



Climate Change and the Insurance Industry: Taking Action as Risk Managers and Investors

Perspectives from C-level executives in the insurance industry



The Geneva Association

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Executive summary

Socio-economic implications of climate change

Failure to address climate change has been identified as one of the highest potential socio-economic risks to our society (WEF, 2016, 2017; Lloyd's of London, 2017; IFC, 2016; The Economist Intelligence Unit, 2015). Only recently, the focus of the climate change debate has moved from being mainly a scientific, environmental and social responsibility to becoming one of the core drivers of socio-economic development and risk management.

Building socio-economic resilience to the increasing impacts of extreme weather requires preventive risk management and adaptive strategies. Transitioning to a low-carbon economy has profound socio-economic implications for many sectors, requiring investments in critical infrastructure, labour training, education and trade. It needs to be well-planned and it must follow a predictable path with strategic alignment across all layers of government as well as active engagement with the private sector and investors. Implementation will take time and may take even longer in some countries and regions, depending on existing policies and political frameworks.

Climate risk as a core business issue

Traditionally, lack of action on climate has been linked to reputational risks. However, only recently, the financial and economic impacts are being considered in relation to physical risks, liability risks and transition risks (Carney, 2015).¹

Increasingly, companies in all sectors are considering climate risk as a core business issue. The G20 Financial Stability Board's Task Force on Climate-Related Financial Disclosure (FSB-TCFD) is developing voluntary and consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers and other stakeholders.² The Task Force is linking physical, liability and transition risks to governance, strategy, risk management, metrics and targets for climate-related risks and opportunities across various industries (FSB-TCFD, 2017).

Paradigm shift in addressing climate change adaptation and mitigation

With rising socio-economic costs associated with physical risks of climate, there is increasing evidence of a paradigm shift in governments' approaches, from 'inaction' or 'post-disaster reaction' towards a more comprehensive and integrated risk management framework, spanning the different sectors and layers of government. This involves preventive risk reduction, risk financing and risk transfer measures underpinned by risk identification and quantification. Recognition of financial impacts and a need to integrate these measures into national development planning and budgeting are also increasingly coming into the focus of finance ministers. Traditional post-disaster financial assistance is proving ineffective and insufficient, dis-incentivising people, businesses and local governments from taking proactive action to manage their risks.

Increasingly, governments are recognising the role and benefits of a market-based insurance industry in carrying and transferring risk. There is increasing evidence that countries with widespread market-based insurance coverage recover faster from the financial impacts of extreme events; it is the uninsured part of losses that drives macroeconomic costs. Yet there is a large and in some places widening protection gap, indicating that the benefits of risk transfer measures are not being harnessed to their full potential.

On the other hand, following the adoption of The Paris Agreement³, there has been a burst of initiatives and activities across a wide range of stakeholders to support the transition to a low-carbon economy (mitigation side). Latest developments include: (i) growing but highly fragmented and in some cases conflicting climate policy and regulatory frameworks at national to local levels and across regions; (ii) innovation in clean and green technologies, with some gaining market share; (iii) rising interest in green financing, with efforts to reduce barriers to green investment on the part of shareholders, asset managers, standard-setting bodies and rating agencies, and growing demand for low-carbon commodities; and

1 In September 2015, Mark Carney, Chairman of FSB in his speech "Breaking the Tragedy of the Horizons", highlighted climate risks as (i) **Physical risks**: economic risks that could arise from direct and indirect impacts due to: (i) increasing severity and frequency of extreme weather events; and (ii) long-term shifts in climate; (ii) **Liability risks**: the impacts that could arise tomorrow if parties who have suffered loss or damage from the effects of climate change seek compensation from those they hold responsible; and (iii) **Transition risks**: financial risks which could result from the process of transition towards a lower-carbon economy.

2 This is an industry-led initiative, chaired by Michael Bloomberg.

3 The Paris Agreement: <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

(iv) efforts to collect and avail reliable information to investors, lenders, insurers and other stakeholders.

Finally, emphasis on climate resilience and decarbonisation of critical infrastructure is becoming one of the top priorities of some governments in relation to their economic planning and trade.

Despite growing waves of climate-related policies and regulations, governments' climate adaptation plans and national pathways for transitioning to a low-carbon economy remain sketchy. A complex network of stakeholders (e.g. governments, policymakers, regulators, standard setting bodies, non-governmental organisations and the private sector) are working on a growing number of climate adaptation and mitigation initiatives. Yet these efforts also remain fragmented. To achieve scale, the key barriers, opportunities and solutions need to be identified through more coordinated dialogue, engagement and action among key stakeholders, taking into consideration both adaptation and mitigation sides.

Role of the insurance industry

Based on interviews with (and written responses from) 62 C-level executives from 21 companies (from different regions, lines of business and size), we offer new insights into the role of the insurance industry as risk experts, underwriters and investors in addressing the climate change goals and targets.

The insurance industry is a critical part of the solution. It is neither the polluter nor the climate policy setter, but it plays a critical role in building socio-economic resilience and enabling economic development and entrepreneurial pathways for achieving climate change goals and targets. Climate change is clearly on the agenda of the boards and the C-level executives although with differing emphasis. The industry is contributing significantly to building financial resilience to extreme events and other physical risks by providing risk information and risk pricing expertise, offering innovative risk transfer products and services, and improving the distribution channels and payout mechanisms. It is also supporting the transition to a low-carbon economy through its underwriting business, investment strategies and active reduction of its carbon footprint.

Challenges and recommendations

The insurance industry wants to contribute more. We have identified a number of critical challenges that need to be addressed by various stakeholders to enable the expansion of the insurance industry's contributions on both the underwriting and investment sides. As a first step, key stakeholders could benefit from engaging with the insurance industry from an early stage and understanding the drivers and benefits of the insurance business model.⁴ Furthermore, we offer three recommendations for the way forward, specifically:

Recommendation 1: Third-party stakeholders such as governments, policymakers, standard setting bodies and regulators across sectors should work in a more coordinated fashion to address key barriers that hinder insurers from scaling up their contribution to climate adaptation and mitigation.

Recommendation 2: The insurance industry should continue to institutionalise climate change as a core business issue, expand its contributions towards building financial resilience to climate risks and supporting the transition to a low-carbon economy by collaborating with governments and other key stakeholders.

Recommendation 3: Governments and the insurance industry should explore ways to support climate resilient and decarbonised critical infrastructure through the industry's risk management, underwriting and investment functions.

⁴ Quantifying, pricing, carrying and transferring risks are at the heart of the insurance business. As institutional investors, the investment strategies are liability-driven, constrained by regulations and a number of other internal and external factors to ensure that they remain solvent and can make their payouts to the policyholders, with the highest probability, at any time.

1. About this study

This study is based on a structured qualitative questionnaire and interviews with C-level executives of the global insurance industry. The questionnaire was designed to explore five areas:

- 1) **Company governance and climate change:** We assessed companies' overall perspectives, philosophy, strategy, policies and processes of the board of directors and C-level executives with respect to addressing climate change adaptation and mitigation (addressed by Chief Executive Officers (CEOs)).
- 2) **Climate change and the liability side:** We explored the insurance industry's contributions as risk experts and underwriters to building financial resilience to climate change (adaptation) and supporting the transitioning to a low-carbon economy (addressed by Chief Risk Officers (CROs) and Chief Underwriting Officers (CUOs)).
- 3) **Climate change and the investment side:** We mapped investment strategies, critical drivers, risks and opportunities related to the transition to a low-carbon economy (addressed by Chief Investment Officers (CIOs)).
- 4) **Challenges hindering the insurance industry in scaling up its contributions on the liability and investment sides:** We explored challenges facing the industry as underwriters and investors in expanding contributions to the adaptation and mitigation sides (addressed by CIOs, CROs and CUOs).
- 5) **Role of the insurance industry in supporting climate resilience and decarbonisation of critical infrastructure:** We sought insurance executives' perspectives on the role of the insurance industry (addressed by CIOs, CROs and CUOs).

We interviewed (and obtained written responses from) 62 group CEOs, CROs, CUOs and CIOs of 21 primary insurance and reinsurance companies.⁵ These included 12 primary insurers underwriting life and non-life (or both) policies and nine reinsurance companies with headquarters in Europe, North America and the Caribbean, Central and South America, Asia and the Pacific (Figures 1a-d).

In Section 2 we highlight the latest developments in addressing the climate change challenge. Section 3 offers a quick look into the foundations of the insurance business

model. In Section 4 we provide our findings, including actions being undertaken by the insurance industry, as risk managers and investors, to address climate adaptation and mitigation, and highlight critical challenges hindering the industry in doing more. Section 5 provides conclusions and recommendations for the way forward.

Figure 1a: Companies by type of business

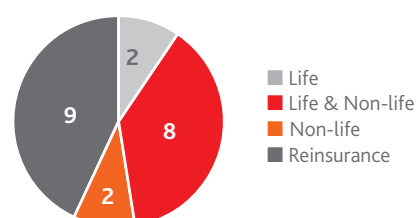


Figure 1b: Companies by headquarter location

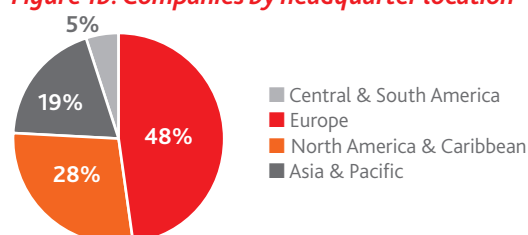


Figure 1c: Company size based on premium volume (USD)

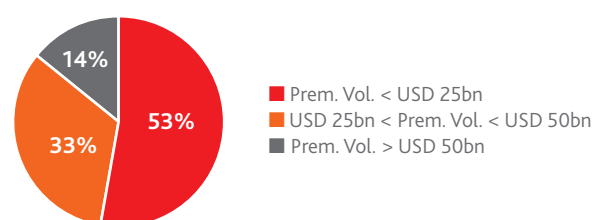
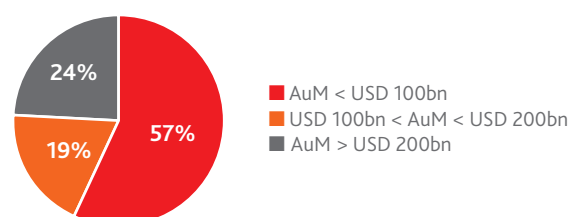


Figure 1d: Company size based on assets under management (USD)



⁵ With total assets under management exceeding USD 4.7 trillion, and a total insurance premium volume in excess of USD 550 billion (in 2016).

2. Latest developments in addressing the climate change goals and targets

Failure to address climate change has been identified as one of the highest potential socio-economic risks to our society.

The World Economic Forum's Global Risk Report (WEF 2016) specifies three of the five top most likely global risks related to climate change. Specifically, it ranks "failure of climate change mitigation and adaptation" as the one most likely to impact on global risk. According to Lloyd's of London, damages from weather-related losses around the world have increased from an annual average of USD 50 billion in the 1980s to close to USD 200 billion in the past 10 years.⁶ This is attributed to climate change and development patterns, which are leading to a rise in concentration of people and assets in high-risk regions such as coastal and urban areas.⁷ IFC (2016) reports that inaction could potentially cost the global economy on average around USD 150 billion each year. This is attributed to more frequent and intense weather extremes, with impact on individuals, communities, small businesses, large companies and governments alike. The Economist Intelligence Unit (2015) estimates the value at risk to assets under management from inaction to be around USD 4.2 trillion (in 2015 value terms).

Only recently, the focus of the climate change debate has moved from being mainly a scientific, environmental and social responsibility issue to one of the core drivers of socio-economic development and risk management.

Following decades of international policy negotiations facilitated by the United Nations, 2015 was a pivotal year for bridging three interconnected topics, namely, sustainable development, climate change and disaster risk reduction. With the adoption of the Sendai Framework for Disaster Risk Reduction (2015–2030),⁸ the 2030 Sustainable Development Goals⁹ and the COP21 Climate Change Paris Agreement, among other issues, over 190 governments have agreed on: (i) a comprehensive risk management framework to address the socio-economic risks, acute and chronic, associated with climate change

(adapting to climate change);¹⁰ and (ii) priorities for curbing greenhouse gas (GHG) emissions and transitioning to a low-carbon economy, with 2050 as the global target year for achieving net zero emissions (mitigating climate change) (The Geneva Association 2016a-b, 2017a-b).

Increasingly, companies in all sectors are considering climate risk as a core business issue. Traditionally, however, a lack of climate action was linked to reputational risks. Only recently are the financial and economic impacts of climate change being considered under physical risks, liability risks and transition risks.

In September 2015, Mark Carney, Chairman of the G20's Financial Stability Board (FSB), in his speech 'Breaking the Tragedy of the Horizons', highlighted financial and economic risks arising from climate change and pointed out that,

"Risks of climate change to financial stability will be minimised if the transition begins early and follows a predictable path, thereby helping the market anticipate the transition to a two degree world."

Carney (2015) defines climate risks as:

- *Physical risks* include economic risks that could arise from direct (e.g. destruction of property and critical infrastructure) and indirect (e.g. business interruption, affected labour force, interconnectivity of supply chains) impacts due to: (i) increasing severity and frequency of extreme weather events such as cyclones and floods (acute risks); and (ii) long-term shifts in climate patterns such as changes in precipitation patterns linked to reduction of water supplies and sustained high temperatures that may cause rising sea-level and chronic heatwaves (chronic risks).
- *Liability risks* encompass the impacts that could arise tomorrow if parties who have suffered loss or damage from the effects of climate change seek compensation from those they hold responsible.

⁶ Source: <https://www.theguardian.com/business/2014/may/08/lloyds-insurer-account-climate-change-extreme-weather-losses>

⁷ Economic costs are attributed to direct impacts on assets (e.g. homes and buildings, critical infrastructure, manufacturing sites, etc.) and indirect losses (e.g. business interruption, supply chain and trade disruptions).

⁸ Sendai Framework for DRR: http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

⁹ The 2030 Agenda for Sustainable Development: <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

¹⁰ During the period from 1980 to 2015, Munich Re's NatCatSERVICE identified 15,700 disaster loss events (Munich Re, 2016). Of those, 91 per cent were caused by weather-related extremes (meteorological, hydrological and climatological events), accounting for 51 per cent of the total of 1.7 million lives lost, 79 per cent of the USD 4 trillion in total economic losses and 90 per cent of insured losses (inflation adjusted).

– *Transition risks* are financial risks which could result from the process of transition towards a lower-carbon economy. Changes in policy, technology, market and physical risks could prompt a reassessment of the value of a large range of assets as the costs and opportunities become apparent, leading to stranded assets.¹¹

The G20 Financial Stability Board's Task Force on Climate-Related Financial Disclosure (FSB-TCFD) is developing voluntary and consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers and other stakeholders.¹² The Task Force is linking physical, liability and transition risks to governance, strategy, risk management, metrics and targets for climate-related risks and opportunities across various industries (FSB-TCFD, 2017).

With rising socio-economic costs associated with physical risks of climate change, there is increasing evidence of a paradigm shift in governments' approaches, from 'inaction' or 'post-disaster reaction' towards a comprehensive and more integrated risk management approach.

Following over a decade of global intervention by the United Nations, the international development community, non-governmental bodies and the global insurance industry, governments are starting to realise the socio-economic benefits of a comprehensive and more integrated approach to adapting and building resilience to extreme weather risks spanning different sectors and layers of the government. This is underpinned by:

- (i) Measures to reduce existing risks or prevent new risks such as land zoning, retrofitting and enforcement of robust building codes, flood protection, etc.;
- (ii) Emergency preparedness and early warning to further reduce risks and expedite response to and recovery from disasters;

(iii) Innovative risk financing and risk transfer measures to provide protection cover for governments, businesses and individuals and distribute or pool the residual economic risk;

(iv) Effective reconstruction planning after any event (may include rezoning), to prevent recurrent risks and build resilience to future events.

The decision to invest in such measures requires understanding and quantification of the socio-economic risks and cost-benefit analysis of possible measures. The macro-economic impacts of weather-related extremes and the need for integrating these measures into national development planning and budgeting is increasingly coming into the focus of finance ministries (World Bank, 2017). Yet, in many countries, policy and regulatory environments, institutional capacities and mandates, sectoral silos, conflicting or competing priorities and lack of coordination within and across government layers (from national to local) hinder implementation of such measures.

Following the adoption of the Paris Agreement, there has been a burst of initiatives and activities across a wide range of stakeholders to support transitioning to a low-carbon economy.

Latest developments include: (i) growing but highly fragmented climate policy and regulatory frameworks; (ii) technological innovations motivated by decarbonisation and energy efficiency; (iii) rising interest in green financing by shareholders, asset managers and standard setting bodies; and (iv) the need for reliable data and transparency for investors.

Figure 2 highlights the recent developments in four areas including: (i) climate change-related policy and regulation; (ii) technology; (iii) financing and markets; and (iv) compliance and reporting.

¹¹ Stranded assets are defined as "assets that have suffered from unanticipated or pre-mature write-downs, devaluations or conversion to liabilities. These can be caused by a variety of factors linked to technology transformation, innovation, coal and other fossil fuels linked to the pricing of carbon and phasing out of fossil fuels. It could also refer to an asset that has become obsolete or non-performing, but must be recorded on the balance sheet as a loss of profit. In the context of fossil fuels, natural gas is considered to be relatively low-carbon and is expected to be a key component of the global energy mix as the world transitions to a low-carbon economy."

¹² This is an industry-led initiative, chaired by Michael Bloomberg.

On the policy and regulatory fronts, the wave of climate-related policies and regulations is growing, but national plans and strategies remain highly fragmented.¹³ With the adoption of COP21 Paris Agreement, it is generally believed that many governments will follow through on their pledges for GHG emission reduction and will continue to step up their targets over time. Yet, respective (sub-)national policies and sectoral strategies, trajectories and timelines associated with the implementation of the national pledges remain sketchy. More specifically, it is unclear to what extent development of the national decarbonisation 'plans' is done in consultation with state and local government authorities and private sector leaders. Other climate change-related policy and regulatory developments such as taxing carbon, implementing carbon emission caps and subsidies (e.g. for renewable energy or energy efficiency measures) are emerging with benefits for some and costs for others, yet the long-term impacts may need to be better understood as some policies may work better than others. Governments are also working together through inter-governmental platforms to address barriers to green financing and mobilising private sector investments in green, such as the G20 Green Finance Study Group GFSG (G20, 2016a-b) and the EC High-Level Expert Group HLEG on Sustainable Finance (2017). Finally, traditional government fossil fuel subsidies continue to send mixed messages, hindering innovation and investments in green energy infrastructure (WEF, 2009, 2010, 2011; BlackRock, 2015, 2016; Standard & Poor's Global Ratings, 2017b).^{14,15}

New technologies motivated by the lowering of carbon emissions or energy efficiency are starting to gain market share with four key front runners, including LEDs, solar, onshore wind and hybrid and electric vehicles (Goldman Sachs, 2015a-b, 2016; Arabella Advisors, 2016).

Within the finance and capital markets, the movement towards 'green' investing is slowly gaining momentum and scale. Among key factors are: (i) rising shareholder receptivity and awareness (e.g. Exxon, Occidental); (ii) climate change-related legal threats (Standard & Poor's Global Ratings, 2016a); (iii) increasing receptivity reflected in three types of actions among leading asset managers¹⁶; (iv) the growing size of the green bond market over the last two years¹⁷ and emergence of other green instruments (HSBC, 2015, 2016; BlackRock, 2016); (v) initiatives of international standard setting bodies towards expanding the pipeline of investable-grade opportunities and recognition of the need for 'green' asset class and standardisation (ICMA, 2016; Standard & Poor's Global Ratings, 2017a-c)¹⁸; (vi) linking investments in green and infrastructure; (vii) rising demand for and trading of low-carbon and sustainable commodities¹⁹; and (viii) credit rating agencies' climate risk assessment tools for sovereign, municipality and company credit ratings (Standard & Poor's Global Ratings, 2014a-e, 2015a-c, 2016a-b, 2017a-c; Moody's 2016, 2017). Investors increasingly believe that ultimately the capital markets and advancements in green and clean technology will drive the transitioning.

13 For example, the EU and the U.S. are putting more emphasis on energy efficiency, while emerging economies such as China, Brazil and India are focusing on low-carbon energy production (e.g. solar and wind). Some nations are integrating their strategy as part of their national multi-pronged strategy for reducing GHG including building on efficiency and innovation in both energy and non-energy sectors (e.g. Canada's Pan Canadian Framework for Clean Growth and Climate Change). Climate change-related policies at the state and local levels are also emerging, which may or may not be aligned with national policies.

14 According to the International Energy Agency, on average globally, government fossil fuel subsidies continue at four times those for renewable energy.

15 For example, G20 nations account for nearly 85 per cent of the global GDP and are spending approximately USD 452 billion in fossil fuel subsidies, effectively undermining their own policies on climate change (Oil Change International and U.K.-based think tank Overseas Development Institute, 2015), with the U.S. leading the pack in exploration, capital and operational expenditure, even during the Obama administration.

16 Three types of trends are emerging: (i) establishment of various green investor coalitions; (ii) prominent asset managers promoting and integrating principles of green investment into their investment strategies and processes, as shareholders push companies to assess and manage climate risks (e.g. BlackRock, Deutsche Asset Management); and (iii) institutional investment strategies to support technological innovations related to decarbonisation (Goldman Sachs, 2015a-b, 2016).

17 During China's G20 presidency, the "labelled as" green bond market nearly doubled in size from 2015 to 2016, reaching a total of USD 80 billion. In 2016, nearly USD 60 billion were issued by known sources, including the development banks, municipal governments, asset-backed securities, corporations and banks; however the source of the remaining USD 20 billion is still to be defined.

18 The International Capital Market Association (ICMA) has joined forces with the Global Financial Markets Association (GFMA) to establish the Global Green Finance Committee (GGFC). This is a coordinated industry effort to promote green finance, facilitate cross-fertilisation between related markets and asset classes, with the ambition of acting as a representative counterparty to the official sector on green policy matters.

19 For more information see, 'Green Revolution Spreads to Metals' Markets and Investments, Financial Times, 6 Dec 2017.

Finally, over the last few years, companies and asset owners have increasingly been pressed by various sources (banks, security exchanges, NGOs, etc.) to assess, measure and disclose their climate risks.²⁰ Fragmentation of these initiatives is leading to reporting fatigue in the market.

Emphasis on climate resilience and decarbonisation of critical infrastructure is rising as one of the top priorities of some governments in relation to their economic planning.

The global economy will require big investments in infrastructure as the world's population and the middle class grow. With critical infrastructure (e.g. energy, water and sewage systems, transportation) constituting the backbone of a functioning society, infrastructure spending has begun to rebound after the global financial crisis and is expected to grow significantly over the coming decade (McKinsey & Company, 2016).²¹ Any investment in critical infrastructure needs to be climate resilient and decarbonised for the world to achieve its goals and targets towards a climate resilient and low-carbon economy. Destruction, disruptions or interruptions in critical infrastructure could lead to cascading effects across sectors and sometimes across borders, causing significant harm to the populations' well-being as well as significant direct and indirect economic impacts. In this context, addressing climate change impacts and decarbonisation is rising as one of the top priorities for governments.²²

20 A wide range of reporting and compliance frameworks, some mandatory and some voluntary have emerged, primarily in response to monitoring environmental and sustainability aspects of climate change. These requirements have been targeted specifically at institutional investors, who responded, mainly as part of their social responsibility and marketing agenda. They fall into four categories, with some examples provided below:

- Governments: Australia, EU, U.S., U.K., France law 173, California Insurance Commissioner;
- Market indices: Dow Jones Sustainability Indices, Morgan Stanley Capital International (MSCI) indexes;
- Exchanges and Central Banks: Singapore, Australia, Brazil, South Africa, Netherlands;
- NGOs: OECD, United Nations Environment Program Financial Initiative (UNEP FI), Carbon Disclosure Project (CDP), Climate Disclosure Standards Board (CDSB), Global Reporting Initiative (GRI, Institutional Investor Group on Climate Change (IIGCC), Asset Owner Disclosure Project (AODP).

21 McKinsey & Company (2016) argue that the world needs to invest about 3.8 per cent of GDP or an average of USD 3.3 trillion per year in economic infrastructure just to support expected rates of growth from 2016 to 2030.

22 Resilient and decarbonised critical infrastructure is also a key priority in the above-mentioned international framework agreements adopted by over 191 member states.

Figure 2: Recent developments related to transitioning to a low-carbon economy



Increasingly, governments are recognising the role and benefits of the insurance industry as risk management experts and risk underwriters, yet there is a large, and in some places growing, protection gap that needs to be addressed.

There is growing evidence that countries with widespread market-based insurance coverage recover faster from the financial impacts of extreme events; it is the uninsured part of losses that drives macroeconomic costs.²³ The widening protection gap indicates that the benefits of risk transfer measures such as insurance are not harnessed to their full potential. On the other hand, following a major disaster, countries with lower levels of insurance penetration experience larger declines in economic output and more considerable fiscal losses (Von Peter et al., 2012). Furthermore, traditional post-disaster financial assistance is proving ineffective and insufficient, and dis-incentivising people, businesses and local governments from taking proactive action to manage their physical risks.

The rapid increase in global economic losses from disasters has put the spotlight on insurability and the need for government investments in measures to reduce existing risks and prevent new risks. Since 2005 there has been a notable increase in innovations and initiatives in disaster risk financing and risk transfer (including insurance) targeting new markets. With a number of factors hindering expansion of risk transfer around the world, scalability and sustainability remain a central concern (The Geneva Association, 2014a, 2016b, 2017a-b; ClimateWise, 2016a; OECD, 2015; World Bank, 2017).

The insurance industry offers solutions to building resilience to climate change and supporting the transition to a low-carbon economy. It is already contributing significantly to both adaptation and mitigation and would like to do more.

On 19 November 2015, days before global leaders gathered in Paris to forge the landmark Paris Agreement, The Geneva Association, a platform of 80 CEOs from the global insurance industry²⁴ reissued its Climate Risk Statement, highlighting the industry's willingness to step up its contributions to building climate resilience and support the transition to a low-carbon economy (The Geneva Association, 2014b).

Since the adoption of the Paris Agreement, The Geneva Association, under the leadership of its board of directors has conducted extensive research and consultations to identify opportunities and address challenges that currently hinder the insurance industry from stepping up its support (The Geneva Association 2016a-b, 2017a-b; The Geneva Association-Insurance Development Forum, 2017).

"The Paris Agreement offers both opportunities and challenges for the insurance industry, which will not only be providing a wider range of risk-transfer solutions and services, but also be supporting emission reduction efforts and the transition to a low-carbon economy through its investment strategies while also actively managing its own carbon footprint. However, the challenges in managing the transition to a low-carbon and climate resilient economy cannot be underestimated in relation to risks, policy and the regulatory requirements, as well as capital and investment perspectives. This is where long-term thinking, industry-wide alignment and engagement as well as public-private partnerships become even more important.... Active engagement in relevant public-private partnerships and closer cooperation with policymakers, governments, regulators and other stakeholders, will be critical to pave the way." (The Geneva Association, 2016b)

With 2020 around the corner, based on dialogue with 62 C-level executives, in this report we provide new insights and concrete recommendations on how to leverage the insurance industry's contributions as underwriters and investors to meet the global climate goals and targets on both the adaptation and mitigation sides.

23 Following a major disaster, countries with lower levels of insurance penetration experience larger declines in economic output and more considerable fiscal losses than those with higher levels of insurance penetration (Von Peter et al., 2012).

24 <http://www.genevaassociation.org>

3. A review of the foundations of the insurance business model

Understanding the insurance business model is key to leveraging the industry's contributions to achieving global climate change goals and targets. To help put our findings into perspective, first we highlight a few critical fundamentals about the insurance business model. Annex 1 provides a more detailed description of the insurance business model and its drivers.

3.1. Transfer of risk

Transferring and carrying risk is at the heart of the insurance business. Insurers assess, price, assume and transfer risk on behalf of their policyholders.

As risk underwriters, insurance companies offer protection to people, businesses and governments in return for a premium. The insurance industry's value chain includes: policyholders, (primary) insurers, reinsurers, brokers and the financial market. Traditionally, from an underwriting point of view, there are three basic ways of classifying insurance, including social versus private, life versus non-life and commercial versus personal. The insurance policy is a mutual agreement whereby the insured transfers the risks of an uncertain loss to the insurer by paying up front a certain fixed amount. Subsequently, in the occurrence of a covered event, the insurance company indemnifies the policyholder. It needs to be noted that the actual insurance product is not the payment in the event of a covered loss. It is rather the guarantee that losses will be indemnified if the policyholder suffers a loss. The guarantees of the insurance mechanism rely on three methods, including pooling of risks, retrocession and securitisation.

3.2. Liability-driven investment strategy

The investment strategy (asset management) of insurance companies is liability-driven, constrained by regulations and driven by a number of internal and external factors, Asset Liability Management, or ALM.

Insurers invest conservatively. Insurance companies need to ensure that they remain solvent and can make their payouts to the policyholders with the highest probability at any time. Insurers have a fiduciary duty to enhance the value of their 'policyholder' assets. These fiduciary duties pose constraints on the industry's investment strategies.

On the other hand, insurance regulators impose risk-based capital charges on investments to ensure adequate capital levels to cover insurers' liabilities; the riskier the investment, the higher the capital charge. These vary by country and region. It is important to note that different lines of business are exposed to different risks. This dictates how financial risks associated with assets and liabilities are managed differently by life and non-life insurers. Specifically,

- (i) **Life insurers** are typically 'buy and hold' investors. They aim to generate predictable and stable income to match cash flows of long-dated and generally predictable liabilities. Life insurance contract duration can range from ten years to several decades, involving payout patterns of 20 to 30 years.²⁵ Life insurers are deeply concerned about the asset-liability mismatch, with interest rate risk being a key issue.
- (ii) **Non-life insurers** are geared towards more liquid investments with shorter time horizons, typically one to three year in duration.²⁶ However, in some instances (e.g. asbestos-related) claims are paid out many years later, exposing them to interest rate risk.

²⁵ Duration is a term that qualifies the sensitivity of cash flows to interest rate. That is why it is usually shorter than the payout patterns.

²⁶ Liability business is usually longer than one year, typical P&C portfolios have a duration of two to three years. One year is typical for NatCat risks.

4. Findings of the study

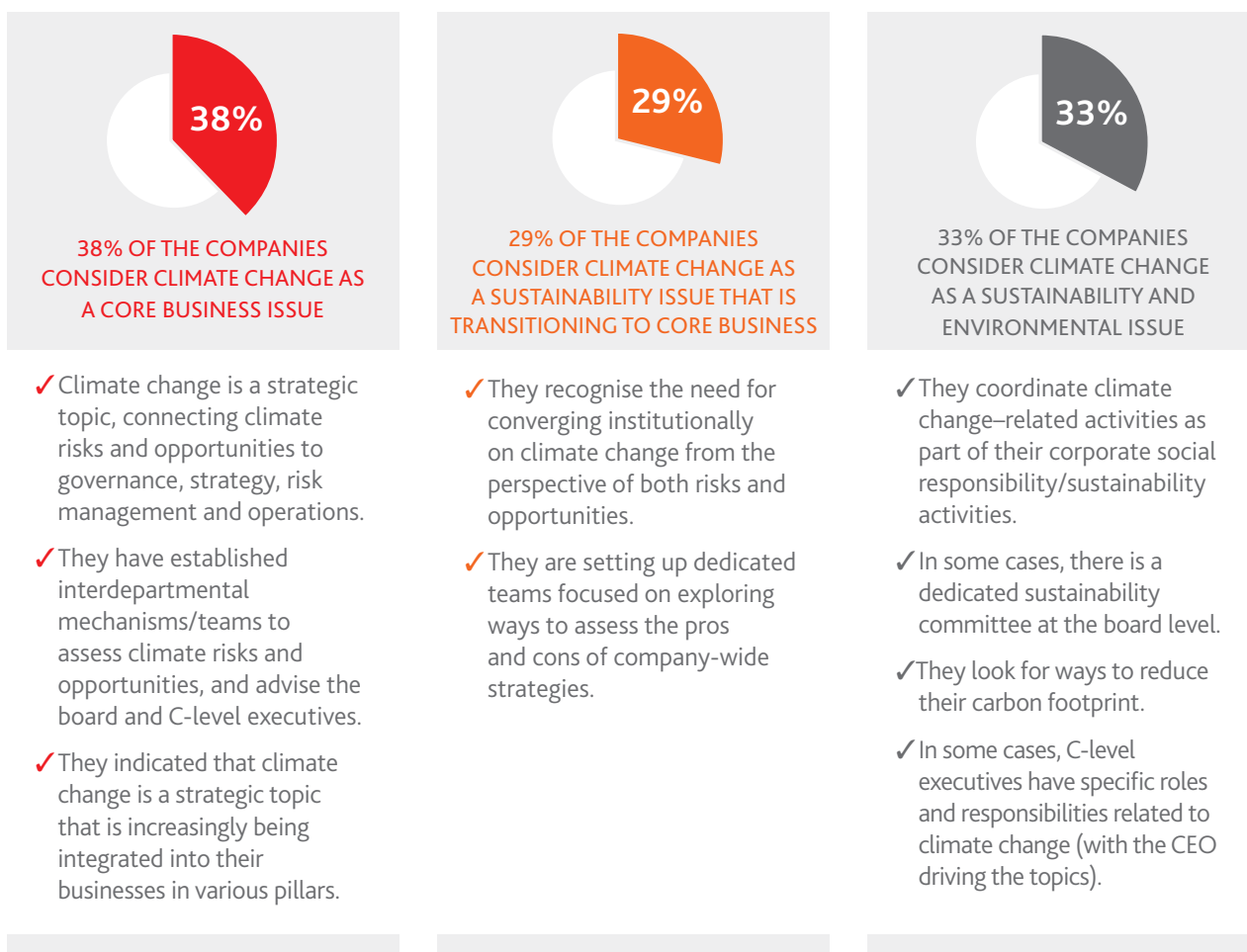
4.1. Governance and climate change

Climate change is on the agenda of the boards and the C-level suite in the insurance industry although with different emphasis.

Expanding contributions to solving the climate change challenge is a priority of the majority of C-level executives. Climate change is being considered by insurance company boards and C-level suite in three ways, as (i) a core business issue with implications for governance, strategy, risk management, operations and asset management; (ii) a sustainability issue but transitioning into core business; (iii) a sustainability and environmental issue (Figure 3). Specifically:

- 1) ***Around 38 per cent of participating companies consider climate change as a core business issue, with implications for governance, strategy, risk management and operations.*** These companies have established interdepartmental mechanisms and/or teams to assess climate risks and opportunities and to provide advice to the C-level suite and the board. They indicated that climate change is a strategic topic that is increasingly being integrated into their businesses in various pillars, such as:
 - (i) Innovating products and services and developing specialised business units providing financial cover for physical climate risks and incentivising reduction of GHGs;
 - (ii) Supporting strong policy action on climate change through engagement in high-level formal mechanisms at national to international levels;
 - (iii) Assessing, evaluating and for some (already) integrating Environmental, Social and Governance (ESG) criteria into investment strategies;
 - (iv) Institutionalising company policies and strategies related to carbon-intensive sectors where it makes sense;
 - (v) Reconsidering investment strategies and policies as related to climate change;
 - (vi) Engaging with shareholders through voting and resolutions related to climate risk;
 - (vii) Taking institution-wide measures under the direct supervision of the board and/or the C-level suite to reduce their carbon footprint.
- 2) ***For 29 per cent of companies, climate change is evolving from a purely environmental and sustainability topic into a core business issue.*** They are recognising the importance of converging institutionally on climate change from the perspective of both risks and opportunities. Some companies are setting up dedicated teams focused on exploring ways to assess the pros and cons of company-wide strategies by:
 - (i) Starting to map and understand the impacts of climate change on their business and operations;
 - (ii) Considering climate change as an emerging issue for governance, strategy and risk management considerations;
 - (iii) Developing and innovating products and services to support climate resilience and GHG reduction;
 - (iv) Engaging and educating their own staff;
 - (v) Exploring ESG and other methodologies for addressing climate change in their investment strategies;
 - (vi) Assigning specific roles and responsibilities to C-level executives, with the CEO driving the topic.
- 3) ***For the remaining 33 per cent, climate change continues to be purely an environmental and sustainability issue.*** Addressing climate change is generally coordinated within the corporate social responsibility and/or sustainability departments that in some cases report to a dedicated Sustainability Committee at the board level. In some companies, C-level executives have specific roles and responsibilities, with the CEO driving the topic.

Figure 3: Climate risk is considered by the boards and C-level executives of the participating insurance companies in three ways



4.2. Climate change and the liability side

Insurers provide expertise in catastrophe risk modelling and risk pricing, along with significant knowledge in preventive measures. They offer innovative and specialised risk transfer solutions to: (i) build financial resilience to impacts of extreme events; (ii) incentivise reduction of GHG emissions; (iii) enable entrepreneurial pathways to green and clean technology from start-up to commercialisation.

Specifically, our interviews indicated that:

- 1) The insurance industry is sharing its risk knowledge, risk modelling and risk pricing expertise with its clients in the public and private sectors to enable risk awareness and promote risk-based decision making (The Geneva Association 2016b, 2017a-b; The Geneva Association and Insurance Development Forum, 2017).
- 2) Larger companies are engaged in a wide range of research initiatives (advancing risk modelling, improving risk information and preventive measures against physical risks). The research may be conducted in-house, be outsourced or conducted at centres of excellence that may be bilaterally or multilaterally funded by the industry.
- 3) A number of companies are setting up 'innovation units' or 'incubators' or are 'funding new centres of excellence in adaptation' to develop new ideas and solutions to help economies tackle underinsurance and improve socio-economic resilience to physical risks of climate.
- 4) Insurers offer incentives for risk reduction, for example by means of premium reductions if their policyholders adopt and implement preventive measures (e.g. retrofitting homes against flood or wind damage).
- 5) Companies are developing a wide range of products and services to help customers to build climate resilience and reduce GHG emissions. Examples include:
 - (i) *Traditional and/or alternative risk transfer* products (e.g. parametric insurance) for weather-related extremes, such as tropical cyclones, storms, floods, forest fires etc.;
 - (ii) *Crop insurance* against climate risks; however, there are a number of challenges to the innovation of broader coverage in this area, such as access to risk data;

- (iii) *Micro-insurance products* that are being introduced, and other products in low-income countries around the world, currently for small farmers who lack access to traditional insurance;
 - (iv) *Services that support issuance of Cat bonds* for customers such as infrastructure-related companies and manufacturers with large production bases²⁷;
 - (v) *Specialised insurance products for renewable energy* ranging from residential solar systems to micro-hydro turbines and on-shore and off-shore wind farms; and
 - (vi) *'Green buildings' insurance* and products and related incentives.
- 6) The industry is providing specialised products and services to protect governments' budgets. Examples include:
- (i) *Regional pools*: A number of reinsurers have emerged as industry leaders in setting up regional sovereign risk-pooling schemes such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF), Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), or the African Risk Capacity (Africa's first parametric natural disaster insurance pool) (The Geneva Association 2016b, 2017a).
 - (ii) *Disaster expense insurance for local governments* that is provided in some Asian countries to compensate for the expenses needed by the municipality for evacuation of residents in case of a natural catastrophe.
- 7) The industry is working to improve its products and services in areas such as business interruption, contingent business interruption and other risks associated with supply chain failures linked to natural catastrophes. Some companies are already starting to address these issues at two levels:
- (i) *Product level*: Insurers are piloting new products to provide integrated coverage; however, some of them mentioned that there is still a lack of confidence at the customer level to take this view as opposed to buying different policies.
 - (ii) *Service level*: Insurers are starting to look at assessing, at the level of the individual customer, how a particular catastrophic event in one country would impact a certain customer or a certain industry.
- 8) A number of companies have developed 'specialised energy business units'. They are offering products and services to address business risks associated with the complex value chain from start-up to commercialisation and roll-out to support the development of renewable energy and other technologies.
- 9) All companies indicated that they are constantly striving to increase efficiency and speed up assessments, contract settlements and payouts after a disaster.

4.3. Climate change and the investment side

Increasingly, climate change is being considered as a risk factor and an emerging investment theme by the majority of the CIOs, who recognise the importance of 'climate aware investing'. The insurance industry is increasingly integrating climate change considerations into their investment strategies and processes as part of the broader sustainability topic.

Our interviews revealed:

- 1) Various approaches to investment strategies such as:
 - (i) Not investing in companies with more than 30 per cent of their business associated with thermal coal mining or coal power generation.
 - (ii) Making a conscious choice not to divest from fossil fuel intensive energy companies because these companies are primary investors in green and clean technologies as part of their long-term strategy. Divesting could choke this critical source of funding and potentially compromise the transition to a low-carbon economy.²⁸
 - (iii) Not investing in fossil intensive sectors if they are providing underwriting services to these. Such policies are motivated by their enterprise risk management (ERM) practices.

²⁷ To reduce customers' burden of cumbersome administrative procedures associated with Cat bonds issuance as well as to help their customers diversify the hedging methods for catastrophe risks through their advice on setting optimal issuance conditions, etc.

²⁸ For example, the majority of investments in renewable energy and other sources of clean energy are made specifically through these carbon-intensive companies (Bloomberg New Energy Finance, 2017).

- 2) ESG is emerging as the predominant methodology of insurers.^{29,30} Insurers employ a variety of different approaches when taking ESG factors into account. Examples include:
- (i) *Screening*: screen out securities based on ESG criteria, such as fossil fuels, tobacco, etc. This is the most widely used form of ESG investing and it is easy to implement.
 - (ii) *Best-in-class* (inclusionary screening): only include companies that perform best on ESG criteria within each sector or industry. A more targeted version of this type of investing is to exclude any companies that score below a predetermined threshold, regardless of their sector.
 - (iii) *Thematic investments*: select an ESG-related theme, such as renewables, and construct a specialised portfolio of related securities.
 - (iv) *Divestment*: sell all holdings in a particular sector or industry, such as coal.
 - (v) *Active ownership*: use their ownership stake in a company to influence its strategy, operations, governance and risk management to achieve climate resilient business strategies.
 - (vi) *Due diligence when selecting an external asset manager to outsource the asset management function*: most of the insurers require their external managers to have integrated ESG factors into their investment processes and/or principles as part of their due diligence.³¹
 - (vii) *ESG integration*: include systematically and explicitly ESG risks and opportunities in the investment analysis.
- 3) With regard to ESG integration, there are differing opinions:
- (i) Smaller companies indicated that ESG integration is an expensive strategy as they need to hire analysts and/or buy the necessary data.
 - (ii) Some CIOs indicated the need for methodologies to quantify return on investments linked to ESG criteria to provide more clarity on whether integrating ESG criteria in the investment strategies leads to an outperformance or underperformance of the investment portfolio. Indeed, there is little evidence that assets sensitive to climate change trade at a discount to the market.³²
 - (iii) A few companies have not integrated ESG criteria into the investment processes, indicating the need for more guidance, universally accepted analytical methods, data availability, asset and investment valuation techniques, and modelling constraints. Some of these companies are partnering with large investment management firms to support them in the integration process.
- 4) Most companies are using MSCI's methodology for tracking ESG risks.³³ MSCI rates companies on an 'AAA' to 'CCC' scale according to their exposure to industry-specific risks and their ability to manage those risks relative to peers.

29 The Environmental, Social and Governance (ESG) Criteria is a set of standards for a company's operations that socially conscious investors use to screen investments. Environmental criteria look at how a company performs as a steward of the natural environment. Social criteria examine how a company manages relationships with its employees, suppliers, customers and the communities in which it operates. Governance deals with a company's leadership, executive pay, audits and internal controls, and shareholder rights. Investors who want to purchase securities that have been screened for ESG criteria can do so through socially responsible mutual funds and exchange-traded funds (source: Investopedia.com).

30 Furthermore, the more recent, broader interpretation of fiduciary duties seems to point to the fact that using ESG analysis to support financial decisions is consistent with the duty of care (OECD, 2017). Policy is also moving in this direction, with the UN Principles for Responsible Investment in 2015 asking regulators to ensure that fiduciary duty requires investors to take account of all ESG factors in their investment process.

31 In general, insurers tend to outsource their investment activities to large investment companies that are at the forefront of developments when it comes to climate risks.

32 Empirical Research in 2014 concluded that out of more than 60 separate academic studies on out- and underperformance of ESG portfolios versus benchmarks, approximately 80 per cent of them found no noticeable difference. Yet, this does not mean there will be no climate risk premium in the future as countries adopt emissions trading programs —be it carbon taxes or 'cap and trade'— to help them meet their INDC targets. Greater transparency of climate risks and exposures will likely lead to a gradual discounting of companies and assets exposed to climate risk, and could increase the value of those most resilient to these risks (Empirical Research Partners, 2014).

33 For further details, see <https://www.msci.com/documents/1296102/1636401/MSCI+ESG+Rating+Brochure.pdf/44c55c89-335b-4a9e-8fbd-51cd8252614f>.

4.4. Challenges hindering the insurance industry in scaling up its contributions

The liability side

There are many factors hindering the expansion of market-based insurance in high-, middle-, and low-income countries.

We have highlighted eight critical ones mentioned in the interviews³⁴:

- 1) *Limited access to risk information and related risk pricing difficulties*: Pricing of physical climate risks (e.g. weather-related extremes) is difficult due to lack of hazard/vulnerability/exposure data in many regions, the complexities of disasters and volatility of losses. When risk-based premiums are applied, this often stands in direct conflict with affordability of cover (higher risk, higher premium).
- 2) *Public policy, regulatory and legislative issues*: Public policy and regulations can create the necessary preconditions and the operating environment for the insurance sector. Specifically, government policies, regulation and investments in prevention and risk reduction measures are critical foundations of insurability.
- 3) *Lack of awareness about insurance (from ministries of finance to the general public)*: In general, the insurance business model and how insurance leads to financial resilience at both macro and micro levels are not well understood.
- 4) *Need for stakeholder-relevant products and services*: Many companies indicated that they are focused on developing more relevant products that meet their customers' needs and that this should be a priority for the entire industry.
- 5) *Limited take-up of disaster insurance*: This means that there is a relatively small pool of policyholders even where insurance is available at an affordable price. The main reasons are lack of risk awareness, limited understanding of insurance mechanisms, lack of a culture of risk management, underestimation of potential impacts, and reliance on other support mechanisms such as post-disaster government handouts.
- 6) *Weakness of domestic insurance market*: For some rural areas and in some middle- and low-income nations this limits access to insurance, distribution channels and payout systems.
- 7) *Regulatory barriers in some countries*, which may hinder access to global reinsurance capacity and expertise.
- 8) *Scalability and sustainability of insurance programmes*: The relationship between the public and private sector is of particular importance in the context of rising losses, where effective Public-Private Partnerships (PPPs) seem to be the only viable option for maintaining insurability.

The investment side

A number of challenges hinder insurers in scaling up their investments to support the transition to a low-carbon economy. These fall into five areas, including: (1) financing and market-related factors; (2) financial and insurance regulations; (3) climate change-related policies and regulatory frameworks; (4) technology; and (5) data and transparency for informed investing.

Financing and market-related factors

A majority of insurers believe that the massive green financing gap could only be addressed through (i) development of generally accepted definitions and standards for 'green' as an asset class; (ii) expansion of the pipeline of investable-grade opportunities that meet their investment criteria and risk appetite; (iii) expansion of the green bond market with appropriate monitoring, as well as new investment tools and related markets; (iv) methodologies for and expertise in due diligence and monitoring among asset managers. Furthermore, it was stressed that:

- 1) Currently, the market cannot accommodate large-scale portfolio allocations to green. Cheaper and more widespread green bond funding is needed to drive more investment towards climate resilient projects. Specifically, there is a need for: (i) more issuance of green bonds coupled with a broader variety of issuers; and (ii) emergence of new instruments (e.g. green loans, green securitisations).

³⁴ The Geneva Association (2016a) also provides further details about the underpinning causes.

- 2) There is a need for well-defined asset classifications, standards and methodologies by which insurance companies and other institutional investors can assess the relative merits of a green investment or project. A lack of universally accepted principles about what constitutes 'green', is resulting in different interpretations.

Financial and insurance regulations

Insurance companies evaluate investments on a risk-return basis including return on capital. They are increasingly interested in reallocating capital towards long-term green investments. However, some respondents noted that international and national financial and insurance regulations on capital charges may potentially restrain their capacity to do this.³⁵

Climate change-related policy and regulatory frameworks

Our interviews confirmed concerns with the considerable uncertainties associated with the national climate policy and regulatory pathways to achieve climate change targets. Unclear and deeply fragmented national sectoral policies and regulations make it difficult for investors to assess risks and opportunities. The responses further revealed that,

- 1) Fragmentation in climate policies and regulations within and across nations leads to risks, impacting investors' confidence. This is further exacerbated by retroactive policy change, lack of policy or conflicting policy signals (such as fossil fuel subsidies). Greater clarity about national policies, particularly in relation to major carbon emitting sectors, could help to build an informed view about different climate scenarios and to integrate these views into their investment strategies.
- 2) There is a need for policy incentives to encourage green investment at scale (e.g. tax incentives and subsidies associated with investments in renewable energy or electric vehicles).
- 3) Lack of appropriate price signals, such as failure to price carbon and natural capital, are also seen as barriers to scaling up green investments.³⁶

Technology

While the insurance industry has contributed to the growing investments in renewable energy, the green and clean technology markets cannot yet accommodate the scaling up of the risk-adjusted returns that the insurance industry is seeking.

A number of executives stressed that markets for green and clean technologies remain volatile, and in general, do not meet their criteria. Most of these new technologies are still in their infancy, and investing in them may be more aligned for those asset managers willing to take higher risks in exchange for higher returns. In general, responses indicated the need for more 'green' technology investment opportunities and structures that are close to the insurance industry's risk appetite.

Data and transparency for informed investing

Insurers, as investors, need data to make informed investment decisions. The interviews indicated that:

- 1) Evaluating the physical, liability, and transition risks associated with transitioning to a low-carbon economy starts with gathering reliable data. However, fragmentation and lack of common reporting frameworks are leading to reporting fatigue without producing consistent and reliable data and transparency.
- 2) There is a need for better standards for reporting climate risks. The FSB-TCFD industry-led initiative could potentially be a game changer, leading to more clarity and standardisation, resulting in data consistency and transparency for investors.
- 3) All companies need standard stress testing tools, scenario analysis methodologies and expertise to address FSB-TCFD recommendations.

35 While green bonds are generally issued by large companies or entities that issue liquid debt securities, and as such green bond investors do not have to give up liquidity, there are no pricing differences between green bonds and traditional bonds of comparable credit ratings and maturities—green bonds do not trade at a premium compared to their peers. The fact that 'green bond' has not been established as an asset class on its own does not allow for different risk capital charges to be applied to them.

36 Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.

4.5. Role of the insurance industry in supporting climate resilience and decarbonisation of critical infrastructure

In general, insurers consider critical infrastructure as fundamental to scaling up socio-economic resilience to physical risks and transitioning to a low-carbon economy.

The liability side

The insurance industry is already underwriting critical infrastructure, and there is willingness to expand coverage, but a number of challenges remain. Our interviews revealed that:

- 1) While critical infrastructure constitutes the backbone of a functional society, almost no consideration has been given in many countries to assessing impacts of natural hazards. Focus is mainly on operational risks, such as fire and explosion, as these are higher probability events.
- 2) There are limited incentives, especially for private operators, to increase resilience.
- 3) Any investments in critical infrastructure should consider climate resilience for the entire life cycle; however, it is believed that many countries are primarily focusing on decarbonisation without paying sufficient attention to ensuring climate resilience.
- 4) The extent to which insurers have been underwriting infrastructure risks varies from country to country.
- 5) Insurers need to have access to high quality data to assess various risks associated with all phases of the infrastructure project throughout the entire life cycle, including their design, construction, operation and maintenance.

The investment side

For institutional investors to invest in critical infrastructure, they require a stable, predictable regulatory and political framework, a pipeline of investable-grade projects and an efficient market for critical infrastructure.

Our interviews indicated that:

- 1) Most insurers (particularly on the life side) see infrastructure projects as a potential opportunity for investing for reasons such as: (i) potentially lucrative risk-adjusted return on equity; (ii) long-term exposure as a good match for long-term liabilities; and (iii) increased diversification across asset classes, structure, geography and exposure.
- 2) Similar to other green investments, investing in infrastructure poses additional constraints related to capital charges under insurance and financial regulations.³⁷
- 3) There is a need to develop a sufficient pipeline of investable infrastructure projects that provide insurers with the appropriate risk-adjusted returns over the project's lifetime. At present, there is limited transparency on the volume of these projects, even in the short-term, making it difficult to commit to long-term financing.
- 4) Capital markets for infrastructure assets remain relatively complex, non-standardised and illiquid.
- 5) Addressing regulatory and political impediments could increase investments in critical infrastructure. In low- and middle-income countries, political and currency risks remain as barriers to investment.
- 6) Across countries, and even within the same countries, infrastructure projects often have different contractual terms, which increases the due diligence insurance companies need to undertake in their role as investors, and at the same time, limits them in building the expertise required to assess projects efficiently.
- 7) There is a need for greater standardisation in terms of documentation and disclosure, for example, by means of a common risk assessment framework and documentation. This could potentially allow investors to move more of their liquid fixed-income assets into critical infrastructure assets.
- 8) Pooling projects, including the development of respective funds, indexes and securitisation vehicles could reduce transaction costs.

³⁷ However, the EU recently recognised infrastructure as an asset class with dedicated capital risk charges and allocation rules under Solvency II. Nevertheless, these changes have led to almost no increase in green investments, as capital charges remain high.

Key findings of the study are summarised in figure 4.

Figure 4: Summary of findings of the study

1 The insurance industry is already taking action in addressing the climate change challenge.

As risk managers and underwriters, the industry provides leadership in risk modelling and pricing, knowledge of preventive measures and innovation in risk transfer solutions—all of which enable building socio-economic resilience to climate risks, entrepreneurial pathways for clean technologies, incentives for GHG reductions, and more efficient settlement of contracts.

As investors, the industry, under its liability-driven approach, is constrained by fiduciary duties and regulations. It is evaluating investment strategies and policies that increasingly integrate climate change considerations, and conducting due diligence of their asset managers. ESG is emerging as a predominant methodology—although with a few considerations.



2 External hurdles hinder the expansion of the insurance industry's contributions.

Hurdles to expansion of risk transfer solutions

- Limited access to risk information and related risk pricing difficulties
- Public policy, regulatory and legislative issues
- Lack of awareness about insurance
- Weakness of domestic insurance markets
- Limited take-up of disaster insurance
- Regulatory barriers to access global reinsurance
- Scalability and sustainability of insurance programmes

Hurdles to scaling up green investments

- Limited capacity of the markets to accommodate large-scale portfolio allocations to green
- Need for well-defined asset classifications, standards and methodologies for assessing green investments
- Fragmentation in climate policies and regulations that impact investors' confidence
- Regulatory risk capital charges that could restrain long-term green investments
- Lack of appropriate price signals, such as failure to price carbon
- Need for green technology investment opportunities and structures that better satisfy the insurance industry's risk appetite
- Data and transparency for informed investing



3 Climate resilient and decarbonised critical infrastructure is an opportunity for the insurance industry but it poses specific challenges.

As risk managers and underwriters, the industry requires data to assess the risks associated with climate resilient and decarbonised infrastructure projects throughout their lifecycle—from design and construction to operation and maintenance.

As investors, the industry requires a stable regulatory and political framework, a clear 'infrastructure' asset classification, a robust pipeline of opportunities and an efficient market for critical infrastructure. Pooling and structuring projects could reduce transaction costs.



5. Conclusions and recommendations

Building financial resilience to rising costs associated with physical climate risks requires proactive risk management and adaptation strategies. Transitioning to a low-carbon economy needs to be well planned and to follow a predictable path with alignment across all layers of government and the private sector.

Implementation will take time and may take longer in some countries and regions depending on existing policies and political frameworks. This will have profound socio-economic implications spanning many sectors (e.g. energy, water, food and agriculture, transport, finance) involving investments in critical infrastructure, labour training, education and trade.

However, despite growing waves of climate change-related policies and regulations, national pathways for building climate resilience and transitioning to a low-carbon economy remain sketchy. A complex network of stakeholders (e.g. governments, policymakers, regulators, standard setting bodies and the private sector) are working through the growing number of adaptation and mitigation initiatives, but these efforts also remain fragmented (Annexes 2, 3).³⁸ To achieve scale, the key barriers, opportunities and solutions need to be identified through more coordinated dialogue, engagement and action among key stakeholders.

The insurance industry is a critical part of the solution. It is neither the polluter, nor the climate policy setter, but it plays a critical role as risk manager, underwriter and investor in enabling economic resilience and entrepreneurial pathways for addressing climate change goals and targets.

As a global leader in risk management, the insurance industry is already contributing significantly to building socio-economic resilience to extreme events and climate risks. It is also supporting the transition to a low-carbon economy through its underwriting business, investment strategies and active reduction of its carbon footprint. But, it wants to do more.

We believe that as the first step to leveraging this industry's value proposition, key stakeholders could benefit from engaging with the insurance industry from an early stage. Furthermore, a number of critical challenges outside the scope of the insurance industry need to be addressed by various stakeholders in a more coordinated manner to enable expansion of the insurance industry's contributions.

To this end, we recommend that:

Recommendation 1: Third-party stakeholders such as governments, policymakers, standard setting bodies and regulators across sectors should work in a more coordinated fashion to address key barriers that hinder insurers from scaling up their contribution to climate adaptation and mitigation.

On climate change adaptation

The management of climate risks falls on every member of society. Risk awareness and risk ownership (by individuals, communities, businesses and different levels of the government) are central to society's ability to take rational risk management decisions.

While we believe that everyone plays a key part, in this report we focus our recommendations on the role of government. Specifically, we urge governments to:

- 1) Identify and quantify socio-economic risks of climate change (with regular updates) and conduct cost-benefit analysis of possible measures to underpin climate risk management decision-making. To this end:
 - (i) *Facilitate systematic collection* of reliable environmental and socio-economic data.
 - (ii) *Establish national data platforms and data policies* to make publicly-funded data accessible to public and private sector institutions.
 - (iii) *Invest in education and raise public awareness of physical climate risks* (acute and chronic) by providing and regularly updating national climate risk maps and information portals.

³⁸ On the adaptation side, among key stakeholder segments are the United Nations, the development community including the OECD, the World Bank Group and other multilateral development banks, international donors, various socio-economic groupings (e.g. G20, G7, EU, APEC, ASEAN, CARICOM), the insurance industry and its affiliations, NGOs, the scientific community and engineering associations (Annex 2). Similarly, on the mitigation side, among key stakeholder segments are, the United Nations, the development community, socio-economic groupings (G20 and its FSG-TCFD and Green Finance Working Group, EU and its HLEG on Sustainable Finance), NGOs (e.g. Bloomberg's Sustainable Energy and Climate Action Plan, CDP, AODP, CERES), financing and capital markets and related policymaking and regulatory bodies (e.g. ICMA, GFMA, EIB, ESMA and IOSCO, central banks, banking sector), technologists and innovators and fossil fuel-intensive companies (e.g. energy, automobile manufacturers, etc.) (Annex 3)

- (iv) *Establish indicators and targets, collect reliable data, and conduct risk audits* to measure progress on the building of resilience.
- 2) Develop comprehensive and integrated climate risk management plans that span all sectors of the economy:
- (i) *Ensure plans are risk-informed and involve:* (a) *ex-ante* preventive measures (to avoid new risks) and risk reduction measures (to reduce existing risk); (b) pre-agreed disaster preparedness and response measures to ensure a quick return to normal after a disaster; (c) risk financing and risk transfer measures, such as insurance, to build financial resilience to the residual economic risks; (d) effective reconstruction planning to prevent recurrent risks and build resilience to future events.
- (ii) *Encourage national governments* to consult with and engage different ministries and layers of the government (particularly the local governments), as well as the private sector.
- (iii) *Provide enabling environments, including sound policies, regulations, legal and institutional frameworks* to facilitate and incentivise the implementation of such measures.
- (iv) *Lay out institutional foundations for enhanced coordination across government layers* including strategic alignment, planning, budgeting and incentive mechanisms.
- (v) *Establish mechanisms for engagement and consultation with the private sector* (e.g. market-based insurance industry).
- (vi) *Invest in, enforce and promote (as relevant) preventive and risk reduction measures* (e.g., update and enforce new building standards, land zoning, invest in infrastructure that increases resilience, retrofit public buildings and infrastructure) to address the underpinning causes of risks, leading to insurability of the residual risks, paying special attention to strengthening and building climate resilient public infrastructure.
- (vii) *Reform post-disaster financing schemes and adopt financial protection strategies* to increase ownership, impact and cost-efficiency of disaster response financing. Consider innovative solutions provided by the insurance sector for catastrophe risk transfer and protection of government budgets.
- 3) Engage with and establish relevant public-private partnerships with the insurance industry for building socio-economic resilience to climate change:
- (i) *Establish policies and regulatory regimes to enable the insurance industry to provide scalable and sustainable risk transfer solutions* to protect individuals and businesses, as well as governments' budgets (local to national) against climate risks, leveraging the industry's innovations in risk transfer solutions, distribution channels and mechanisms for payouts after disasters.
- (ii) *Invest in education and raise public awareness of the socio-economic benefits of risk transfer solutions* such as insurance to enhance the public's receptivity and take-up.
- (iii) *Realise opportunities to leverage risk expertise and knowledge of the insurance industry*, particularly in the areas of risk assessment, risk pricing and preventive measures.
- (iv) *Establish relevant public-private emergency facilities* to cope with very low probability but very high impact events that are beyond the capacity of the insurance industry.

On the transition to low-carbon economy

Different key stakeholders should address a number of barriers to allow institutional investors, particularly those with fiduciaries duties and regulatory constraints (such as the insurance industry) to expand their contributions. We have categorised our recommendations in four key areas, targeted at different key stakeholders.

- 1) We encourage policy setting, regulatory and standard setting bodies involved in financing and capital markets to³⁹:

39 A number of intergovernmental mechanisms are emerging, aiming to identify barriers to green financing and mobilise private investment into green projects, such as the G20 Green Finance Study Group and the EU High Level Expert Group on Sustainable Finance. More recently, the International Capital Market Association (ICMA) has joined forces with the Global Financial Markets Association (GFMA) to establish the Global Green Finance Committee (GGFC), a coordinated industry effort to promote green finance, facilitate cross-fertilisation between related markets

- (i) *Develop clear classifications for assets and financial products that capture all acceptable definitions of 'green'.*
 - (ii) *Support expansion of green bond markets with proper monitoring and verification.*
 - (iii) *Support, promote, and enable the expansion of the pipeline of green investments and new investment tools that meet the investment criteria of liability-driven institutional investors.*
 - (iv) *Establish well-defined standards and methodologies by which insurance companies, other institutional investors and asset managers can assess the relative merits of a green investment or project.*
- 2) We encourage governments to:
- (i) *Strive to provide greater clarity on national decarbonisation policies, carbon pricing and/or trading policies, regulatory frameworks and strategies, particularly in relation to major carbon emitting sectors.*
 - (ii) *Develop consistent national sectoral strategies in alignment with national decarbonisation plans, spanning key sectors —particularly, energy, water, agriculture, manufacturing and chemicals, transportation and housing— to ensure a well-managed transition. Consider the implication of critical issues such as technical innovations and other disruptions, greening and climate resilience of critical infrastructure, trade, education, labour training and job creation opportunities.*
 - (iii) *Engage and consult from the early stages with different sectors and levels of the government (emphasising city and local levels) and with the private sector to develop implementation plans. Ensure better alignment across sectoral, climate, financial, labour, education and trade policies to enable 'well-managed' transitioning.*
- (iv) *Discuss carbon pricing/trading policies with the goal of incentivising and/or helping with financing the 'well-managed' transition rather than as stand-alones.*
 - (v) *Ensure that the Nationally Determined Contributions plans are accompanied by clear capital raising plans, engaging both the public and private sector.*
 - (vi) *Establish strong public-private partnerships and structures to enable the flow of private sector financing and implementation.*
 - (vii) *Phase out the fossil fuel subsidies and establish subsidies and tax incentives for investing in green.*
- 3) *Financial reporting and compliance authorities could establish consistent disclosure rules for all market participants in order to provide better information on the financial risks emanating from climate change. This could potentially reduce/eliminate the number of fragmented reporting frameworks to avoid reporting fatigue and lead to availability of consistent and reliable data and transparency.*
 - 4) *Insurance regulators could explore ways to incentivise investments in green by the insurance industry through better alignment of insurance regulations with the national climate change policies and priorities.*
 - 5) *The United Nations Framework Convention on Climate Change (UNFCCC) should ensure that its stocktaking includes an assessment on how global capital markets are responding to the climate change challenges and opportunities.*

Recommendation 2: The insurance industry should continue to institutionalise climate change as a core business issue, expand its contributions towards building financial resilience to climate risks and supporting the transition to a low-carbon economy by collaborating with governments and other key stakeholders to address challenges.

and asset classes with the ambition of acting as a representative counterparty to the official sector on green policy matters. Furthermore, credit rating agencies could play a critical role in the adoption as they are incorporating climate risk management as a factor in their evaluation of publicly-traded company and sovereign credit ratings.

At the company level

We recommend that insurance companies continue to:

- 1) *Expand their underwriting products and services* for addressing the protection gap to natural hazards and physical risks of climate; to reduce business risks associated with the complex green and clean tech value chain; and incentivise preventive measures and GHG reduction.
- 2) *Reduce their carbon footprint* for all aspects of their business.
- 3) *Institutionalise climate change as a core business issue* by considering climate risks (physical, transition and liability risks) in their governance, strategy, risk management, underwriting and investment practices.
- 4) *Establish governance mechanisms* to address long-term climate risks with a long-term perspective and promote such approaches as the norm.
- 5) *Stay abreast of latest developments in stress testing and 2°C Scenario analysis*, as well as of developments with the FSB-TCFD.
- 6) *Integrate climate risks into investment decisions*.

However, many barriers identified in this study cannot be addressed at the company level alone. The industry needs to converge on key issues and bring them to the table as a collective.

At the industry level

We recommend the sector to:

- 1) *Proactively engage with governments*, establish partnerships with governments and other stakeholders, as relevant, to expand risk transfer solutions for building financial resilience to climate risks for individuals, businesses and governments.
- 2) *Support the development and advancements in catastrophe risk models with a forward looking approach* through strong partnership with the scientific community.
- 3) *Promote the need for the systematic collection and availability of publicly-funded environmental and*

socio-economic data, national data platforms and data policies to make data accessible to public and private sector institutions.

- 4) *Invest multilaterally in climate adaptation research in areas such as risk reduction measures (e.g. home storm and flood protection, benefits of natural infrastructure), etc.*
- 5) *Promote the need for clear, coherent and consistent climate change policies and regulatory frameworks* to enable climate adaptation and 'well-managed' transitioning to a low-carbon economy.
- 6) *Promote the need for 'green' and 'infrastructure' asset classification, expansion of pipeline of investable opportunities, standards and methodologies, reliable data and transparency and regulatory stability* for long-term investments to pave the way for the expansion of green investing.
- 7) *Stay abreast of developments with the FSB-TCFD and engage in and contribute to the development of standard methodologies for stress-testing and scenario analysis (e.g. 2°C Scenario and Nationally Determined Contributions (NDCs))⁴⁰*, building on extensive experience with development of such tools for physical risks (e.g. NatCat).

Recommendation 3: Governments and the insurance industry should explore ways to support climate resilient and decarbonised critical infrastructure through the industry's risk management, underwriting and investment functions.

We encourage governments to:

- 1) *Ensure that new infrastructure projects, either public or private, are delivered with consideration for resilience to physical risks as well as decarbonisation goals.* To this end, governments should:
 - (i) Set clear public policies, legislation and regulatory frameworks on the requirements for resilience, including measures for system robustness, back-up capacity, rapid recovery and adaptability to new risks that apply to different phases of the infrastructure life cycle.

⁴⁰ The Financial Stability Board TCFD (2017) recognises NDC (Nationally Determined Contributions) as a particularly useful scenario where NDCs are commonly accepted. (See p.28 of the TCFD Final report which reads "In jurisdictions where NDCs are a commonly accepted guide for an energy and/or emissions pathway, NDCs may constitute particularly useful scenarios to include in an organisation's suite of scenarios for conducting climate-related scenario analysis.")

- (ii) Ensure it becomes mandatory for any new infrastructure to undergo a comprehensive assessment of impacts of extreme events and climate risks, among other risks.
- 2) *Reassess physical risks associated with existing public infrastructure* and invest in retrofitting measures.
- 3) *Consult with the insurance industry* to explore what the industry could offer through its underwriting and investment functions.

We recommend policymaking, regulatory and standard-setting bodies within the financing and capital markets to:

- 1) *Establish 'infrastructure' as an asset class and support development of an efficient market.* Note that capital markets for infrastructure assets remain relatively complex, non-standardised and illiquid.
- 2) *Define a common risk assessment framework, disclosure and documentation standards* to reduce the due diligence required by institutional investors, often due to differing contractual terms.

Figure 5: Recommendations





Recommendation 1

Third-party stakeholders such as governments, policymakers, standard setting bodies and regulators across sectors should work in a more coordinated fashion to address key barriers that hinder insurers from scaling up their contribution to climate adaptation and mitigation.

Climate change adaptation

Governments

- Identify and quantify socio-economic risks of climate change (with regular updates) and conduct cost-benefit analysis of possible measures to underpin climate risk management decision-making.
- Develop comprehensive and integrated climate risk management plans that span all sectors of the economy and levels of the government.
- Engage with and establish relevant public-private partnerships with the insurance industry for building socio-economic resilience to climate change.

Transitioning to low-carbon economy

Policy setting, regulatory and standard setting bodies

- Develop clear 'green' classifications for assets and financial products.
- Support expansion of green bond markets with verification.
- Support, promote, and enable the expansion of the pipeline of green investments and new investment tools.
- Establish well-defined standards and methodologies to assess merits of green investments.

Governments

- Provide greater clarity on national decarbonisation plans and policies.
- Develop consistent national sectoral strategies in alignment with the national decarbonisation plans.
- Ensure better alignment across sectoral, climate, financial and trade policies, regulatory frameworks and related incentives.
- Discuss carbon pricing/trading policies with the goal of incentivising and/or helping with the financing of a 'well-managed' transition.
- Ensure that the Nationally Determined Contributions plans are accompanied by clear capital raising plans.
- Establish strong public-private partnerships and structures to enable private investing in the green sector.
- Phase out the fossil fuel subsidies and establish subsidies and tax incentives for green.

Financial reporting and compliance authority bodies

- Provide better information and consistent disclosure rules for all market participants.

Insurance regulators

- Align regulations to enable green investments with a long-term view.

UNFCCC

- Ensure stocktaking of global markets' response to climate change.



Recommendation 2

The insurance industry should continue to institutionalise climate change as a core business issue, expand its contributions

towards building financial resilience to climate risks and supporting the transition to a low-carbon economy by collaborating with governments and other key stakeholders.

Company level

- Expand underwriting products and services for addressing the protection gap to natural hazards and physical risks of climate; reduce business risks associated with the complex green and clean tech value chain; and incentivise preventive measures and GHG reduction.
- Reduce carbon footprint for all aspects of business.
- Institutionalise climate change as a core business issue.
- Establish governance mechanisms to address long-term climate risks and promote such approaches as the norm.
- Stay abreast of latest developments in stress testing and 2°C Scenario analysis, as well as of developments with the FSB-TCFD.
- Integrate climate risks into investment decisions.

Industry level

- Proactively engage with governments to leverage the industry's value proposition to build socio-economic resilience to climate risks.
- Support the development and advancements of forward-looking catastrophe risk models.
- Promote the need for systematic collection and availability of publicly-funded environmental and socio-economic data.
- Invest multilaterally in climate adaptation research.
- Promote the need for clear, coherent and consistent climate change policies and regulatory frameworks.
- Promote the need for 'green' and 'infrastructure' asset classification, expansion of pipeline of investable opportunities, standards and methodologies, reliable data and transparency and regulatory stability for long-term investments.
- Stay abreast of latest developments in stress testing and scenario analysis.



Recommendation 3

Governments and the insurance industry should explore ways to

support climate resilient and decarbonised critical infrastructure through the industry's risk management, underwriting and investment functions.

Governments

- Ensure new infrastructure projects are climate resilient and decarbonised by setting clear policies, legislation and regulatory frameworks.
- Reassess physical risks of existing public infrastructure and invest in retrofitting.
- Join forces and consult with insurance industry to explore the industry's potential contributions.

Financial regulators/standard setting bodies

- Establish infrastructure as an asset class and support development of a market.

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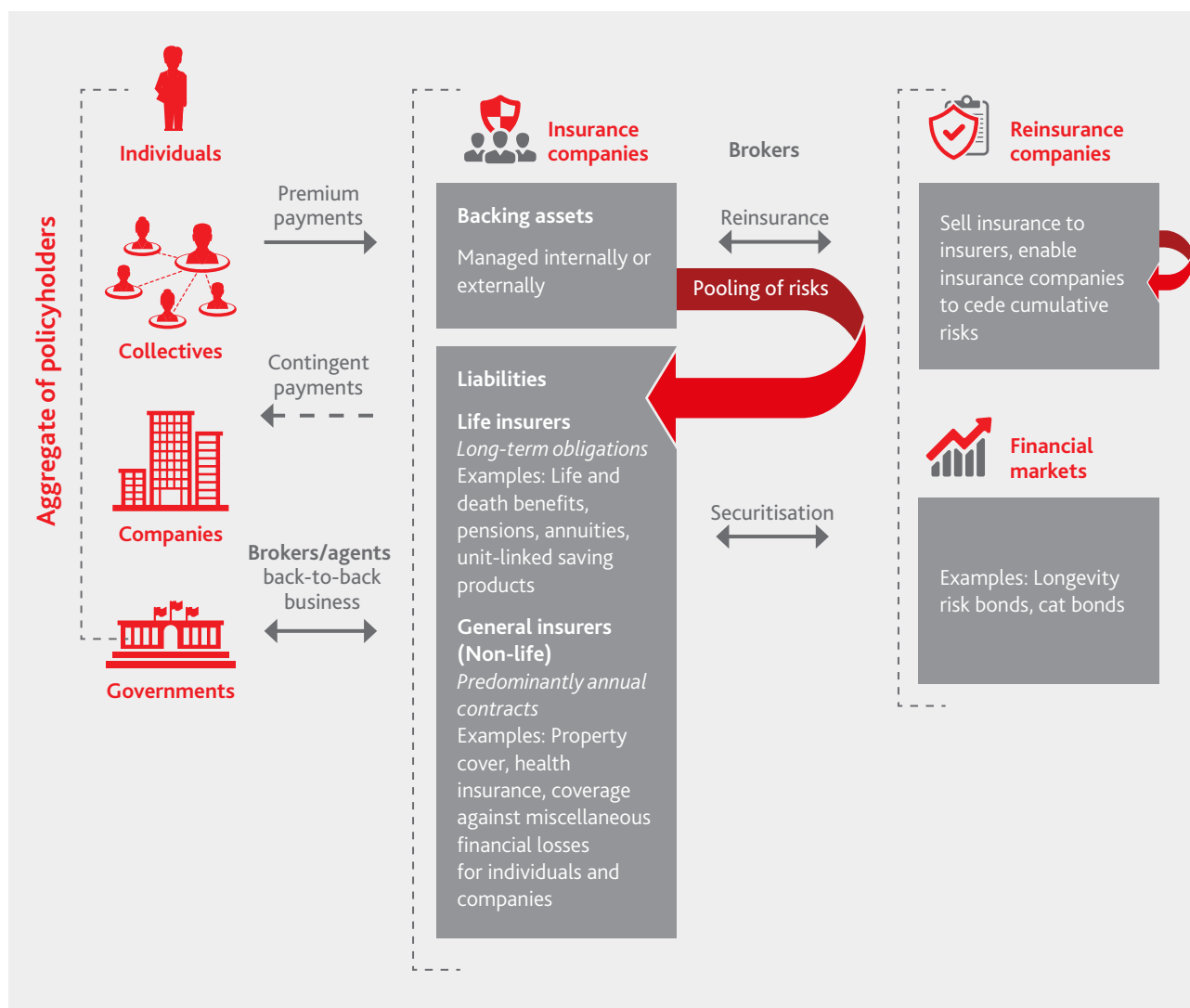
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Annexes

Annex 1: A brief look into the foundations of the insurance business model

Transferring and carrying risk is at the heart of the insurance business. The core business of insurers is to assess, price, assume and transfer risk on behalf of their policyholders. Figure A1 provides an overview of the insurance industry's value chain.

Figure A1: The insurance industry value chain



The insurance industry's value chain

This includes:

- **Policyholders:** Buyers of insurance, e.g. oneself, a car owner, all drivers of a certain vehicle, all people working for a company, a company itself, municipalities and states, etc.
- **(Primary) Insurers:** They enable individuals and collectives to bear risks. e.g. most drivers cannot afford the casualties of a car accident.
- **Reinsurers:** Reinsurance companies act as insurers for insurance companies. Their important role is highlighted in more detail below.
- **Brokers/agents:** Are intermediaries or 'sales agents' between policyholders and insurers as well as between primary insurers and reinsurers. Maintaining a distribution network and consulting services, brokers offer a critical service as intermediaries in enabling the risk transfer transaction, but do not bear the risk.
- **Financial market:** A well-functioning financial market is needed for the production of insurance products. On the one hand, earned premiums need to be reinvested. On the other hand, insurance companies need to raise additional risk capital.

Traditionally, from an underwriting point of view, there are three basic ways of classifying insurance (Skipper, 1998):

- **Social versus private:** Social insurance is government-administered and emphasises social equity and income redistribution, whereas private insurance is based on individual actuarial equity with premiums reflecting individual risk characteristics embedded in a portfolio to benefit from diversification.
- **Life versus non-life:** Life insurance pays benefits on a person's death, living a certain length of time, sustaining disability or injury. Non-life insurance generally covers property losses, liability losses and, in some countries, workers' compensation and health insurance payments.
- **Commercial versus personal:** Commercial insurance is purchased by businesses or other organisations to insure large risks. Personal insurance is purchased by individuals and covers mass risks.

The risk transfer function

Insurance companies offer protection to people, businesses and governments in return for a premium. The insurance policy is a mutual agreement whereby the insured transfers the risks of an uncertain loss to the insurer by paying up front a certain fixed amount. Subsequently, in the occurrence of a covered event, the insurance company indemnifies the policyholder. It should be noted that the actual insurance product is not the payment in the event of a covered loss. In fact, it is rather the guarantee that losses will be indemnified if one suffers a loss. Obviously, this guarantee comes only with a certain likelihood; insurance companies may go bankrupt during the coverage period. Correspondingly, the creditworthiness of an insurance company is key. The insurance industry is heavily regulated. The guarantees of the insurance mechanism rely on three methods, including pooling of risks, retrocession and securitisation.

- **Pooling of risks:** By pooling similar risks of different individuals, the uncertain magnitude of the losses becomes controllable. Residual annual fluctuations are offset over time. This is the fundamental role of insurance: organising the diversification of risks.⁴¹ In this sense, insurance companies achieve the management of their liabilities accordingly. By holding a capital buffer, insurance companies may still endure a period of adverse loss experience.
- **Retrocession:** Cumulative and peak risks can be capped by ceding them to a certain portion to reinsurance companies. Correspondingly, reinsurance companies act as insurers for insurance companies. Huge losses are spread across many parties and become bearable.
- **Securitisation:** The coverage of certain risks can also be financed by placing them in the financial market.

The investment function

The investment (asset management) function of insurance companies is deeply linked to the liabilities. Structuring the balance sheet is known as Asset Liability Management (ALM). Investment strategies are developed with consideration for a number of internal and external factors. Insurance companies need to ensure that they remain solvent and can make their payouts to the policyholders with the highest probability at any time. The asset

41 In other words, it is important to underline that the role of insurance is the socialisation of risk.

allocation and investment decisions are typically supervised by an investment committee, chaired by the Chief Investment Officer (CIO). The process involves optimisation under constraints, which is conducted in a two-step approach in close collaboration with other stakeholders from the company.

First and foremost, investment decisions are mainly driven by the underwritten liabilities. To this end, the actuaries calculate the expected cash flows and the required risk capital so that the insurance company can fulfil its fiduciary responsibility with very high probability. This includes target return on investments (ROIs) and duration patterns for the liquidity management. These vary across different business segments. Second, asset allocation strategy involves alignment of the actuarial projections (the prudence regime), expectations from the shareholders (demand for a risk-adjusted return on their investment) and the company's risk appetite (as supervised by the board of directors).

Insurers have a fiduciary duty to protect and enhance the value of their 'policyholders' assets. Fiduciary duties pose constraints on the industry's investment strategies. Their primary responsibility as fiduciaries is to invest funds entrusted to them by policyholders (i.e. premiums) prudently in order to provide benefits to the beneficiaries of those funds (i.e. settle claims when they become due). The common understanding of this responsibility is that insurers, as fiduciaries, should focus on generating risk-adjusted portfolio returns in order to maximise the financial benefits they can pay out. Prudential standards aim to ensure that they will do so.⁴²

Financial and insurance regulatory system

To ensure that insurers have adequate capital, regulators impose risk-based capital charges on insurers' investments; the riskier the investment, the higher the capital charge. Regulatory capital requirements are designed to ensure that the insurers could fully honour future claims.⁴³ Regulators will intervene if an insurer does not have sufficient capital to meet its regulatory requirements. The asset allocation is restricted to a high degree by regulatory requirements targeted at consumer protection, which are enforced in the insurance industry through complex regulatory systems, which vary regionally.^{44,45}

Regulatory capital charges and the associated formulas vary by type of insurance company and asset class. For example, assume that the baseline charge for an investment in common equities by a non-life insurer is 15 per cent of the asset value; for every dollar invested in common equities, a non-life insurer would be charged USD 0.15. As such, insurers might be more drawn towards asset classes with lower capital charges (e.g. long-term, high-quality fixed income investments).

42 There is no global definition of fiduciary duties, with fiduciary standards varying across different legal systems, cultures and contexts. However, fiduciary principles impose a duty of care (which requires fiduciaries to exercise skill and prudence when looking after the assets of beneficiaries) and a duty of loyalty (which requires fiduciaries to manage funds in the beneficiaries' interests, not their own, and to be impartial to the interests of multiple beneficiaries). Institutional investors have interpreted the combined duties of care and loyalty to require fiduciaries to only consider the financial interests of beneficiaries. The implications of this 'narrow' interpretation for insurers is that fiduciaries should not incorporate climate change considerations into their investment decision-making because in doing so they could be in breach of their duty of care (taking non-financial factors into account might put financial returns at risk) or duty of loyalty (placing their own ethical or moral beliefs above the financial interests of their beneficiaries) (OECD, 2017).

43 Even if the future loss experience is worse than assumed when the liabilities are calculated.

44 **Prudence regime:** The idiosyncrasy of insurance cash flows is that their magnitude and timing are random. Actuaries calculate the capital requirements in order to be able to serve these contingencies with very high probability. Unless regulations explicitly prevent it, diligent actuaries assume a prudent position, i.e. it is better for the insurance company to reserve slightly too much capital than too little.

45 **Risk appetite:** According to the general economic theory, risky investments tend to have more volatile returns. This involves the upside potential of risky investments being higher.

Typical investment patterns

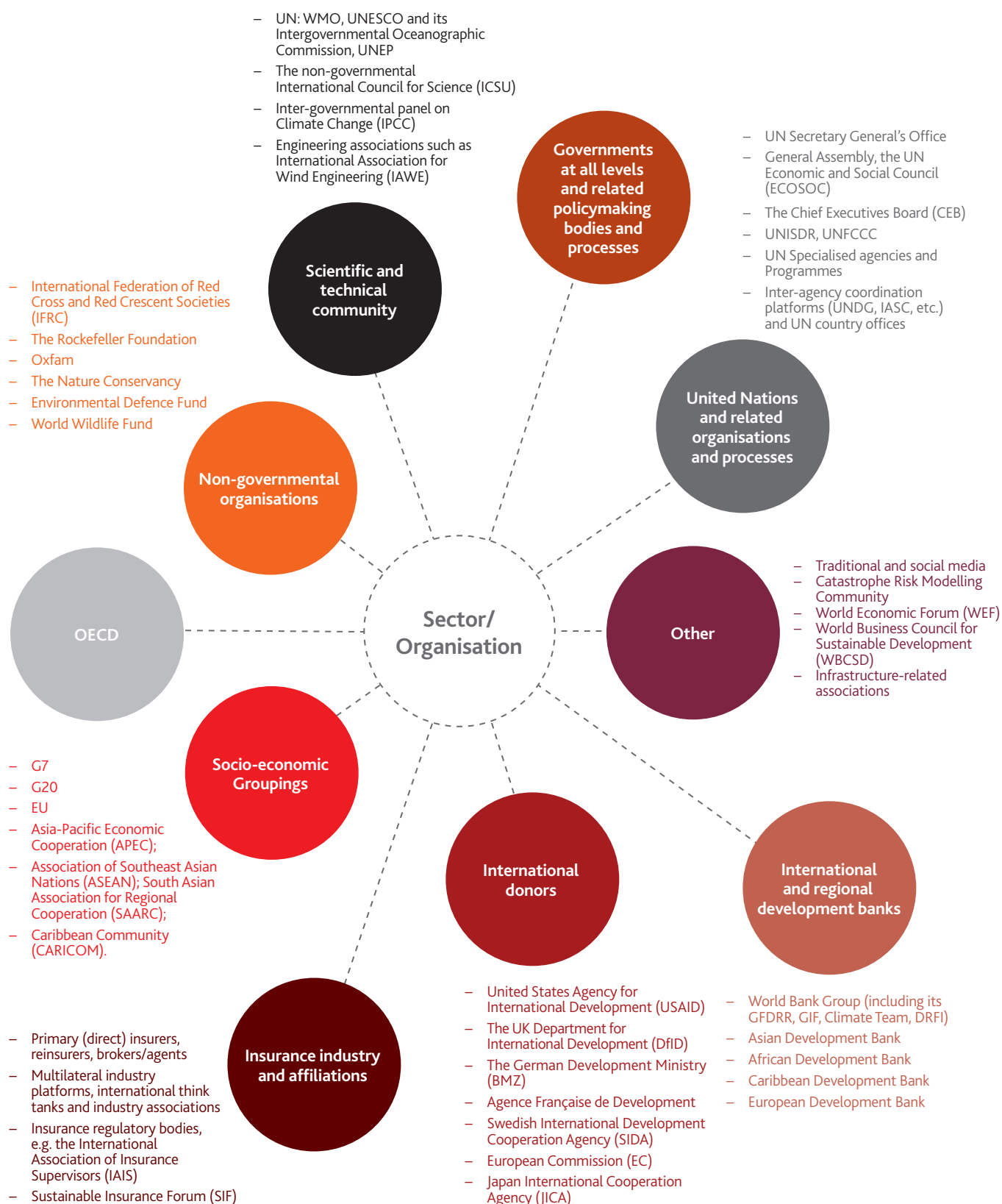
The nature of liabilities determines how the financial risks associated with the assets and liabilities are managed, given that different lines of business are exposed to different risks. It would be fair to say that in order to fulfil their fiduciary responsibility and to guarantee creditworthiness, insurance companies prefer to select secure investments with slightly lower ROIs.

Life insurers are typically 'buy and hold' investors seeking to generate predictable and stable income to match long-term and generally predictable liabilities that must be paid when claims become due (life insurance contract durations are of 10 years and more with payout patterns of twenty or thirty years or more). Life insurers are deeply concerned with the asset liability mismatch, and so the focus of ALM is often interest rate risk since the longer the duration the more sensitive the liabilities are to changes in interest rates.

Non-life insurers' investment categories are geared towards more liquid investments with shorter investment horizons in order to be able to compensate policyholders quickly and efficiently (non-life insurance contracts are typically one year in duration).

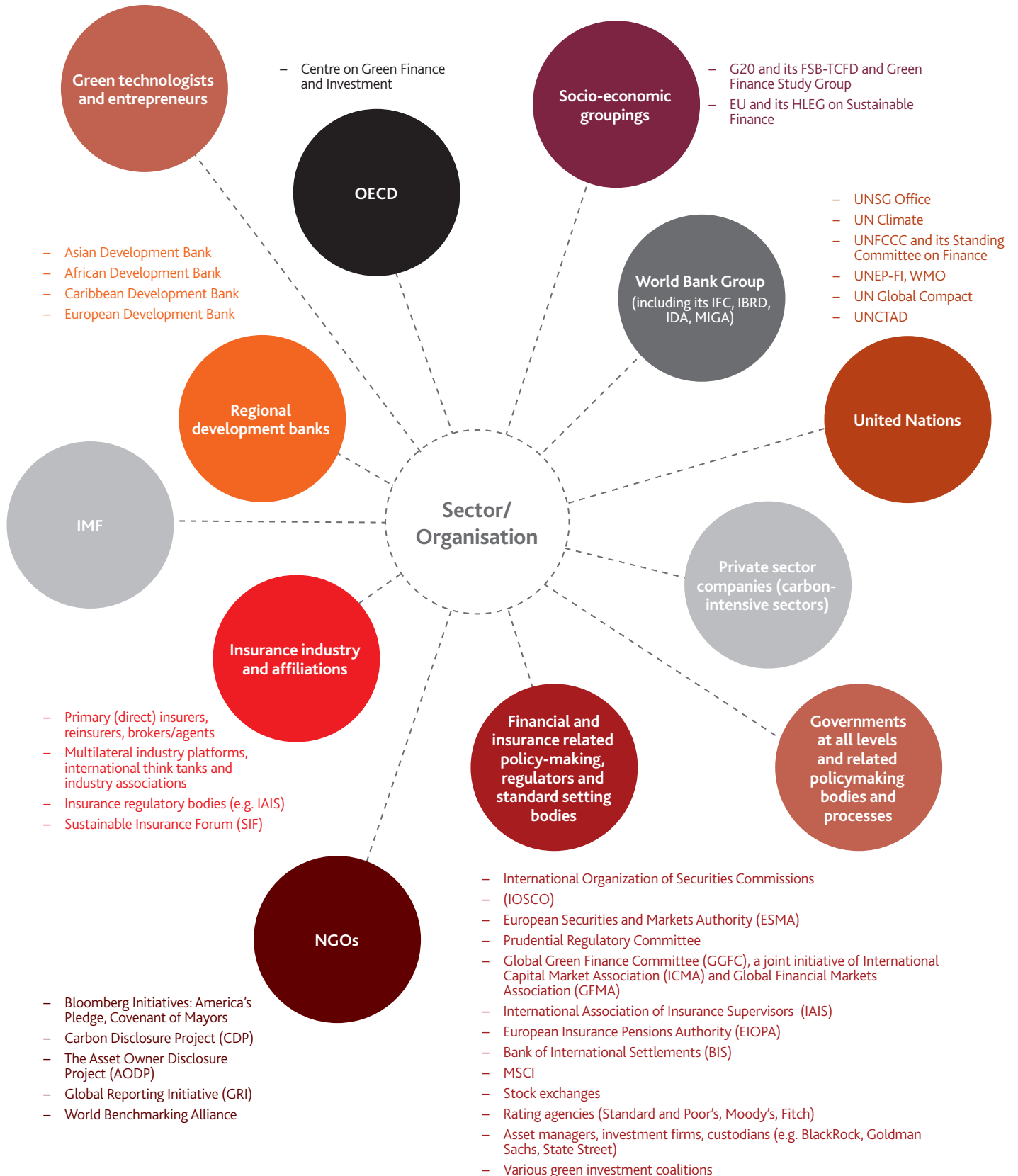
Large insurance conglomerates usually maintain their asset management divisions in-house, while smaller companies tend to outsource the asset management function to third party asset managers.

Annex 2: Key organisations supporting climate resilience and adaptation



Source: The Geneva Association (2017a) 'The Stakeholder Landscape in Extreme Events and Climate Risk'. Authors: Golnaraghi, M. and Khalil, P. Available at: https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/stakeholder-landscape-in-eecr.pdf

Annex 3: Key organisations addressing the transition to a low-carbon economy





This report offers new insights into the role of the insurance industry in addressing the climate change adaptation and mitigation goals. It highlights the insurance industry's value proposition and efforts to build financial resilience to climate risks and to support the transitioning to a low-carbon economy. It proposes key recommendations for multiple stakeholders.



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