fracking and oil sands, requires processes and technologies that differ considerably from those used for conventional resources in terms of energy input, cost and environmental impact. As these technics expand, concerns about the sustainability challenges and impacts associated increase too, displayed through e.g. increased activist criticism and media coverage.</p>	
Obesity	Social / political / economic 	<p>The increasing prevalence of obesity has a direct impact on life-expectancy as well as on healthcare costs, with the latter also subject to potential future changes in legislation regarding reimbursement. Liability might be affected where e.g. sedentary jobs or specific products consumed can be directly linked to weight gain. Medical progress with the aim of reducing future obesity presents an opportunity especially for life insurers.</p>	
Pandemics	Environmental 	<p>Pandemics are a material risk that has the potential to affect all life insurance markets around the world. Ongoing medical developments along with changes in the way that individuals and authorities respond to a pandemic threat make it difficult for life insurers to predict the scale and nature of the next pandemic.</p>	2007

Topic descriptions (7/10)

Topic	Sector Impact/trend	Description	ERI Publication
Political instability	Social / political / economic 	Political instability and violent social unrest can appear suddenly and may spread like wildfire if underlying structural causes are given. These include high food and energy prices, water scarcity, high unemployment and poor public services. This is likely to impact insurance losses under property schemes (incl. BI/CBI), particularly in areas of high value concentration.	
Resource Supply Scarcity	Environmental 	As the world economy continues to grow – to a large extent driven by the rapid industrialization and growth of developing nations – and world population increases, so does the demand for natural resources. Furthermore, activities aimed at the extraction of resources result in environmental pollution and growing scarcity may lead to conflicts in the future.	
Shifting range of pathogens	Environmental 	Due to the impacts of climate change and an ever greater density of global travel networks, many pathogens are expanding and/or shifting their range, with potential implications on human health and agricultural production.	



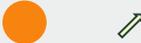
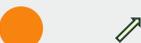
Topic descriptions (8/10)

Topic	Sector Impact/trend	Description	ERI Publication
Supply chain	Social / political / economic 	Hyper-optimisation of supply chains due to improvements in technology and global logistics may increase vulnerabilities to disruption and concentrations of risk. Further risks arise from increased complexity resulting from the rise in interconnectivity. This may result in higher than expected accumulation and correlation of insured losses.	
Synthetic biology	Technological 	Synthetic biology refers to the design and construction of biological devices and systems. It relies on key enabling technologies such as DNA sequencing and measuring gene expression which have progressed rapidly. It could have far-reaching consequences for medicine.	
Urbanization	Social / political / economic 	Our world is moving into unprecedented technological dimensions, with new records being set almost every day. Complexity and interconnectivity are increasingly becoming part of our day-to-day lives. Urbanisation changes the way we live and shifts the way we interact with our environment.	2014
Water risks	Social / political / economic 	Increasing global population, undermine water and food security. Associated risks include water scarcity, pollution, health, water treatment issues, decreased economic growth, a rise in social and political instability and conflicts, reputation risks.	2016

Topic descriptions (9/10) – New Entries

Topic	Sector Impact/trend	Description	ERI Publication
Blockchain and Digital currencies	Technology  	<p>Blockchain” is a distributed ledger that exists on peer-to-peer computer networks. The technology first came to prominence as the technology supporting Bitcoin and other crypto-currencies (see below). However, interest is now growing in the technology in its own right and its core attributes of security, resilience and transparency. Early stage applications include in settlement of bond and equity transactions and providing a secure record of asset ownership. However, potential applications go much wider. The full extent of Blockchain’s application to financial services is difficult to ascertain at present and some important hurdles remain, such as scalability and anonymity (for KyC and AML purposes). Nevertheless, the technology is expected to be substantially disruptive to incumbent operators in a variety of markets, including insurance. The level of investor interest in the technology which is substantial, notably by the Fintech community and the growth in start-ups looking to exploit different applications of the technology, can be taken as indicators of the scale of the threat/opportunities that Blockchain could pose.</p> <p>A crypto-currency or digital currency is a form of currency or medium of exchange that is electronically created and stored. Some digital currencies such as Bitcoin are cryptocurrencies, that is they rely on cryptography for chaining together digital signature of token transfers. There are concerns that cryptocurrencies are extremely volatile and prone to 'pump and dump' fraud.</p>	

Topic descriptions (10/10) – New Entries

Topic	Sector Impact/trend	Description	ERI Publication
Collective Redress	Regulatory/Legal 	The development of collective redress mechanisms, defined as a “procedural mechanism which allows, for reasons of procedural economy and/or efficiency of enforcement, many single claims (relating to the same case) to be bundled into a single court action” in Europe, can create an inflation of claims as seen with “class actions” in North America.	
Permafrost Thawing (New since May)	Environmental 	The permafrost is subject to thawing and to increased human activities, e.g. from mining. Permafrost thawing will release massive quantities of methane, a potent greenhouse gas, while loss of ice cover threatens to expose nuclear waste in Greenland from an old US military base. Permafrost thawing might release microbes, some of them potentially harmful for humans. Two kind of microbes have already been released during the summer 2016 (i) Ancient microbes that lived originally as far back as 50.000 years ago, and (ii) recent such as anthrax and smallpox.	
Sharing Economy (New since May)	Social / political / economic 	From UberPOP to AirBnb, the customers are now taking charge, a business model that started out as B2B/B2C is now shifting to C2B – i.e. the customer becoming the entrepreneur. New challenges for risk economy arise from this shift away from classic to new business models in insurance services (e.g. peer-to-peer insurance)	
Shifting geopolitical landscape / war risk (New since May)	Social / political / economic 	Together with a general relative shift of global economic power from the West to the East, new geopolitical settings and ambitions are increasing the complexity and instability of global power balances. Failure of global governance, and increasing bilateral or multilateral dispute between states increase the risk for trade wars and military conflict, thus destabilizing the world economy and particularly financial markets.	

Deleted Entries in 2016

Topic	Sector Impact	Description	ERI Publication
Digital currencies	Social / political / economic 	<p>A digital currency is a form of currency or medium of exchange that is electronically created and stored. Some digital currencies such as Bitcoin are cryptocurrencies, that is they rely on cryptography for chaining together digital signature of token transfers. There are concerns that cryptocurrencies are extremely volatile and prone to 'pump and dump' fraud.</p> <p>Motivation of the proposed deletion: it has been inserted in Blockchain.</p>	
Personal damage compensation	Regulatory / legal 	<p>An escalation of medical expenses, a steady increase in indemnity, combined with more plaintiff-friendly court rulings and the new possibility of collective redress in Europe create a difficult environment for workers' compensation products. This also includes recent developments regarding sports-related head injuries.</p> <p>Motivation of the proposed deletion : this is an older entry, the escalation of medical expenses more-friendly court rulings can not be considered as emerging any more. Collective redress is treated separately.</p>	

Previously deleted entries since 2011

- ❖ EMF : Electromagnetic Fields
- ❖ Asbestos / Silica
- ❖ MTBE - Methyl Tert-Butyl Ether
- ❖ Welding rods
- ❖ Toxic moulds / implants
- ❖ Alcohol
- ❖ Occupational Diseases



Emerging Risks Initiative Position papers published by the CRO Forum

Topic	Year	Chairing Cy
Water risks	2016	SCOR
The Smart factory	2015	Prudential
Pushing the limits, Human Rights & Corporate insurance	2014	Swiss re
Food, Risk Appetite, Diversification, ESG	2013	Lloyd's
Endocrine Disruptors	2012	Hannover Re
Power blackouts	2011	Allianz
Nanotechnology, Longevity, Carbon nano tubes	2010	Zurich Ins.
Environmental Liabilities, Work related stress	2009	RSA
Critical Information Infrastructure	2008	AXA
Terrorism, Influenza pandemics	2007	Munich Re
Climate Change and tropical Cyclones	2006	Swiss Re



CROF ERI Position Papers 2005-2016

Water Risks
23 and 27 September 2016

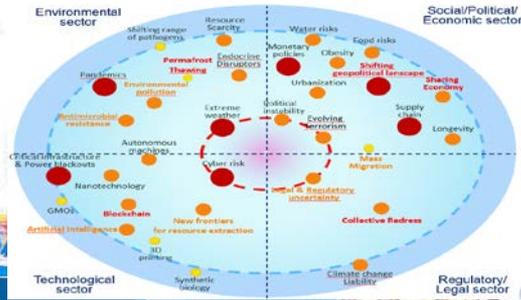
2008 Axa

2007 Munich Re

2006 Swiss Re



2009
RSA



Water Risks
Emerging Risk Initiative - Position Paper
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2010
Zurich



2010
Zurich

Nanotechnology
CROforum
Emerging Risk Initiative - Position Paper
November 2010
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Power Blackout Risks
Risk Management Options
Emerging Risk Initiative - Position Paper
November 2011
CRO FORUM

Endocrine Disruptors
Risk Management Options
Emerging Risk Initiative - Position Paper
November 2012
CRO FORUM

Food and its impact on the risk landscape
Emerging Risk Initiative - Position Paper
November 2013
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Pushing the limits - managing risk in a fast-changing world
Emerging Risk Initiative
November 2014
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The Smart Factory - Risk Management Perspectives
December 2015
Emerging Risk Initiative
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2016 SCOR

2015 Prudential

2014 Swiss Re

2013 Lloyd's

2012 Hannover Re

2011 Allianz

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