14th Survey of Emerging Risks – Executive Summary

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14th Survey of Emerging Risks

It is impossible to comprehend the results of this survey without some context. The survey was open during November 2020. While the world's primary risk was COVID-19, and it continues to surprise us today with new symptoms and variants, the year set records for wildfires and hurricanes as well. Into 2021 we have seen Lenin's observation play out.

There are decades where nothing happens; and there are weeks where decades happen.

While the Atlantic hurricane season set records, impacting Central America, the Caribbean and the United States, typhoons hit Asia, especially the Philippines, and cyclones in May impacted India and Bangladesh. Climate change continues to impact the strength and frequency of these storms. Heat and drought interacted with wildfires, especially in Australia and the western United States, leading to deaths and property damage. Increasing levels of carbon dioxide were only briefly slowed during early lockdowns as the Keeling Curve (measure of carbon dioxide atmospheric concentration) continues to set records.

Economic growth was volatile following the shutdowns early in the year, with large government stimulus aiding recovery efforts but building debt to levels not seen since World War 2. Trade wars and cyber-attacks introduced new issues to work through. Oil supply and currencies cycled quickly.

The pandemic hit hard worldwide starting in mid-March, and likely was present several months before that. Many ramifications are yet to be understood. For example, moratoriums on evictions of renters and owners are being lifted at a time when housing costs are leading a wave of inflation. Supply chain issues are likely to be noted later in 2021 as shipping container shortages and export manufacturing clarifies.

Whether climate change, pandemics, cyber, war, or financial volatility, the risk landscape is moving quickly, and historical distributions are no longer stable. Unknown knowns, where historical distributions are no longer predictive, are becoming the norm for many risks. The good news is that experience often is an advantage to recognizing these impacts. Artificial intelligence (AI) tools struggle to predict these changes before the experienced practitioner, and the best analysis seems to come from experienced modellers working with AI tools.

This survey attempts to track the thoughts of risk managers about emerging risks across time. It is the 14th survey of emerging risks sponsored by the Canadian Institute of Actuaries (CIA), Casualty Actuarial Society (CAS) and Society of Actuaries (SOA). The researcher thanks the Financial Reporting and Reinsurance Sections for their financial support, and the Joint Risk Management Section for logistics and governance.

Trends about emerging risks are as important as absolute responses, helping risk managers contemplate individual risks, combinations of risks, and unintended consequences of actions and inactions. The survey responses, especially the comments, give risk managers a way to anonymously network with peers and share innovative ways they think about risk. Each completed survey helps those who participate think more deeply about the topic, and it is anticipated that the reader will benefit in this way as well.

The Executive Summary contains a high-level overview of the survey, and the results section provides commentary about the survey in its entirety. Appendix I includes definitions for all 23 individual risks. Complete survey results can be found in Appendix II, allowing the reader to scan specific sections or questions, and they include every comment received for the open-ended questions. Everyone has a different level of expertise and experience, and personally reviewing the comments will allow the reader to reach their own conclusions and pick out ideas that are useful to them. Appendix III provides a link for those interested in reviewing reports, podcasts, and other material from previous surveys in the series.

Section 1: Executive Summary

The year 2020 will be remembered for a long time, both for events that caused death and destruction as well as for acts of kindness. The medical profession and other essential workers stepped up in ways that created burdens on them, and concerns about inequality and racial justice became seen in a new light in ways that are stimulating research seeking data so solutions can be developed.

Flooding in Jakarta, Afghanistan, Michigan and the United Kingdom, Cyclone Amphan in India and Bangladesh, the Typhoons Goni and Vamco back-to-back in the Philippines (with the volcano Taal also acting up), a record setting Atlantic hurricane season led by Laura and Eta, heat waves seemingly everywhere, wildfires in Australia and California and earthquakes in Turkey were all material regional events. Geopolitical tensions and deglobalization continued, and 2020 were reported to be tied with 2016 as the warmest year on record.[1] This evolution of risks is captured in the *14th Survey of Emerging Risks*, completed in November 2020. These events provide examples where recent occurrence of an event leads those who experienced it to overestimate its reoccurrence. This is called *recency bias*[2] and has consistently affected the results of this and other surveys about risk management.

The rotating question in this survey's iteration, where respondents are asked to choose up to three applicable risks, asked which emerging risks interact prominently with COVID-19. Not surprisingly, in addition to *Pandemics/infectious diseases* as runner-up with 18%, *Financial volatility* (20%) and *Chronic diseases/medical delivery* (13%) were also named by more than 10% of respondents.

The responses across all questions, but especially as a current risk, highlight a surge of perceived risk from pandemics. Several open-ended questions solicited respondent's experience with planning for a pandemic, both prior to the current event and looking forward. Climate change and technology concerns remain high priorities. Using this report as a contrarian indicator may help a risk team anticipate future issues that are not currently in the public eye. An example in this iteration of the survey may be earthquakes and energy price shocks, which finished with the lowest responses when five emerging risks were chosen. Surprisingly, given the records set in 2020 around the world, tropical storms are one of the lowest rated risks.

1.1 SURVEY FRAMEWORK

The survey is completed annually (except in 2008, which included the first two iterations in spring and fall), generally during November. In addition to the top emerging and top five emerging risks, the survey also looks at the top current risk and risk combinations. Combinations of risks often follow the patterns shown when looking at emerging risks one at a time but sometimes also reflect surprises. Some risks are more common when viewed with others than by themselves. This paper will review these quantitative responses, looking for material changes and trends, in addition to considering qualitative risk assessments and current topics. First, we will review the questions that headline the survey.

Respondents select from 23 risks in five categories as follows. When a chart shows 24 risks, the last one is *Other*, and the survey asks specifically which risks are missing so they can be considered in the future. Some risks that will be considered for increased exposure are economic inequality, racial inequality, and food insecurity.

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[1] https://www.nasa.gov/press-release/2020-tied-for-warmest-year-on-record-nasa-analysis-shows

[2] Kahneman, Daniel. *Thinking Fast and Slow*. 2013. Farrar, Straus and Giroux. People tend to recall something that has happened recently more easily than something that occurred in the more distant past. This is recency bias, defined by Daniel Kahneman and Amos Tversky. This is among the psychological insights that resulted in Kahneman receiving the Nobel Prize in Economics in 2002.

Economic Risks
1. *Energy price shock*
2. *Currency shock*
3. *Chinese destabilization*
4. *Asset price collapse*
5. *Financial volatility*

Environmental Risks
6. *Climate change*
7. *Loss of freshwater services*
8. *Natural catastrophe: tropical storms*
9. *Natural catastrophe: earthquakes*
10. *Natural catastrophe: severe weather*

Geopolitical risks
11. *Terrorism*
12. *Weapons of mass destruction*
13. *Wars (including civil wars)*
14. *Failed and failing states*
15. *Transnational crime and corruption*
16. *Globalization shift*
17. *Regional instability*

Societal risks
18. *Pandemics/infectious diseases*
19. *Chronic diseases/medical delivery*
20. *Demographic shift*
21. *Liability regimes/regulatory framework*

Technological risks
22. *Cyber/networks*
23. *Disruptive technology*

Respondents are asked to define greatest strategic impact since this is how they will make their choices. Possible responses follow combinations of three groups (world economy; me personally or my firm/industry; lives, habitat, and safety) and two types of impact (financial, disruption). In this iteration of the survey disruption was chosen more frequently than financial impact.

1.2 TOP FIVE EMERGING RISKS

The results continue to show interesting trends, although some were broken in this iteration of the survey. Figure 1 shows the pattern of responses when respondents were asked to choose their top five emerging risks from among 23 individual risks (and "Other"). The risks roll up into five categories (Economic, Environmental, Geopolitical, Societal, and Technological). The Geopolitical category of risks held steady from the prior survey (26% of the total chosen when up to five emerging risks were selected) and maintained the top category response, as Societal moved into second place (20%), just ahead of Technological (19%), Environmental (17%), and Economic (16%). The uppermost choice (although not ranked among the top five risks overall) from the Geopolitical category was *Wars (including civil wars)* (25% of respondents choosing it in their top five, steady with the prior survey). *Globalization shift* (25%, up from 20%) increased and *Regional instability* (17%, down from 22%) fell.

Figure 1

Emerging Risks by Category (Up to Five Risks Chosen per Survey)

% of Responses in given year
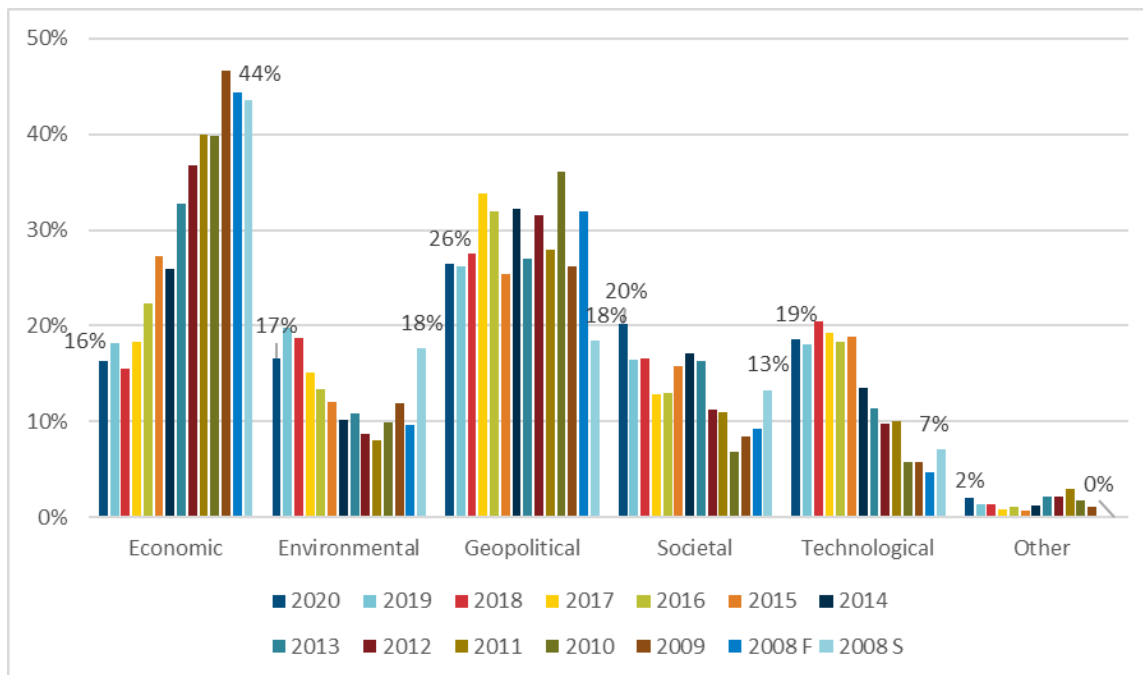
Risks with new highs across the survey history were *Pandemics/infectious diseases* (45%) and *Disruptive technology* (40%). Electric vehicles, batteries, renewable power, and 5G technology all seemed to gain exposure, with new investment vehicles designed to identify companies most likely to disrupt. A new low was recorded by *Regional instability* (17%). From the prior iteration of the survey all five of the Environmental risks were lower.

Climate change remains the top response, followed by *Cyber/networks* and *Pandemics/infectious diseases*.

The evolution of the top five risks chosen provides evidence that trends can be relied on in this survey, and the general continuity between survey iterations adds credibility (the top five are consistent, with only the top two choices switching places). As shown in Table 1, several risks have remained consistently at the top over the past four years.

Table 1

Top Five Emerging Risks, 2017–2020

| Year	2017	2018	2019	2020
1	Cyber/networks	Cyber/networks	Climate change	Climate change
2	Terrorism	Climate change	Cyber/networks	Cyber/networks
3	Disruptive technology	Disruptive technology	Disruptive technology	Disruptive technology
4	Regional instability	Demographic shift	Demographic shift	Pandemics/ infectious diseases
5	Asset price collapse	Financial volatility	Financial volatility	Financial volatility

Three risks increased materially from the previous survey when respondents were asked to choose their top five emerging risks. *Pandemics/infectious diseases* more than doubled (22% to 45%), *Globalization shift* (20% to 25%), and *Disruptive technology* (35% to 40%) each showed big jumps. *Chinese destabilization* (23% to 15%) and *Demographic shift* (33% to 25%) both fell despite news about each during the year.

Figure 2 shows the results for the top five emerging risks from the most recent two surveys, listed in order of the rankings from 2019, highlighting the volatility between years for a few risks.

Figure 2

Year-Over-Year Emerging Risks (Up to Five Risks Chosen per Survey)

% of Responses in Given Year
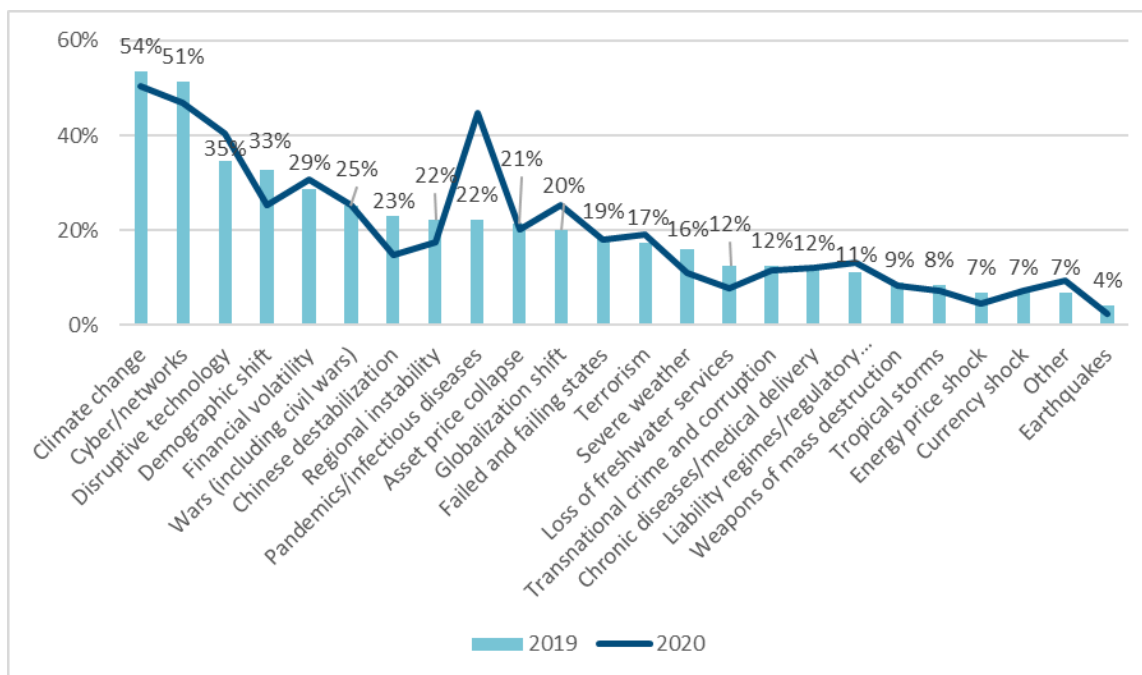
1.3 TOP EMERGING RISK

When asked for a single emerging risk from the respondents' top five, the results saw some repositioning, with *Climate change* maintaining its lead and *Disruptive technology* moving closer by 5% in second.

The results for the top emerging risk question were as follows (61% of respondents selected one of the top five, up slightly with the previous survey):

1. *Climate change* (26%, down from 27%)
2. *Disruptive technology* (15%, up from 11%)
3. *Pandemics/infectious diseases* (8%, up from 2% and the largest absolute gain)
4. *Financial volatility* (5%, down from 6%)

Cyber/networks dropped out of the top five, falling from 10% to 3%, for the largest drop after a peak of 23% in 2015. All of the risks except *Natural catastrophe: earthquakes* were selected by at least one respondent as top emerging risk in this iteration of the survey for the third consecutive year. *Climate change* responses kept the Environmental category in a solid lead (29%, down from the previous year's 32%).

Figure 3 shows how the categories have evolved over the last few iterations of the survey, with increases in the Environmental, Societal, and Technological categories offset by a large reduction in the Economic category.

Figure 3

Top Emerging Risks by Category – Single Greatest Impact

% of Responses in Given Year
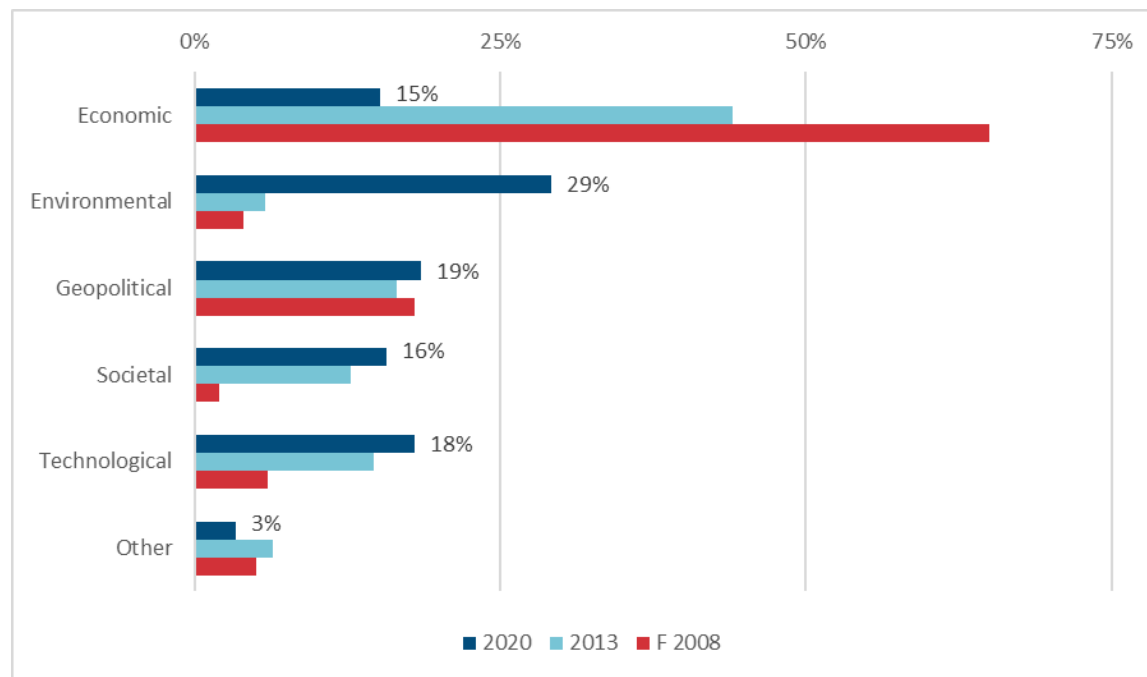
1.4 TOP CURRENT RISK

Not surprisingly, the top current risk in 2020 was *Pandemics/infectious* diseases, with none of the other risks higher by 1% and four risks receiving no support: *Natural catastrophe: tropical storms*, *Natural catastrophes: earthquakes*, *Regional instability* and *Demographic shift*.

Figure 4

Top Current Risk, Year-Over-Year

% of Responses in Given Year
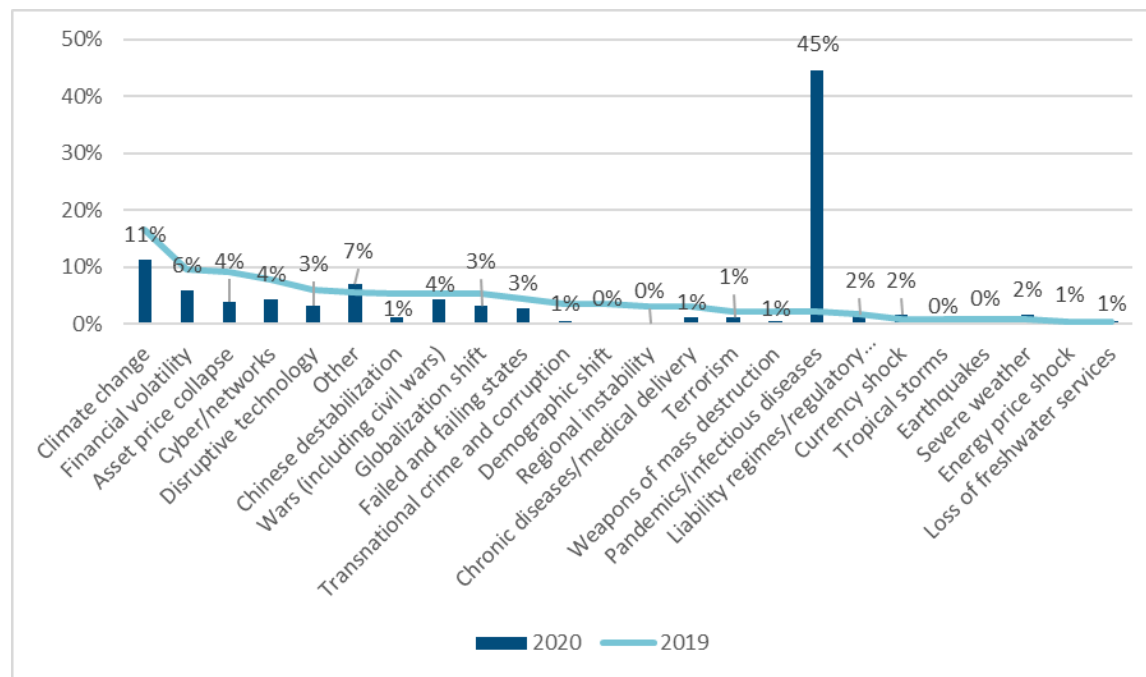
1.5 RISK COMBINATIONS

There are several terms represented by *risk combinations* in this report. *Compound risks* are correlated risks that impact a specific result. An example of this would be the interaction between climate change, financial growth and regional conflicts. *Risk clusters* do not require correlation, looking at multiple risks that an organization like an insurer or reinsurer could incur either in parallel or sequentially. Risk combinations can be insightful, as readers can review which risks other risk managers think work together in material ways. The top three risks chosen in combination were the same as the previous survey, but in a different order: *Climate change*, *Financial volatility,* and *Cyber/networks*. Interestingly, no combination of these three risks appears in the top five. The top five saw a lot of turnover, with only *Cyber/networks* and *Disruptive technology* maintaining its top five status (at number 1). Overall, the Societal category moved up and the Environmental category moved down from the prior survey. *Climate change*, the top risk chosen, was shut out of the top five combinations after being present in two in the previous survey.

These are the top five combinations that were selected:

1. *Cyber/networks* and *Disruptive technology* – 6%
2. *Asset price collapse* and *Financial volatility* – 4%
3. *Wars (including civil wars)* and *Failed and failing states* – 3%
4. *Financial volatility* and *Pandemics/infectious diseases* – 3%
5. *Terrorism* and *Cyber/networks* – 3%

Results this year for the top five combinations were less concentrated, with their total adding up to 20% after last year's comparable total of 21%.

There are 253 possible two-risk combinations of the 23 risks, and the risk concentration ratio is a metric showing how diverse results are. Comparisons are made by ranking the risks and comparing the resulting statistics, looking at the 25th percentile, 50th percentile (median), 75th percentile and total. A higher percentage reflects greater concentration of concerns. A result of 100% would be comparable to the base year of 2009, which has turned out to be an outlier of concentrated risk, when respondents were dealing with the aftermath of the great financial recession. As shown in Figure 5, the distribution of results was less concentrated than in the prior year and at its lowest level since the question was added in 2010.

Figure 5

Risk Concentration Ratio (Base 2009 = 100%)
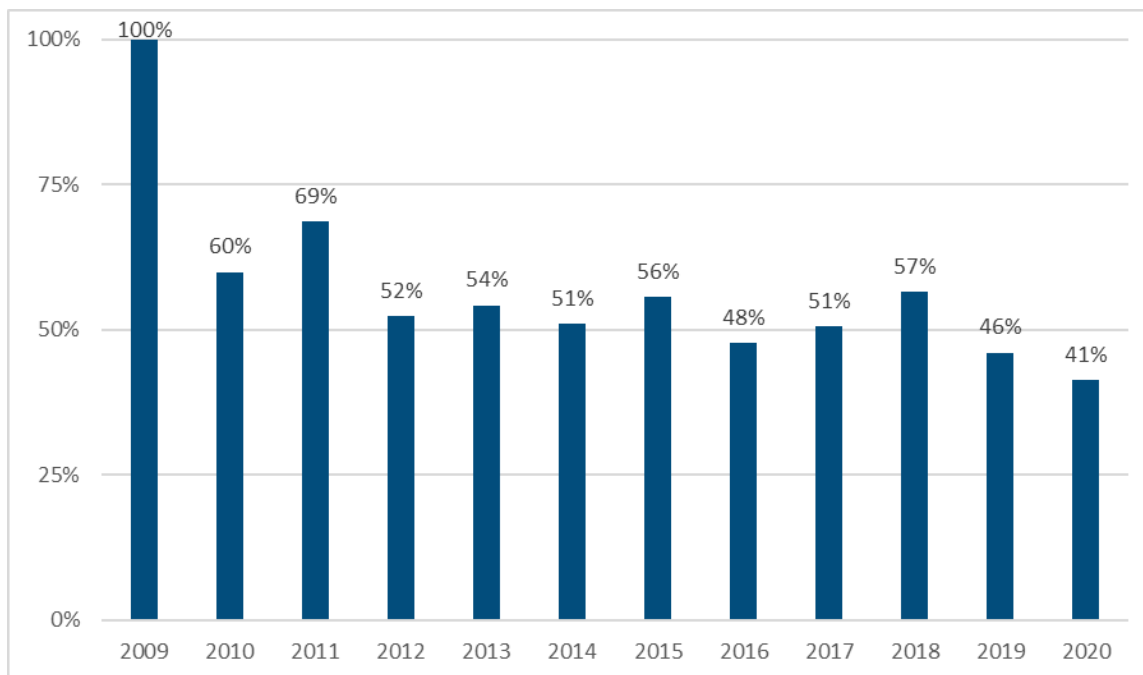
As a relative measure, the risk concentration ratio represents the current feeling among the risk management community. A lower risk concentration ratio can be interpreted as reduced risk, or it may mean a greater variety of risks are being considered. Alternative interpretations should be considered for a year such as 2020, where a single risk dominated but a wide variety of risk events occurred.

1.6 TRENDING

Figure 6 shows results for this survey by category for the top current risk, the top five emerging risks (as a percentage of the total), the top emerging risk and combinations. Risk managers are given an option (*Other*) if they feel a risk is not represented in the list; typical references were about political issues. The survey question with the highest response rate includes a data label for each category. Generally, the top five emerging risks and combination questions generate similar results, while the top current risks drive the top emerging risk categories higher, but these results are an anomaly driven by the presence of a dominant risk.

Figure 6

Category Comparison Across Four Questions
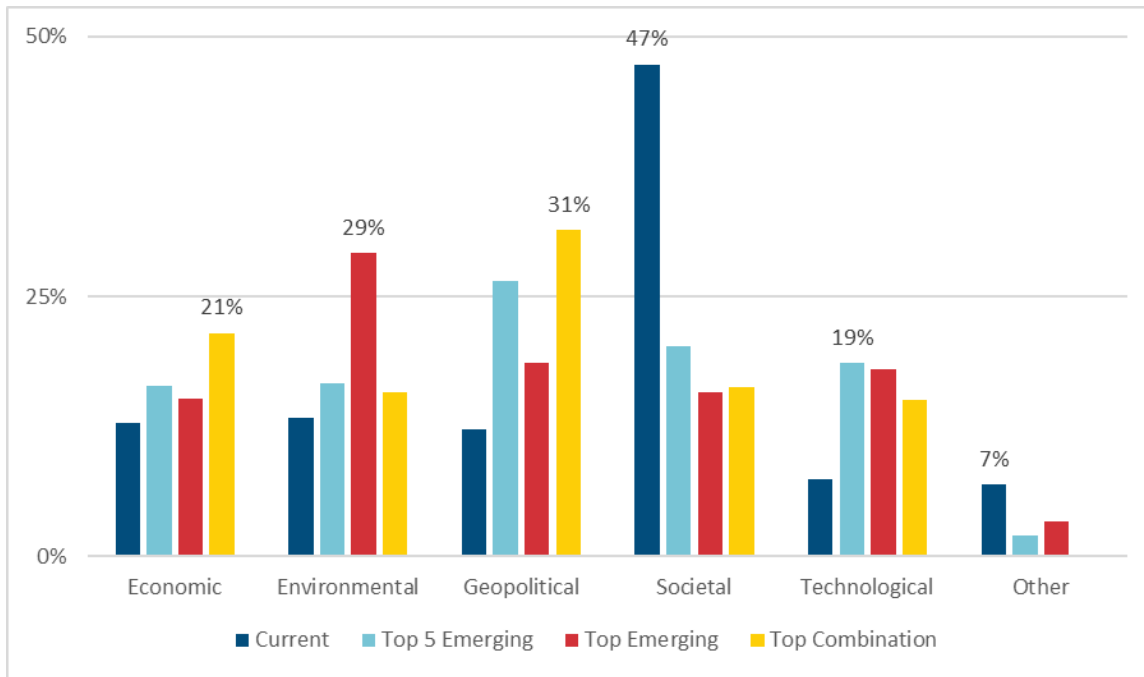
% of Responses to Given Question

Figure 7 compares the current risk results with the top five, top emerging risk and combinations at the individual risk level. Hypothesizing why there are discrepancies is useful, and readers may have different viewpoints.

Figure 7

Risk Comparison Across Four Questions

% of Responses to Given Question (Note that the maximum value for a response has been truncated at 15% to better display differences between the majority of the risks – an uncapped maximum is available in the appendix.)
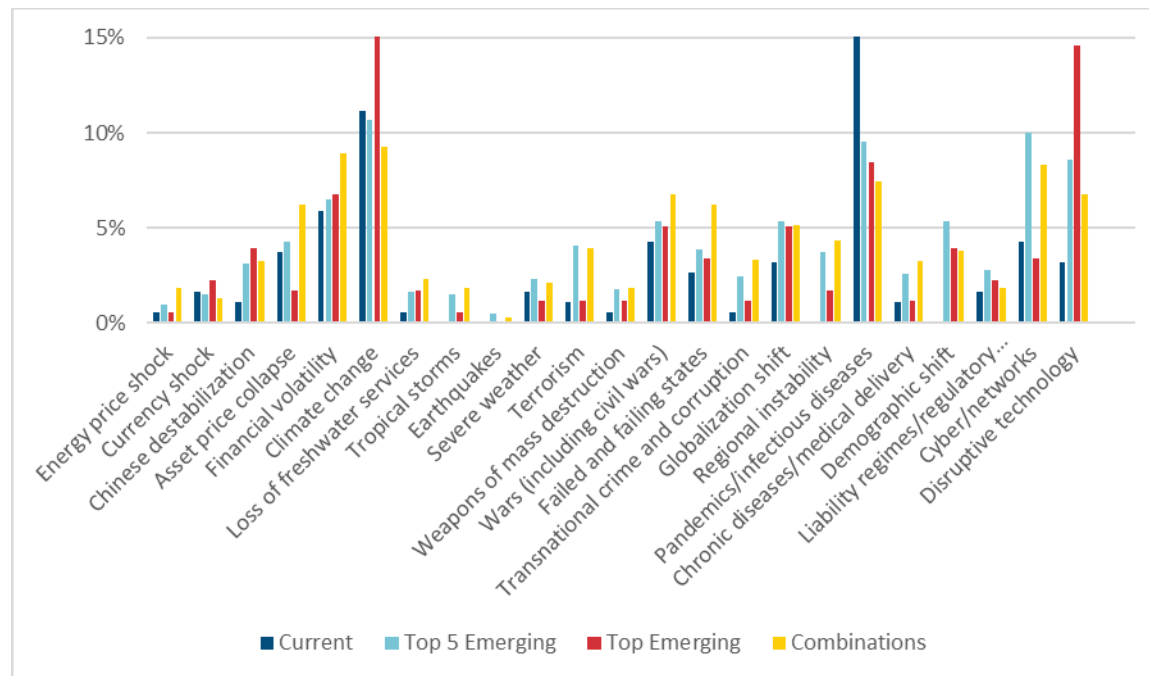
The top risk with the greatest disparity favoring the current risk over the top emerging risk is *Pandemics/infectious diseases.*

The top risk with the greatest disparity favoring the top emerging risk over the current risk is *Climate change.*

The top risks with the greatest disparity favoring the top five emerging risks over the top emerging risk is *Cyber/networks*.

The top risk with the greatest disparity favoring the top emerging risk over the top five emerging risks is Climate change (15.7%).

The top risk with the greatest disparity favoring the top current risk over the top five emerging risks is *Pandemics/infectious diseases*.

The top risk with the greatest disparity favoring the top five emerging risk over the top current risk is *Cyber/networks*.

1.7 COVID-19

The ongoing coronavirus pandemic could have been much worse for insurers and other institutional investors. Central banks around the world quickly provided stimulus and backstopped some at-risk asset classes.[3] Based on number of lives lost, mortality impacted primarily retirees and those with co-morbidities. These groups typically have low net-amount-at-risk amounts if they own a life insurance policy, and mortality risk was offset by longevity benefits in payout annuities, so life insurer profitability was minimally impacted.[4] Autos were driven fewer miles and business interruption policies are being litigated regarding coverage. Morbidity risk has offsets with higher costs

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[3] Schilling, Lisa. *COVID-19 Economic and Asset Impact Update, September 30, 2020.* https://www.soa.org/resources/experience-studies/2020/covid-19-economic-impact/
[4] Rudolph, Max. Life Pandemic Model Updates to US Life Insurance Industry Moderate Scenario. January 2021. https://www.soa.org/resources/research-reports/2021/life-pandemic-model/

associated with those who got sick and lower costs from care deferred. Long COVID implications on disability and vaccine levels of success are likely to drive longer term implications of the pandemic. Many companies were prepared for a work-from-home scenario, with technology capabilities allowing office workers to complete many tasks securely from off-site.

The five risks considered most likely to interact with COVID-19 include some that are unsurprising like *Pandemics/infectious* diseases and *Chronic diseases/medical* delivery, but also *Financial* volatility, *Asset price collapse,* and *Globalization shift*. Recognition of the impact on economic and geopolitical risks will help risk managers with future scenario planning.

Figure 8

Interaction with COVID-19

% of Responses to Selected Question
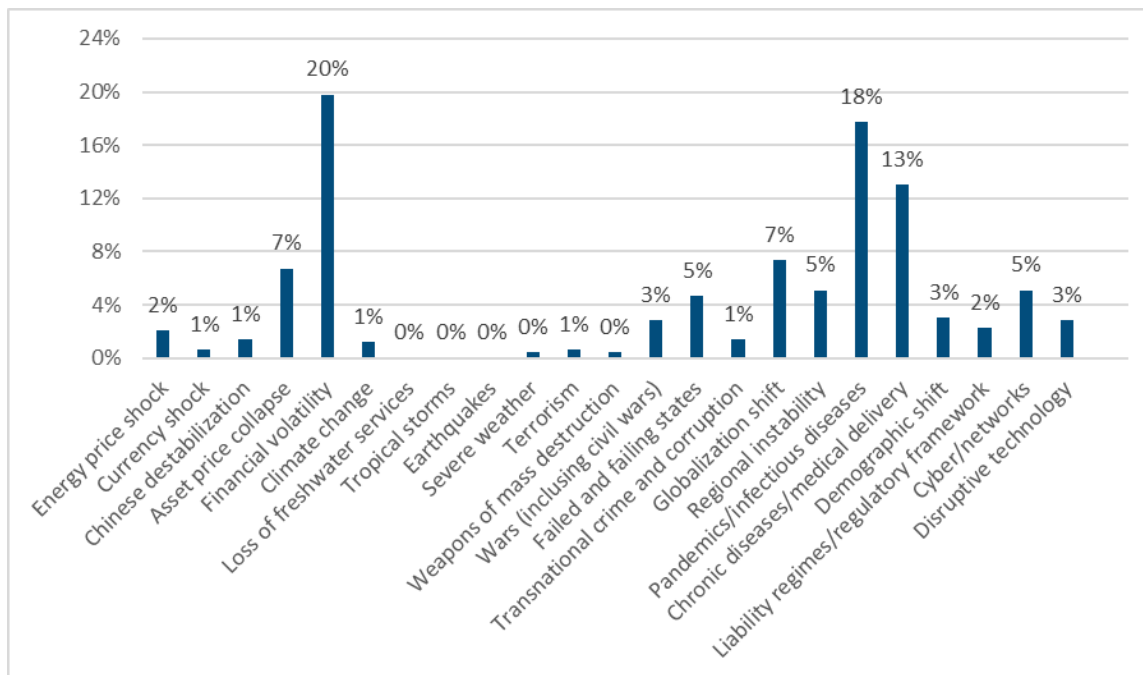
Responding to open-ended questions about previous planning for a pandemic, and how that planning is evolving, leads to some useful lessons. Many companies had previously tested their business continuity plans and found that work-from-home would work, a solution not available even in the recent past due to limited internet bandwidth. Many companies had already implemented regularly occurring remote access capabilities, and had tested it. Those who had no plan reacted quickly to set up laptops for everyone. Some had personal protective equipment on site and an employee support network in place. Scenario planning provided a baseline for the response at some companies. It will be interesting to track the environment during reopening as work and business travel evolves.

Pandemic preparations at some companies were not prioritized in advance due to a low likelihood of occurrence. Others did more talking than doing, and one respondent noted that they prepared for disruption without focusing on specific reasons for it.

Noticeably absent from all but a few comments was any reference to asset planning or concerns about liquidity, although the large initial drops in asset values created large liquidity concerns.

Following the initial response to the pandemic, many risk teams were recognized for various risk management efforts and scenario planning. Others said there was minimal change, or that risk discussions had become more political. Companies now view working from home generally in a more positive light.

Risk planning moved from theoretical to relevant during this risk event, but sometimes has gone too far. Personal freedoms must be balanced against the greater good of the community. Perhaps the time is right to consider clusters of risks occurring simultaneously, and how those risks may interact.

1.8 EMERGING OPPORTUNITIES

Strategic risk management involves looking past a short time horizon and seeking out opportunities. Respondents were asked which emerging opportunities, either priced to add value or to provide diversification, they were monitoring. Few listed any specifics, but those who did tended to look at diversification by risk (mortality/longevity risk) or company structure (e.g., captives). Technology driven distribution was another perceived opportunity.

1.9 BUBBLES

While a few respondents continued to argue that there is no such thing as a bubble (that is, market prices are always deemed correct), other respondents identified quite a few potential bubbles. These included liquidity shortfalls and a wide variety of asset classes. Concerns were also raised about firms with high acquisition cost and technology laggards.

1.10 UNKNOWN KNOWNS

Unknown knowns, where the analyst is ignorant of the probability distribution of a future event despite possessing historical data (thus the results are not predictive of the future), will be a great challenge for the next generation of risk managers. What will be the "new normal" post COVID? Most respondents manage the risk using scenario testing, holding additional capital and seeking diversification. Some in the group named gene therapy, taxes, climate events, cyber risk, interest rates, and social attitudes among their concerns.

1.11 LEADING INDICATORS

As formal risk appetite policies and regulatory processes stabilize, less than half of firms formally identify emerging risks. A large subset of this group identifies leading indicators for emerging risks, and most who do also have criteria for action based on them. Examples of the process include tracking social unrest following the George Floyd killing and other risks with changing statistical distributions to identify tipping points.

1.12 RISK VERSUS RETURN

Over half of respondents (59%) said that enterprise risk management (ERM) had a positive effect in their company/industry, and 47% noted that ERM improved returns relative to risk (with only 8% saying it did not). Examples of positive ERM related to sharing of supplies with medical professionals and improved methods to allocate capital in a low interest rate environment and other strategic initiatives.

Respondents who stated that ERM does not improve returns relative to risk were concerned that actions were not practical, they focused too much on downside risk and process inflexibility. Responses to this question generally describe the risk culture at individual firms, and different organizations have found processes they believe work best for them.

The respondents who answered *Not sure* about the effect of ERM at their company noted that much of the effort seems to be for show and it depends on how the program is implemented.

1.13 ECONOMIC EXPECTATIONS

Respondents were, not surprisingly, downbeat about global economic expectations for 2021, with only 19% reporting *Good* or *Strong* expectations, as shown in Figure 9. Interestingly, the respondents choosing *Poor* nearly doubled from 13% to 25%, the highest response since 2013.

Figure 9

Combined Good + Strong Economic Expectations

% of Responses
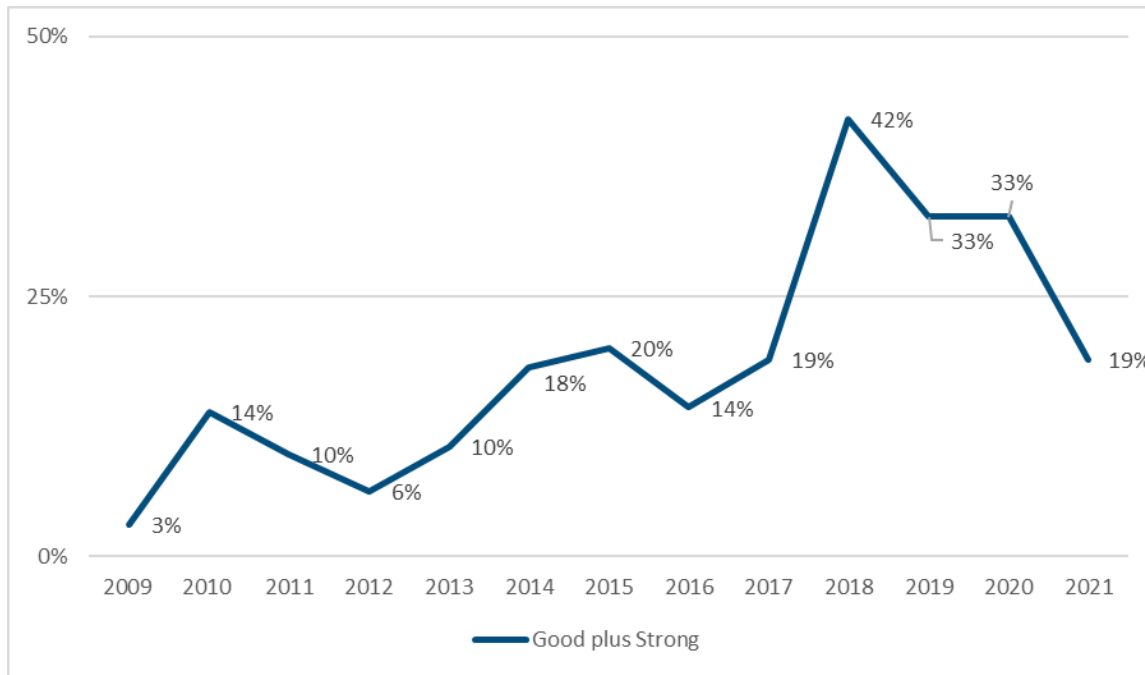
1.14 RISK ACTIVITIES

Over half of respondents (53%) reported that activities related to ERM continued to grow in 2020 (but only 15% of respondents reported experiencing staff growth), with 38% expecting activity growth in 2021. As seen in Figure 10, only 22% of respondents anticipate an increase in funding. Risk managers continue to improve efficiency as they complete implementation of projects related to regulatory requirements. In a year where the value of risk management was demonstrated it is disappointing to see a continued view of the risk team as a cost center and not strategic.

Figure 10

Anticipated ERM Levels in 2021

% of Responses to Given Question
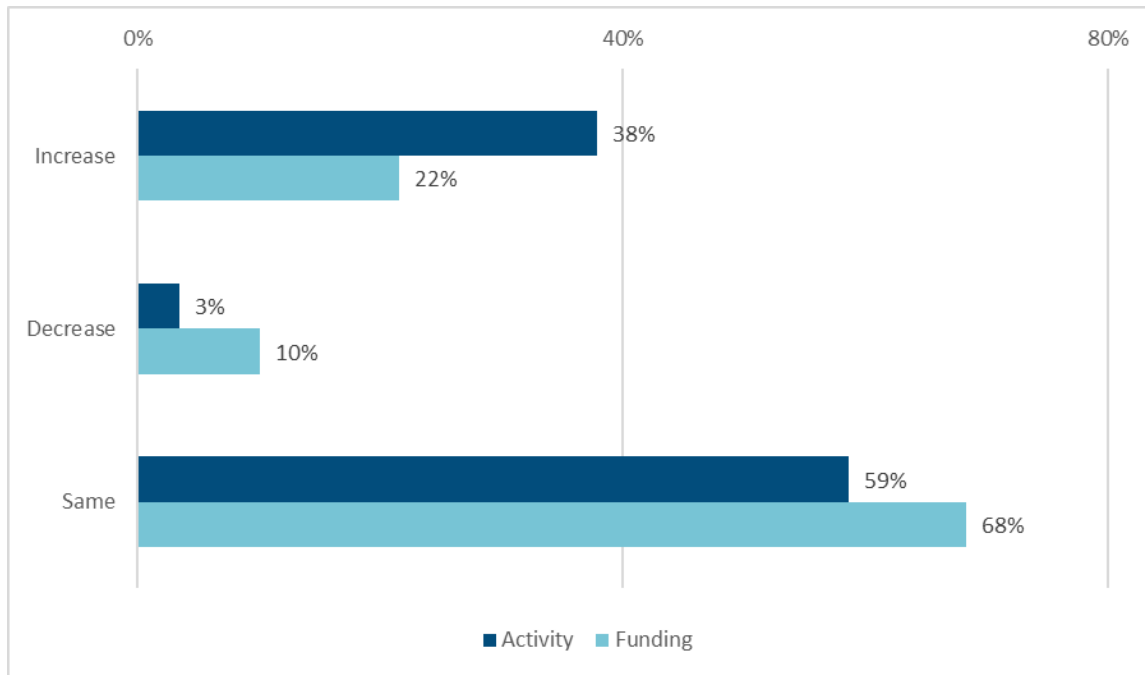
1.15   STRATEGIC OPPORTUNITY

Risk managers reported a higher level of inclusion in decision making surrounding strategic opportunities than in the past (17%, up from 9%, can say no), but the opposite was also true as those without input grew from 4% to 11%. These higher percentages came at the expense of the choice where the ERM function has input and a vote.