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The RISK

Risk & Insurance Solutions of Korean Re

The RISK SPECIAL EDITION 2018

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CLIMATE CHANGE ADAPTATION FOR PRIVATE-SECTOR BUSINESSES

1. INTRODUCTION

The risk of climate change is no longer a thing of a distant future for private-sector businesses. The Stern Review on the Economics of Climate Change suggests that climate change can lead to increased climate volatility, rising temperatures, higher risks of heat waves, droughts, floods, wet winters and dry summers, changes in rainfall patterns, rising sea levels, and increasing frequency and severity of coastal flooding and storms, all of which it warns will have negative impacts on corporate activities. The report also says that in order to prepare for the risk of climate change, companies need to understand the nature and potential impacts of the climate threat and the vulnerability of the community to their business activities and establish cooperative relations with stakeholders.

Indeed, the loss or damage caused supposedly by climate change has been reported frequently in recent years. Due to Typhoon Haiyan in 2013, the Philippines suffered economic losses of about KRW 15 trillion, or 3.3% of its GDP, which led to a 2% decline in economic growth. In 2011, massive floods in Thailand brought about a huge amount of damage to the global IT industry as many hard disk manufacturing plants, including Nikon's, were operating in the affected areas. In 2003 when Typhoon Maemi struck Korea, a large crane at a container terminal at

Busan Port overturned and caused enormous disruption in the handling of export and import cargos, which cost related industries about KRW 338.8 billion. More recently in 2016, Typhoon Chaba caused KRW 215 billion in economic losses in Ulsan only, where industrial facilities were concentrated. Due to the typhoon, 33,106 claims were filed, with the insured losses estimated at KRW 143.3 billion according to the Korean non-life insurance industry. Losses have been increasingly caused by a wider array of weather-related events ranging from typhoons and floods to cold waves and heat waves. In 2014, more than 18,000 flights were canceled, and train services were disrupted in the United States due to a record-breaking cold wave with the lowest temperature recorded in 20 years, which resulted in economic losses of USD 5 billion. In Europe, corn production fell 19% due to heat waves in 2015.

These climate risks, which were low in frequency and high in intensity in the past, are changing in ways that increase both the frequency and severity of extreme weather events. There is also growing uncertainty surrounding the likelihood of a risk occurring. In order for corporations to respond to these risks arising from climate change, they need to first understand what risks they are faced with, how to evaluate them, and how these risks can affect their business.

2. EMERGING RISKS TO PRIVATE SECTOR: CLIMATE CHANGE IMPACTS

The risk factors associated with the physical impacts of climate change have already been discussed in a number of reports related to adaptation to climate change. The physical effects of climate change represent a very significant new threat, according to Adapting to Climate Change: A Business Approach, a report released by the Pew Center on Global Climate Change in 2008. The Network for Business Sustainability also provided a comprehensive climate change report based on a collection of various reports about corporate adaptation to climate change in 2009, which identified a set of emerging risks associated with the impacts of climate change on each sector of the industry, strategies necessary to address them, current challenges and future directions.

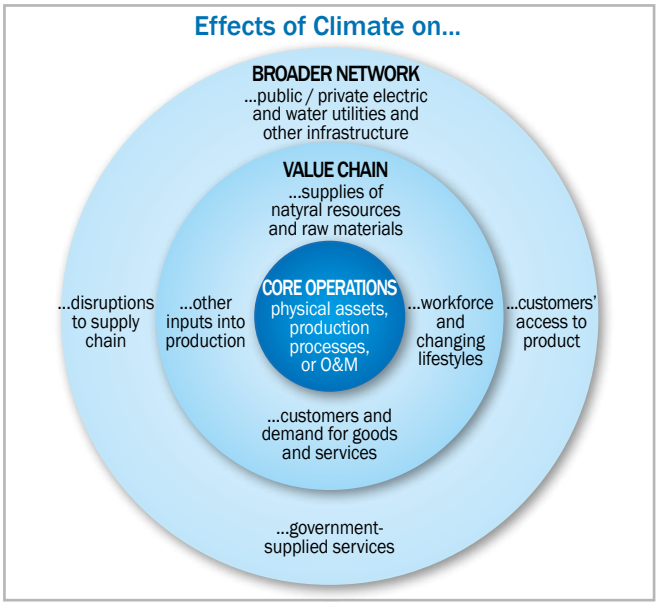
There are eight dustry sectors identified to be potentially affected by climate change: insurance, agriculture, tourism and recreation, energy, water, building and construction, and finance and banking. Table 1. outlines the emerging risks associated with climate change effects on each sector of the industry as presented by the Pew Center on Global Climate Change.

Table 1. Potential Effects of Climate Change on Selected Sectors

Sector	Example Risks Resulting from Physical Effects of Climate Change
Electric Utilities	Peak electricity demand due to warmer and more frequent hot days could in some regions exceed the maximum capacity of current transmission systems and will be combined with system stresses due to heat Increased risk of damage to facilities and infrastructure from extreme and unpredictable weather conditions Uncertainty over energy output from hydroelectric plants due to potential water shortages Uncertainty over water supplies for cooling power plants
Mining	Extreme weather events increase physical risk to business operations, for example due to flooding

Integrated Oil & Gas	Negative business impacts due to weather changes and natural disasters
Food, Tobacco & Beverages	Risk of food supply and operations interruptions due to extreme weather events Longer term weather trends may affect reliability (and quality) of supply of fresh produce Physical risk to water supply and raw materials Greater risk of animal infections(e.g., avian flu), insect infestation, plant disease, wildlife damage,etc.
Building Design & Construction	Extreme weather events may disrupt transport for site deliveries and affect site work (e.g., muddy site conditions), restricting work-days Infrastructure (e.g., drainage) affected by extreme weather events Excessive heat in summer will affect some construction processes and onsite workforce Design standards may need to be clarified or upgraded in response to changing climate Insurance may be more expensive or difficult to obtain for existing buildings, new buildings, and during the construction process
Insurance	Increased need to develop catastrophe models to evaluate capital adequacy and overall natural catastrophe exposure Disruptions to business operations become unpredictable and more financially relevant Competition for water resources between agricultural and urban developments increases commercial risks with impacts on crop insurers Increased risks to human health (thermal stress, vector-borne diseases, natural disasters) Prolonged periods of poor weather or extreme events increase costs of claims and make it more difficult to deal with high volumes of claims
Agriculture	More refrigerated distribution and storage required and problems with livestock transportation in summer heat Damage to transportation infrastructure or disruptions in services due to floods, etc. creating problems with transporting raw materials Limited availability of water and potential interruption of supply to irrigation systems Equipment and other investments, as well as expertise of farmers and workforce, are linked to specific crops, which may become unprofitable or may no longer be viable Quality issues: overheating of grain, or availability of water for pre-washed products Access to land during flood or extreme rain conditions Less frequent frosts will affect quality of certain crops and reduce kill-off of pests/disease Exposure of workforce to increased heat Farm buildings affected by extremes of wind, heat, rain (animal welfare issue)
Motor Manufacturing	Supply chain interruptions and vulnerable transport systems carrying high value products around the world (e.g., one ship carries over $60 million of product) May need vehicles that tolerate new extremes of climate, including greater intensity of rainfall (affecting seals, wipers, tires) and increased need for cooling Process environment will become hotter with increased need for cooling—particularly important for comfort / health of workforce and performance of production processes Increased drying time for painted products as a result of increased humidity

(Source: Pew Center on Global Climate Change (2008) Adapting to Climate Change: A Business Approach)



The risk factors presented in Table 1. are general types of risks by industry sector. The extent of these risks materializing for each business can be determined after identifying the type and nature of the business and what aspects are at risk from the effects of climate change. This screening process for climate change impacts can rely on the risk disk and screening for climate risks as suggested by the Pew Center on Climate Change (Figure 1).

(Source: Pew Center on Global Climate Change (2008) Adapting to Climate Change: A Business Approach)

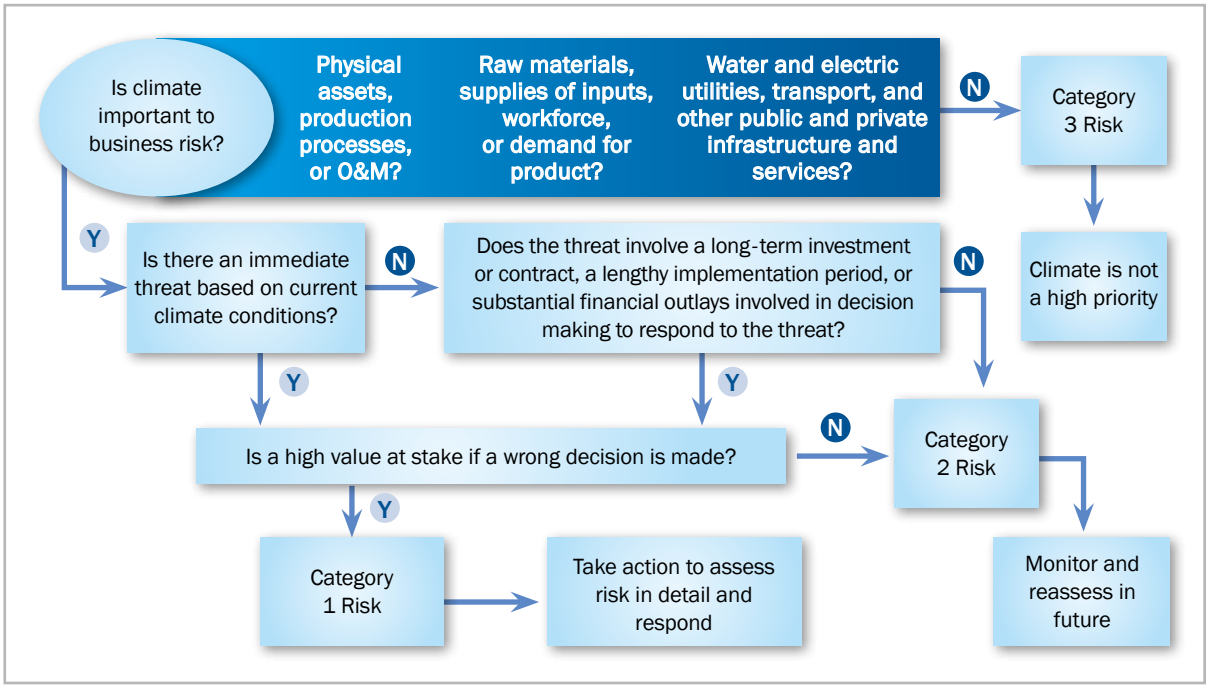


Figure 1. Risk disk and climate change risk screening process

(Source: BundesministeriumfürWirtchaft und Energie)

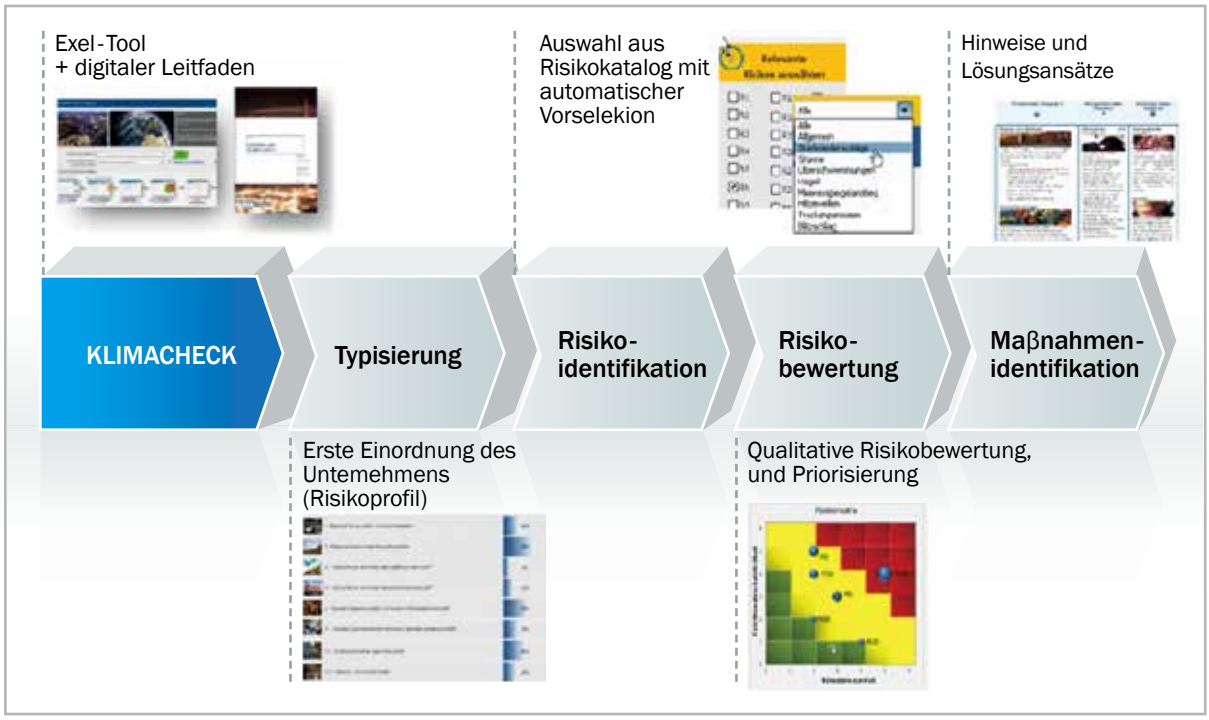


Figure 2. The structure of KLIMACHECK-a climate risk assessment tool for businesses in Germany

3. INTERNATIONAL TRENDS ON THE MANAGEMENT OF CLIMATE CHANGE RISKS FOR CORPORATIONS

In major developed countries, efforts are underway to assess and respond to the impacts of climate change on businesses by developing tools and systems to assess climate change risks.

The UK has been playing a leading role in developing assessment tools for climate change risks, and a good example is Business Areas Climate Impacts Assessment Tool (BACLIAT). This tool allows companies to consider and evaluate the potential impacts of new climate change risks on their business. It consists of a main checklist and a workshop-based process, which runs a set of workshops. The process starts with Workshop A designed to examine past weather conditions, followed by Workshop B where business areas are identified to assess their vulnerability to future climate risks. Workshop Ci involves the establishment of the scope of adaption, and climate impacts within the applicable scope are assessed to generate a list of adaptation options during Workshop Cii. Workshop Ciii is intended to explore areas of new business opportunities.

In Germany, there are support tools for adaptation to climate change such as KLIMACHECK Tool and QuickCheck. These tools were developed and presented under the initiative of the government. KLIMACHECK is an Excel-based support tool for assessing risks and identifying priority areas. Its estimation of damage is based on qualitative analysis. The risk assessment process of KLIMACHECK is shown in Figure 2 and Figure 3.

KLIMACHECK consists of four assessment modules.

Module 1 is the process of selecting the business type of a company and creating a risk profile according to that type. In this process, a company establishes a profile that outlines what risks are expected to cause damage to its

business.

Module 2 is the process of identifying and selecting the risks in the profile to which the company is vulnerable.

Module 3 is a risk assessment process where the priority is determined by using a risk matrix, which assesses the level of impacts (schadensausmaβ) of the selected risks and the probability of occurrence (eintrittswahrscheinlichkeit) through a checklist.

Module 4 involves the identification of measures resulting from the risk assessment to provide hints and solutions (Hinweise und Lösungsansätze) on measures against risks.

QuickCheck is a web-based tool that enables a company to assess the impacts of climate change on its

(Source: Bundesministerium für Wirtchaft und Energie)

Figure 3. 'KLIMACHECK' tool

(Source: http://www.nordwest2050.de/)

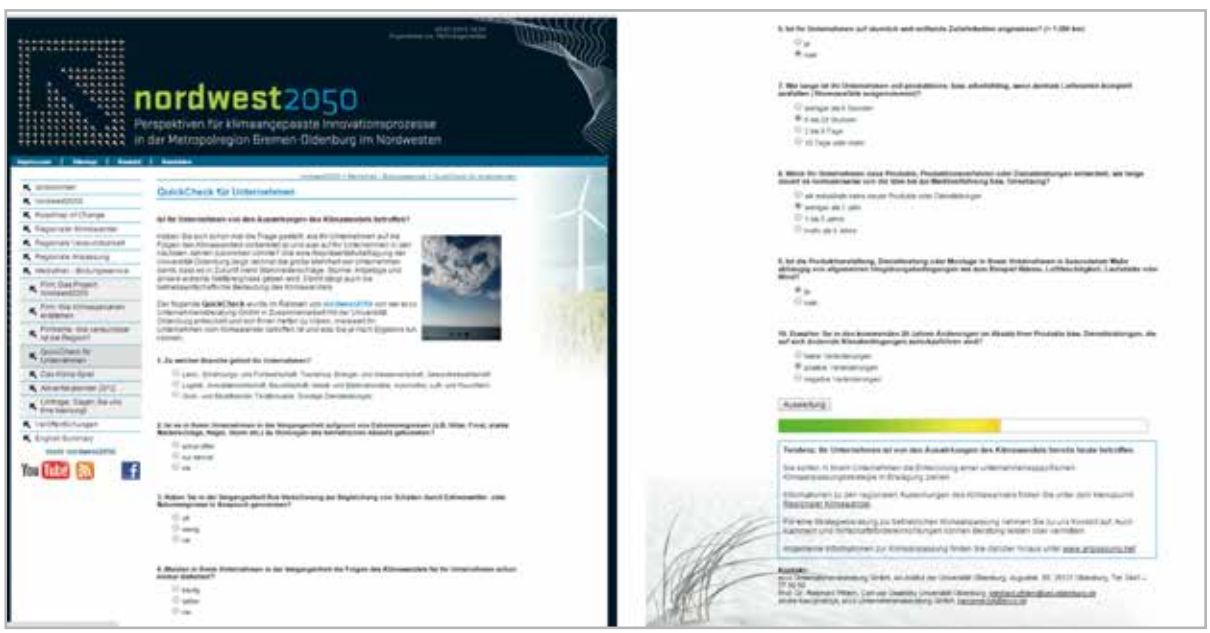


Figure 4. Screenshots of the questionnaire and result generation of QuickCheck

Table 2. Climate change risk disclosure

Lists	What to consider when disclosing
Impacts of laws and regulations	• If current legislation or regulation on climate change affects the business operations of companies, they need to review the need for disclosure and then disclose related risks if they determine that the impacts of such risks on their business are material. • When there is constant effect from current legislation or regulation, companies need to disclose any significant risks arising from the proposed legislation or regulation that is under review
Impacts of international agreements or conventions	• If international agreements or conventions on climate change or greenhouse gas emissions have an impact on the business operations of companies, they need to review the need for disclosure and then disclose related risks if they determine that the impacts of such risks on their business are material.
Indirect impacts of regulations or industry trends	• Companies need to review the actual or potential indirect impacts of regulatory or industry trends regarding climate change and then disclose related risks when such impacts are material.
Physical impacts of climate change	• When climate change has had, or can potentially have, a material impact on the business operations of the companies, they need to review related risks and disclose them if their impacts are material.

(Source: Dokyoung Lee [WU2] (2010) Guidance for Disclosure Related to Climate Change Risks by the U.S. SEC)

business through a set of questions. This questionnaire helps the manager of the company prepare for the effects of climate change on projects in progress and find out what can be applied to future business.

In the United States, the Guidance for Disclosure Related to Climate Change Risks was issued by the Securities and Exchange Commission (SEC) in 2010 as part of investor protection measures with regard to climate change risks.

Regulation S-K, which specifies the scope of corporate disclosure through annual reports, requires companies to disclose their climate change risks. Specifically, Item 503 of Regulation S-K requires disclosure of the most significant factors that make an investment in the company speculative or risky. It also specifies a requirement that disclosure should be made as to how such risk factors can affect the business of the company. Climate change has been included as one of these important risk factors.

There are four climate change risks that companies need to consider or disclose as shown in Table 2.

4. CLIMATE CHANGE RISK ASSESSMENT SYSTEM FOR CORPORATIONS IN KOREA

In Korea, the Climate Change Risk Assessment System (CRAS) has been developed to support corporations with their climate change risk assessment. It is a tool for businesses to identify, select and assess the risks of climate change in relation to their business areas.

The CRAS links climate change impacts from four perils-heatwaves, cold waves, floods and heavy snow -with nine business risk factors. Climate change risks in light of the link between climate change impacts and business risks are financially assessed in connection

(Source: Kim and Lee(2016) Development of a Web-Based Tool for Climate Change Risk Assessment in the Business Sector)

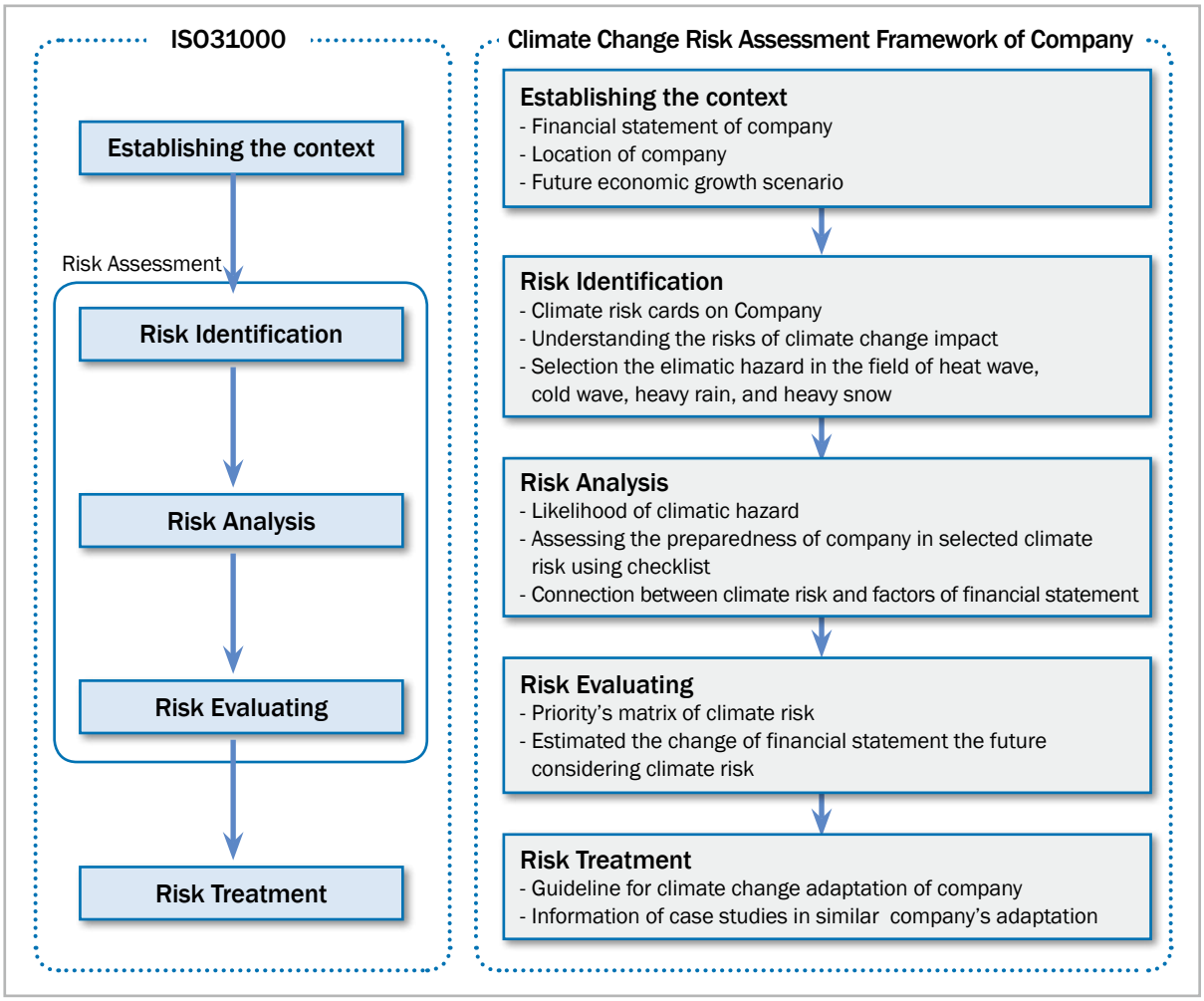


Figure 5. Assessment process of the CRAS

with the operating elements of the company. The overall process of risk assessment is based on ISO 31000 as shown in Figure 5.

The CRAS has a database regarding the four climate change impacts and the probability of their occurrence on companies. By using the financial statements of the companies, it presents the estimated amounts of monetary damage as probability intervals.

The climate change scenarios of the CRAS reflect the RCP 4.5 & RCP 8.5 scenarios of the Intergovernmental Panel on Climate Change (IPCC). Through the CRAS, businesses can check and evaluate the emerging risks associated with future climate change that they may face and can simulate how much damage they may sustain.

5. CONCLUSION

It is not easy for private-sector companies to consider climate change risks as emerging risks in the short term. Considering that there are various short-term

(Source: cras.kei.re.kr)

Figure 6. CRAS and examples of its analysis results

risks associated with business portfolio composition, climate change risks can be perceived by businesses to be less likely to occur in an immediate future. Presumably, climate change is not a risk factor that can emerge any time soon, and companies may find it difficult to determine whether they are vulnerable to the physical effects of climate change that can materialize locally.

Climate conditions are an invisible premise on which business planning of every company is based. In the conventionally dominant paradigm, climate conditions were something that is expected to take patterns similar to the past and that would not change easily. Any change in climate conditions means a shift in constant precondition for risk management plans. This can be a disruptive shift in the foundation of future planning and risk management. There are some people who believe that the impacts of climate change are still uncertain and that technologies and innovations will soon emerge to control climate change and help them come up with optimized responses. It is true that there is uncertainty over climate change impacts, but the belief that the technologies and innovations will be there to control climate change is nothing less than technological determinism based on uncertainty and optimism.

It is therefore imperative for businesses to perceive climate change as one of the emerging risks and come up with various adaptation measures. emerging risks and uncertainties mean crises, but they also mean the emergence of areas that can give rise to new opportunities. Climate change risks can turn into opportunities, not crises, if we seek to figure out what is at risk and make necessary precautions to address them instead of just waiting for someone to tackle the challenge for us.

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THE IMPACT OF INSURTECH ON INSURANCE VALUE CHAIN

1. INTRODUCTION

Blockchain, the Internet of things, big data, artificial intelligence... These were the words that would be heard once in a while, but now they may sound quite familiar to many. They are the technologies that are already taking shape in a way that transforms our lives. The innovation of productivity that mankind has made with the 1st, 2nd and 3rd Industrial Revolutions is now turning into another big leap forward in the name of the 4th Industrial Revolution. It is unclear yet exactly where and how they start, but one thing is clear : the changes the 4th Industrial Revolution would bring are expected to be different quantitatively and qualitatively, at least for the financial industry, from the changes made in the 3rd Industrial Revolution.

Electronic finance of the 3rd Industrial Revolution involved a series of process improvements designed to increase the efficiency of financial transactions with the help of information technology (IT). On the other hand, a wave of the changes involving financial technology (FinTech) are not just about improving efficiency, but brings about disruptive innovation that changes the existing order, which can be a double-edged sword for the financial industry.

This article focuses on the fact that FinTech is a convergence of finance and

technology led by IT companies and start-ups, not by financial companies. It also sheds light on the structural changes of the insurance value chain and value system that the 4th Industrial Revolution will bring to the insurance industry.

In Chapter 2, the changes in value chains made by the digital revolution are examined. Chapter 3 discusses the adoption of FinTech and its impacts on the value chain of the banking industry, which is a bit ahead of the insurance industry in terms of digitalization. Chapter 4 provides a brief review of overall trends and changes involving InsurTech, followed by a discussion of the disaggregation of the insurance value chain and an overview of the IT companies and start-ups in the field of InsurTech. In Chapter 5, a forecast of mid to long term changes is presented along with a discussion of the survival strategies of traditional insurers.

2. THE CONCEPT OF A VALUE CHAIN AND HOW IT CHANGES IN A DIGITALIZED WORLD

A value chain is a set of activities that a company undertakes to provide its customers with valuable products and services. The value chain consists of primary activities, which are the core competencies of the business that create added value, and secondary activities that support primary activities. Value chain analysis enables the business to establish strategies for building its competitive advantage. (Michael Porter, 1985). A value system is a process of connecting value chains to create values and delivering them to end customers.

The digitalization of an industry has reduced transaction costs and increased the level of information transparency, and as a result, value activities and value chains that do not create added value are being removed or outsourced. Another change is a shift in production paradigm where a push-model supply chain is switched into a pull-based one. In short, digitalization can be affecting almost every industry in a way that dismantles, combines, adds or reverses the value activities of businesses, leading to the collapse and reconstruction of the existing value chains and value systems.

A competitive advantage was all about average in the traditional business model where a company engages in the entire process of producing goods or services. In other words, the total cost of production was more important than any cost advantage in an individual stage of the value chain. However, in an economy where the disaggregation of the value chain occurs, a competitive advantage for each stage matters more than the average cost, and the optimization of the value system takes place to manage the linkage of value chain stages where you have competitive advantages.

3. FINTECH REVOLUTION AND ITS IMPACTS ON THE VALUE CHAIN OF THE BANKING INDUSTRY

Before analyzing the impact of new technologies and environmental changes on the insurance industry, this chapter looks into changes in the value chain of the banking industry as it has been going through the FinTech revolution characterized by innovation in the way remittance and payment transactions are conducted. The main business areas of the banking industry are deposits, lending, asset management, remittance and payment. Traditional banks have enjoyed economies of scale and scope over many decades and have generated revenues by providing services across all business areas. Now there are some new entrants dedicated

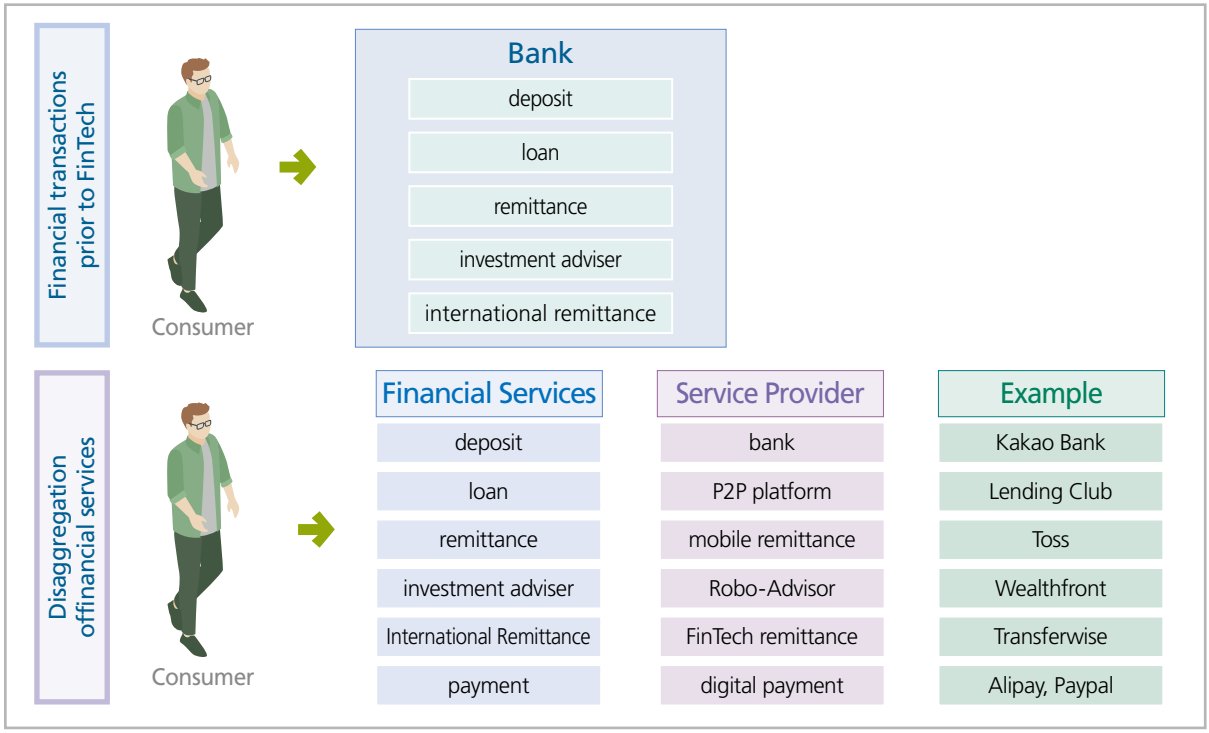

Figure 1. The digital innovation and future of financial services (The Bank of Korea, 2017)

to digitalizing traditional banking services such as Kakao Bank and K-bank, but most FinTech start-ups are focusing on areas in which they have competitive advantages by disaggregating financial services into functions. Figure 1 shows how they are disaggregating individual business areas of financial services, disrupting the traditional business model of banks.

Initially, information and communications technology (ICT) companies such as Paypal or Naver Pay made inroads mostly into the payment service market where they can easily gain a comparative advantage in terms of access to consumers. Now they are finding their ways into a wider range of financial services such as money lending and asset management. Among such players are Lending Club, which is a U.S. peer-to-peer lender; SoFi, which is an online personal finance company that provides loans based on lending criteria other than credit ratings; and Wealthfront or Mint, which provide asset management services based on artificial intelligence (AI) technologies. It is amazing to see how AI trading systems are shaking up the financial industry. Goldman Sachs is a case in point. The U.S. cash equities trading desk at the company's New York headquarters used to have 600 traders at its height, but today there are only two equity traders left.

Beyond simply digitalizing channels or processes, their business models are truly disruptive to the traditional ways of doing business, with the boundaries between financial and non-financial companies blurring. A good example is TransferWise. It is a money transfer service that allows you to send or receive money without using the network of the Society for Worldwide Interbank Financial Telecommunication (SWIFT)' one of the well-established financial messaging systems in the world. Lending Club is changing the model of the existing financial brokerage business by turning the money broker role of banks into a platform. With the emergence of these innovative start-ups, a significant

portion of bank revenues is already being eroded, particularly in remittance and payment services.

By 2025, FinTech startups are estimated to erode 40% of revenues and 60% of profits in consumer finance, 30% of revenues and 35% of profits in retail payments, and 25% of revenues and 35% of profits in small-business loans according to Mckinsey (2015). They are mostly entering areas where business models are platform-based, data-intensive and capital light (World Economic Forum, 2015).

The rise of FinTech players is undermining the profitability of the existing financial companies, encouraging them to remove their organizational and operational inefficiencies and to provide consumers with improved access to their financial services. For example, with the advent of mobile banking, business hours of banks have become less relevant as customers can use banking services whenever and wherever they desire. Also, through the partnerships with start-ups, banks are restructuring their business models to maximize the profitability of their core competencies by outsourcing functions where they have less competitive advantage in the value chain.

4. INSURTECH AND ITS IMPACTS ON THE INSURANCE VALUE CHAIN

Tech-driven changes in the insurance industry are summarized into two categories-Insurance Disaggregation and Connected Insurance in the report 'The Future of Financial Services' released by the World Economic Forum (2015). The report defines four key trends involving the disaggregation of the insurance industry: Disaggregated Distribution, Sharing Economy, Self-Driving Cars, and 3rd Party Capital. This chapter briefly summarizes the basic concepts and status of InsurTech, examines the adoption of the 4th Industrial Revolution technologies and related start-ups at each stage of the insurance value chain, and then analyzes changes in the risk environment itself and their impact on the insurance industry structure.

4.1 InsurTech

The scope of FinTech, which focused mainly on payment systems in its early days, is now expanding to markets with higher added value, and insurance is one of them. Although tech-led changes to the insurance industry have come relatively late compared to other industries, their implications for the insurance business have been comprehensive and powerful enough to the extent that the new word InsurTech was coined to refer to the convergence of insurance and technology. And InsurTech is growing up rapidly.

Among the technologies central to InsurTech are telematics, autonomous vehicles, wearable devices and usage-based pricing, all of which involve the Internet of things. In addition, there are block chains of new secured trading systems and artificial intelligence based on big data. Just like electronic finance before FinTech was about process improvements, the application of ICT in insurance prior to InsurTech had to do with an effective improvement of insurance services led by incumbent insurers. With the emergence of InsurTech, a completely new insurance ecosystem is being created to the extent that technology startups would bypass existing financial institutions and provide insurance and other financial services that meet consumer demand. The InsurTech innovation is being led by IT companies and start-ups as well as traditional insurers. In response, some traditional insurers are working to protect their market shares through collaboration, partnerships, venture investment, and start-up incubators.

Table 1. New entrants to the insurance market and strategies for existing insurance companies

Entrant		Example
Start-up company		Oscar, Lemonade, Trov, Flou, Policy Genius, Knip
Non-insurance large company		Google, Overstock, Rakuten
Existing insurance company	Cooperation	AXA and BlaBla Car
	Partnership	AXA and Alibaba
	Venture investment	Munich Re Slice Labs, Next Insurance, Trov, Simplesurance, Blink, Wrisk, So-sure Investment
	Start-up incubator	Allianz x Inshtech Incubator

Sojung Park, Jiyoun Park (2017), InsurTech innovation: The current and the future, Korean Insurance Research Institute

4.2 The value chains of insurance companies

The dominant players in the early days of the InsurTech industry were the companies that combined all services of the insurance value chain, such as Lemonade and Trov. However, there will be more companies specializing in each field of the insurance industry's value chain (i.e. product development, sales, loss adjustment and customer service) in the future. In addition, due to the emergence of self-driving cars and sharing economies, the nature of the risks that are the subjects of insurance is changing to the extent of shifting the structure of the insurance industry. Figure 2. summarizes these changes in the insurance value chain.

A. Channels

The digitalization of distribution channels has already progressed considerably for some products. It will not be like all channels become digitalized at one time. Rather, the transformation is taking place gradually. Traditional channels preferred by existing

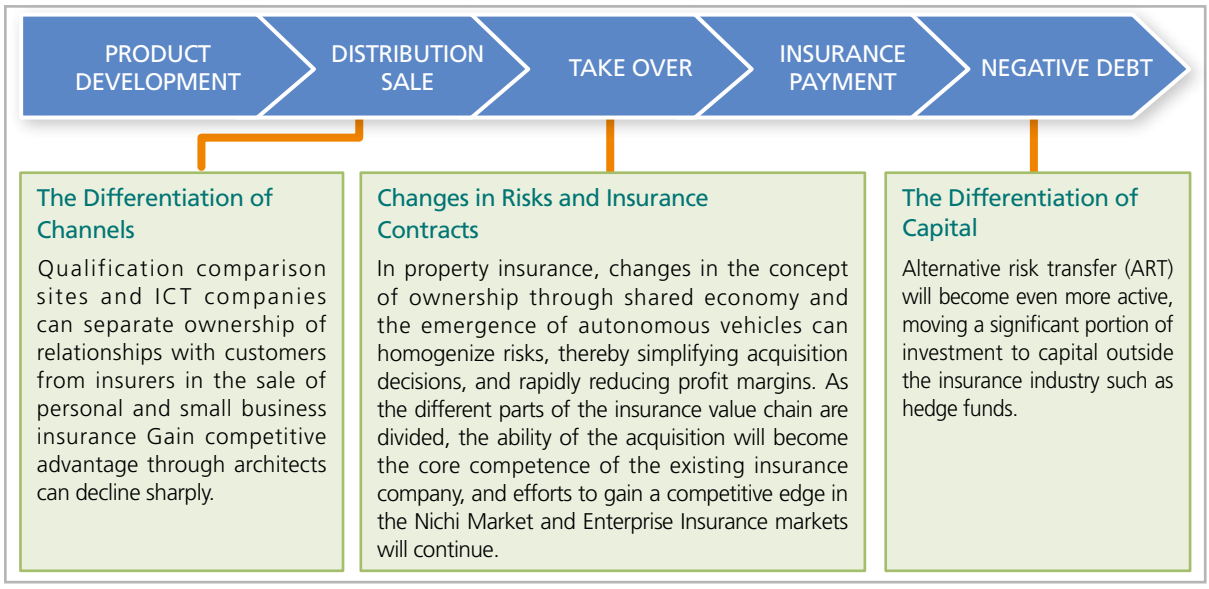

Figure 2. Disaggregation of the insurance value chain (World Economic Forum, 2015)

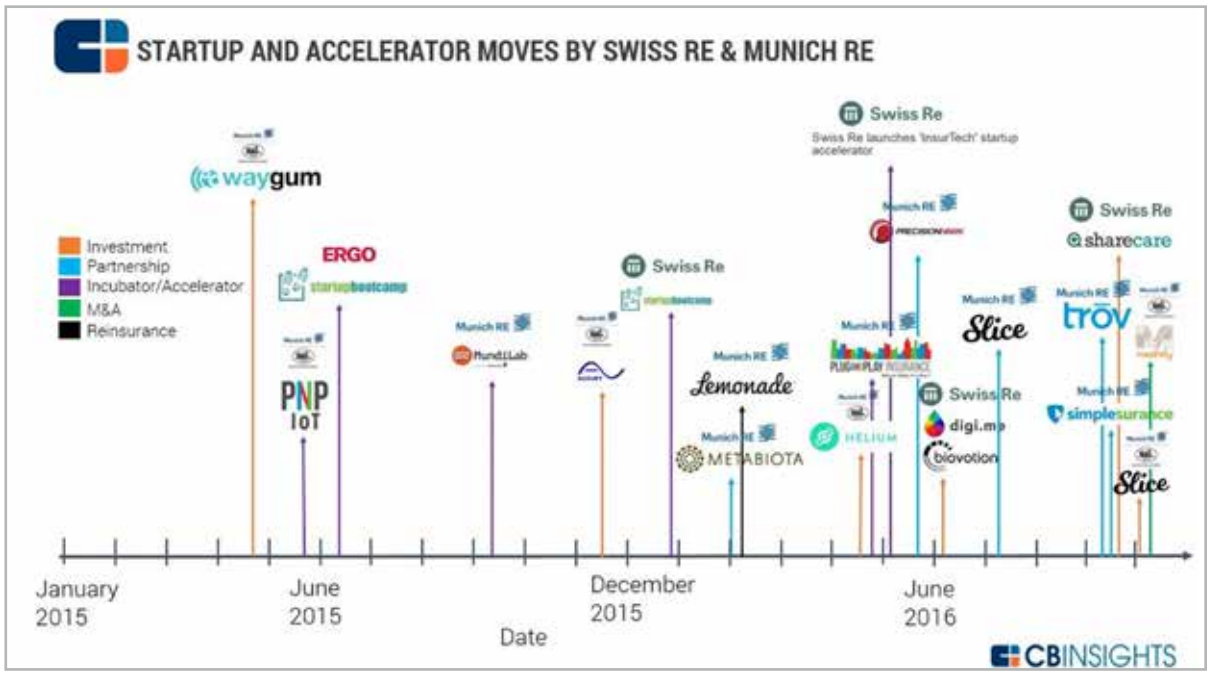

Figure 3. Investment in InsurTech start-ups by reinsurers (CB insight)

insurance consumers will coexist for a while. In other words, the digitalization of channels is an on-going process, with new insurance consumers relying more on digital channels.

Digital channels can take various forms such as price comparison sites, aggregators, digital agencies and broker start-ups. The emergence of such channels is a clear evidence that the existing agents and sales forces of traditional insurers no longer provide a competitive advantage in sales. The insurance sales function can thus be transferred to other companies that can come into contact with consumers more effectively than existing insurers.

A significant change in distribution channels has yet to take place. There have been attempts by IT companies to enter the insurance market such as Google's failed online insurance experiment. Alibaba, a Chinese e-commerce giant, also has skin in the game as it has actively been investing in InsurTech companies including Zhong An Insurance. Potential entrants to insurance channels include Marketplace lenders such as Sofi as an insurance distribution channel, automotive manufacturers such as GM and Tesla, which have built even greater client data than insurers, Internet of things companies, and online retail companies that have numerous touch points with customers.

Google Compare ended up in failure, but it has not stopped investments from flowing into insurance start-ups. It is not unlikely that one day in the future some non-financial firm would develop a successful platform and become a powerful player in the area of insurance distribution channels where digitalization is currently underway.

The World Economic Forum (2015) also predicts that the disaggregation of distribution, one of the key components of the insurance value chain, can take place to separate insurers from the ownership of customer relationships. This will make it more difficult for customers to have loyalty to their insurers and easier to switch to other insurers. In response, insurers will

have to seek innovation to gain customer loyalty and build the ability to catch up with their competitors' innovations quickly.

The role of a local primary insurer can be drastically reduced if its distribution channel that is the key touch point with its customers is separated from the insurer or if most of its claim adjustment function is automated or even transferred to another company. As far as a P2P insurance platform is concerned, the platform provider may act as a channel or broker without taking any risk. In this environment, it may want to do business directly with reinsurers without going through any primary insurer, which is quite disruptive to the traditional insurance industry. That is why reinsurers who seem to have less interest in personal insurance products or distribution channels of primary insurers in the current marketplace are investing heavily in the start-ups related to digital channels of insurance distribution. Figure 3. shows InsurTech start-ups that Swiss Re and Munich Re have invested in. It makes no sense that they are investing in such start-ups simply out of curiosity.

Finally, the adoption of digital channels will increase margin pressures for insurers particularly in some lines of business such as motor insurance where price competition is intense. To overcome this situation, insurers will have to expand the size of their business to achieve economies of scale. This will give rise to a number of mergers and acquisitions (M&A) in the insurance industry. Although M&A deals have not rolled out on a full-blown scale yet, it is worth noting that the combined market share of the top ten insurance companies in the U.S. such as Geico, Progressive, and USAA sharply increased from 59% in 2000 to 71% in 2012.

The consolidation of the motor insurance market by mega insurers can improve cost efficiency by economies of scale and thus lower insurance prices, but this oligopolistic structure may increase the risk of price-fixing among insurers and hinder new innovations, according to the World Economic Forum (2015).

B. Changes in risks and risk taking

- Issue of who can create value from big data and data from AI, IT companies and IoT companies
- Emergence of sharing economies and mega insurance companies
- Development of autonomous vehicles will move personal motor insurance to the commercial insurance area, reducing the size of motor risks and turning them into catastrophe risks' i.e. low frequency and high severity risks
- Rise of new entrants that target niche markets

There are two major changes related to the risk-taking stage: the entrance of companies with data analysis capabilities such as big data analytics and AI; and changes in risk attributes.

First, let's look at changes in data analytics. It is not surprising that many aspects of the insurance business can be changed by innovation in data analysis based on big data or machine learning technologies, given that the insurance industry is all about analyzing data and predicting risk rates. Big data that insurance companies want to utilize are mostly created through telematics or IoT devices such as wearables. It is thus becoming important for insurers to build partnerships with telematics players and to provide new insurance services using IoT devices. Insurers themselves may have the capability to understand and utilize the data that is being generated better than others. However, start-ups with excellent data analysis capabilities or existing large IT companies may be in a greater position to collaborate with telecommunications companies or data-generating IoT companies such as Telsco. When they jump into the business of insurance distribution or

underwriting based on such collaboration, they stand to win and dominate the market eventually.

It would be Zhong An Insurance among others that has received the largest investment and is widely recognized for its growth potential. It is a joint venture between Alibaba and Ping An Insurance. Figure 4. shows that large IT companies such as Baidu, Alibaba, Tencents, and Rakuten are making various investments in the field of InsurTech. Figure 5. shows Google's investment in InsurTech companies. Insurers seem to have every reason to collaborate with IBM Watson, a leader in machine learning and AI, and with Google's AlphaGo. Indeed, Swiss Re began to work with IBM Watson, which owns The Weather Company.

Artificial intelligence is taking weather analysis to a next level, which is undoubtedly an important development for the insurance industry.

Meanwhile, all eyes are on the looming threat from Amazon, which has now become a verb, with 'Amazoned' meaning to have your business crushed because Amazon came to dominate your market. The online retail giant has recently scouted insurance

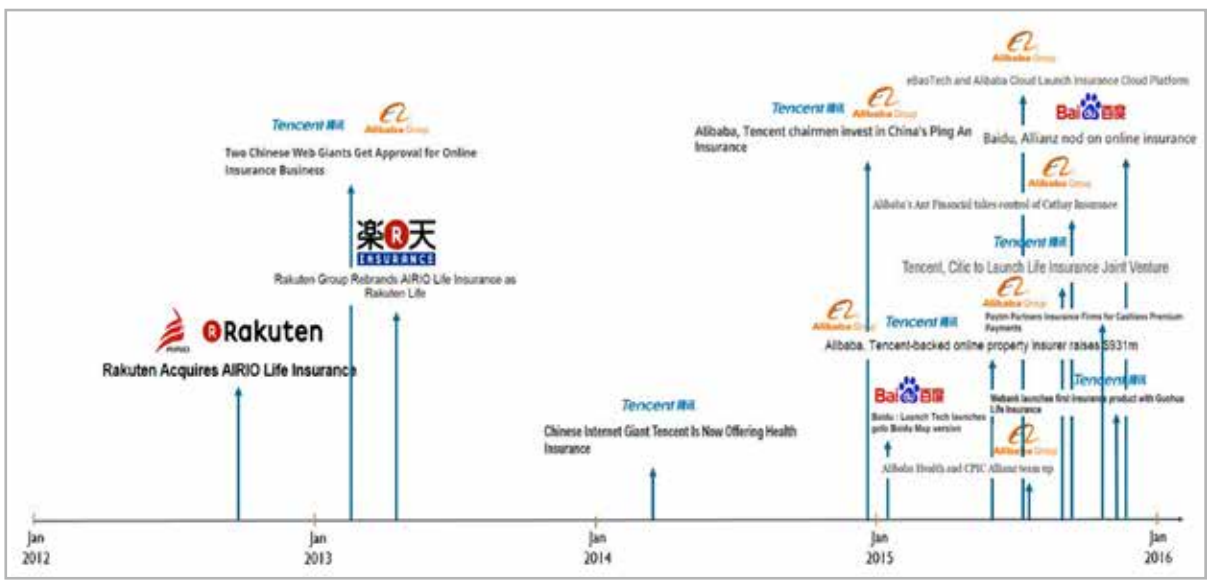

Figure 4. InsurTech investment by IT companies and their entrance into InsurTech (CB insight)

Figure 5. InsurTech investment by Google (CB insight)

workers in the UK seemingly in a bid to tap into the insurance market to provide more than what Amazon Protect currently offers' i.e. product warranty insurance. In addition, A.P Moller-Maersk, Microsoft, and EY have recently announced that they will start the block chain-based insurance business. Likewise, more new insurance business models that go beyond the traditional ones are likely to keep coming about in the future.

Self-driving vehicles can significantly reduce the frequency of accidents and move the responsibility of accidents and the subject of insurance from individuals to manufacturers. This change in the nature of risk is also being driven by sharing economies as mentioned above. Driverless cars and sharing economies are expected not only to reduce the frequency of losses but also to transform home and car risks into very homogeneous forms. In other words, since no individual actually drives a car, the segmentation of drivers' risks may become meaningless. The homogenization of risks can simplify the insurance underwriting and pricing processes to a large extent, and motor insurance can be commoditized.

The sharing economy can change the concept of property ownership dramatically, which translates into a fundamental change in most existing insurance contracts that are written against each insured object. The World Economic Forum (2015), as shown in Figure 6, predicts that in the future, a very broad multi-line policy will likely emerge, such as an All Risk Policy for a wide range of shared assets used by a single policyholder, as opposed to an insurance contract for each specific insured object owned by the policyholder. The price of an insurance contract for shared assets will be determined by the usage frequency and the degree of risk exposure of such shared assets, as is already shown in the automobile insurance plans provided by companies like Metromile or Cuvva. Information about such pricing factors is likely to be accessible to insurers through the IoT networks.

Another notable change that autonomous vehicles and the sharing economy can bring to the insurance industry is that autonomous vehicle manufacturers or providers of sharing economy platforms no longer transfer risks to insurers. These firms, which have a large number of risk objects, are likely to rely on self-insurance because they would be able to diversify risks by themselves. They may just buy some reinsurance in preparation for low-frequency and high-severity disaster situations. This can lead to a rapid decline in risk transfer to the insurance industry.

Digital start-up insurers would often target niche markets that incumbent insurers do not focus on. One of such niche markets offers insurance products dedicated to very specific customer segments. Examples include Next Insurance, which sells liability insurance for certain professional groups such as personal trainers or yoga instructors, and Marmalade, which sells car insurance for young drivers who are learning to drive.

Figure 6. Customer-based multiline insurance in the future (World Economic Forum, 2015)

Founded in 2012, Bought by Many offers customized insurance products against risks that could not be covered by existing insurance products, making it possible to tailor insurance policies more specifically and flexibly than what has been traditionally available.

It may seem that start-ups want to target niche markets so as to avoid competition from traditional players, but this niche market phenomenon is a part of the broader trend of the small quantity production of customized, multiple products, which is another keyword of the 4th Industrial Revolution. Similar to platform-based production in the manufacturing sector, the insurance industry is also shifting focus to highly customized insurance products amid a decline in production and sales unit prices. An insurer becomes a platform in the P2P insurance business model. In addition, the emergence of autonomous vehicles and sharing economies will homogenize risks, simplifying the pricing and underwriting decision-making processes for personal motor insurance policies. As a result, insurers will face increasingly fierce competition, with their margin being highly squeezed, leading them to focus more on less commoditized lines of business and develop bespoke products for specific targets.

C. Changes in the role of insurance contracts and extension of insurability

Traditionally, an insurance contract is created when the insurance price and contract details are determined based on the information available to the insurance company at the time of entering into the contract. After the contract is established, there is almost no interaction between the insurer and the customer until a claim is filed. In other words, any change in the loss or risk during the contract period could be reflected only at the contract renewal time, not during the contract period. However, this traditional way of operating insurance contracts is being changed with the adoption of technologies as is evidenced by the impact of Telematics on motor insurance.

One of the biggest problems of traditional insurance contracts is moral hazard, which is the risk that the behavior of the insured would change in a way that increases the losses for the insurer. The root cause of moral hazard is that the insurer cannot control or monitor the behavior of the insured after the insurance contract is signed and that the insurance contract, once it is made, cannot be changed to reflect any change in the behavior of the insured. Now, the Internet of things, which is represented by wearables, telematics, smart home devices, etc., enables the insurer to interact with the insured continuously after the insurance contract is entered into so that the insurer can monitor the risk of the insured. This gives the insured the incentive to reduce risky behavior and moral hazard. For example, Vitality programs offer the insureds Starbucks coupons as a reward for their physical exercise. In telematics car insurance, drivers are rewarded immediately in the form of a cut in insurance premium when they drive less or improve their driving behavior.

When telematics was first introduced, those using the telematics apps or devices were mostly excellent drivers or drivers who rarely drive. Now this is changing. Marmalade, a UK-based car insurance company, focuses on the services that telematics can offer, rather than on price discounts. It strategically targets novice drivers considered to be a high risk group. Through telematics devices, it provides drivers with feedback and e-learning based on their driving habits so that they should be encouraged to drive safe.

The role of insurance in these contracts goes beyond managing the volatility of risks. The insurer would become a total risk manager who provides advice and feedback regarding risk mitigation on an on-going basis

and remains responsible for any losses incurred in spite of the effort to reduce risks. Perhaps, this changing role of insurance reflects the need for an insurance company to seek changes to survive in a low-frequency risk society where few accidents occur or few people get sick. It may also represent an essential step for insurers to go through before they should be able to obtain information through the Internet of things. No one would allow an insurer to monitor them without having it effectively mitigate their risks (accident, sickness, death etc.).

If such a change occurs, the insurer will be transformed from a business focusing on short-term volatility management to a provider of comprehensive risk management services. The main role of insurance contracts will be the mitigation and management of risks, which is a fundamental change in the concept of insurance.

The health insurance market is spearheading this change of an insurance contract into a comprehensive risk management solution. The CEO of Oscar, a start-up health insurer, explains that Oscar provides care, not just compensation for losses. Unlike Vitality, Oscar goes one step further than giving people incentives for a healthy lifestyle. It seeks to become a comprehensive health care consultant for the insured. Through a Tele-visit program similar to a telemedicine service, it enables you to consult a healthcare provider anytime you want, which helps reduce the number of visits to the emergency room and allows data to be accumulated regarding which hospitals or doctors you should visit for certain symptoms.

Clover, a US-based health insurance start-up that targets seniors, provides preventive care based on data analytics to help seniors improve their health conditions. It offers health care services featuring no limit on the number of visits to doctors or hospitals, coverage for

(Source: www.cloverhealth.com)

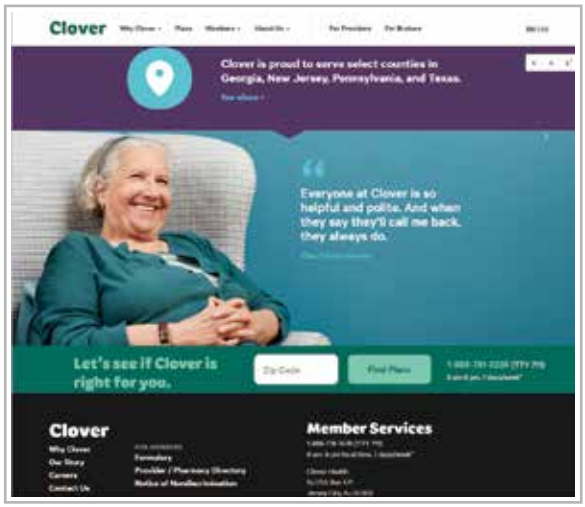

Figure 7. Active patient care of Clover

prescription fees, and home visits for medical checkup by a dedicated team of health care experts. According to Clover, its health insurance plan based on preventive care has turned out effective as the insurer saw its customers experience 50% fewer hospital admissions and 34% fewer hospital readmissions than the average Medicare patient in New Jersey. As shown in Figure 7, Clover says

"For us, the extras are essential," which means that health care benefits are no longer extra services offered by insurers but an important part of an insurance plan."

D. Capital

Insurance-linked securities, such as catastrophe bonds and sidecars, provide a model of pooling capital from the non-insurance sector to accept insurance risks. The decoupling of capital from insurers will likely accelerate as alternative capital is flowing into the traditional reinsurance market both from rapidly-evolving crowdfunding platforms and from less-regulated capital market funds such as hedge funds that have been steadily moving into the ILS market over several decades.

There are already insurers built on crowdfunding capital like World Cover. A rapid growth of shadow reinsurance is also noteworthy. Some US insurers rely on affiliated reinsurance by which they move their capital to non-insurance financial affiliates with a view to avoiding capital regulation (Koijen and Yogo, 2016). The decoupling of insurers and capital is likely to dramatically improve the capital accessibility of small insurers, although the issue of solvency regulations on insurers remains to be addressed.

5. CONCLUSION

While distribution channels and capital can be separated from the insurance value chain, the understanding of risks, pricing and underwriting will likely remain core competencies of insurers. However, it seems to be very difficult for personal-line insurers like motor insurers to maintain underwriting margins, as the difference in risk attributes of individuals will be sharply reduced and the risk will be homogenized in line with the emergence of sharing economies and autonomous vehicles. In order to overcome the margin pressures, insurers would rely on mergers and acquisitions to achieve economies of scale, and their efforts to increase cost efficiency will continue.

The pressure on margins will shift personal-line insurers' attention to the niche markets and some commercial lines of business where automation and digitalization is expected to take place slowly and thus insurers still have competitive advantages, with the underwriting decision-making function remaining their core competency.

However, if traditional insurers focus not on disruptive innovation, but on small and myopic changes only to maximize short-term profits without paying much attention to the broad-based evolution that is taking place, they may meet their demise before even realizing it, perhaps in 20 years. Kodak and Nokia are good examples. They failed to find a way to adapt to the digital age and got washed away by a tech wave. Likewise, not many people expected Amazon to grow so rapidly and become what it is now when it first appeared.

Today insurers are at a critical juncture. They must take serious stock of where they have core competencies in the insurance value chain, what to take and what to give up, and with whom to collaborate with. There is a huge amount of uncertainty about what is in store for them, considering the advent of new technologies and their impacts on social and economic activities across the board. This article has been written to take a reality check in light of InsurTech and provide some of the predictions on future trends. When all is said and done, the best way to predict the future in this age of uncertainty is to create it by yourself.

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MEASURES FOR EFFICIENT OPERATION OF NATURAL PERILS INSURANCE

1. OVERVIEW OF NATURAL PERILS INSURANCE

Natural disaster losses occur every year. Over the recent ten years (2007 -2016), the average amount of damage caused by natural disasters in Korea was KRW 630.8 billion per year, with 16 human casualties. The amount spent on recovery averaged KRW 709.9 billion annually. These natural disaster losses arose mostly from typhoons, heavy rain, heavy snow, strong winds and storm surges. Earthquake has been emerging as a major natural peril in Korea since the Gyeongju earthquake on September 12, 2016, which cost the nation economic losses of KRW 11 billion. Earthquake poses a significant threat to the country, but the seismic hazard involves a huge amount of uncertainty.

It is highly important that natural disaster risks should be managed in ways to prevent human and property losses, but how to deal with losses effectively when an event occurs is as much important. Purchasing insurance can be a good way to do so.

There are private insurance coverages available that offer protection against natural disasters, either as part of a fire policy or a property all risks policy. However, the take-up rate of the natural perils coverage by endorsement is as low as 0.3% due to high insurance premiums and demanding underwriting conditions. In order to address these issues, the government started to run a natural perils insurance

(Source: Natural Disaster Annual Report 2016, Ministry of the Interior and Safety, Korea)

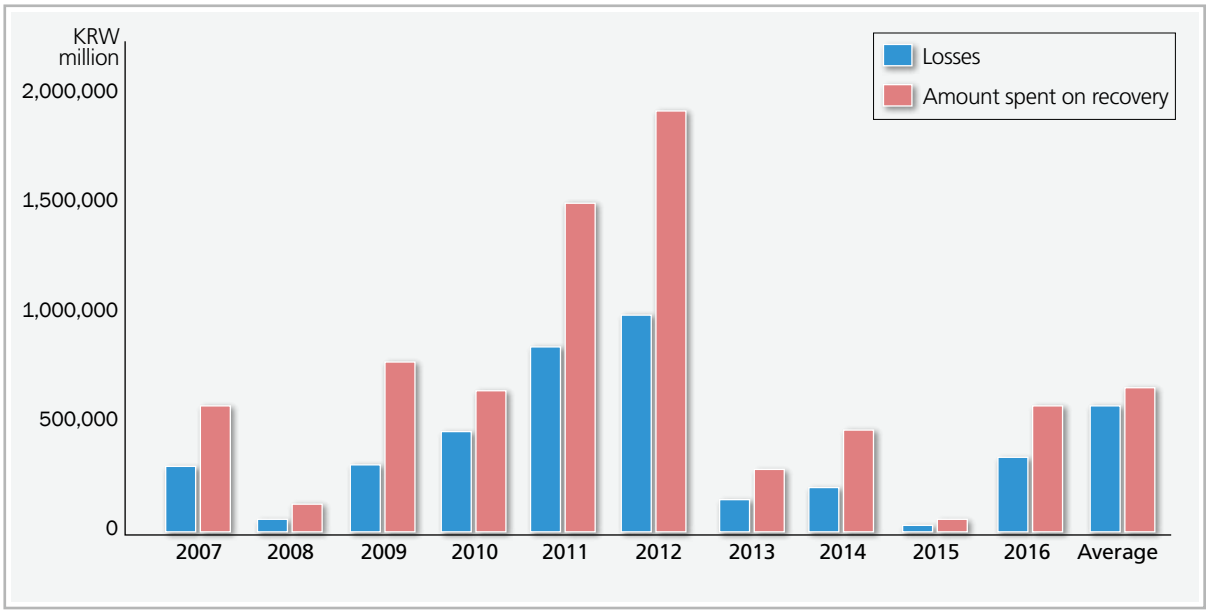


Figure 1. Natural disaster damage in the last 10 years

Table 1. Take-up rate of natural perils coverage by endorsement to fire insurance

Property type	Fire insurance		Natural perils coverage endorsement		Take-up rate of natural perils coverage endorsement	
	The number of policies	Premium (KRW 100 million)	The number of policies	Premium (KRW 100 million)	The number of policies	Premium (KRW 100 million)
Housing	102,036	154	550	7	0.54%	4.55%
Other property except for housing and factory	1,368,982	914	2,504	51	0.18%	5.58%
Factory	54,755	1,184	1,485	27	2.71%	2.28%
Total	1,525,773	2,252	4,539	85	0.30%	3.77%

(Source: Korea Insurance Development Institute, 2014)

program that would be subsidized by public funds on a pilot basis in 2006 and then officially launched the insurance program nationwide in 2008. In celebration of the 10th anniversary of its nationwide implementation, this paper discusses measures for a more efficient operation of natural perils insurance.

2. OPERATION OF NATURAL PERILS INSURANCE

2.1 Insurance take-up rate

Natural perils insurance was introduced to complement the nation's disaster relief system. The relief aid provided by the government was far from enough on the part of those affected by a natural disaster. Moreover, people would take it for granted

to be paid by the government every time a disaster event occurred, which discouraged them from making voluntary efforts at disaster prevention.

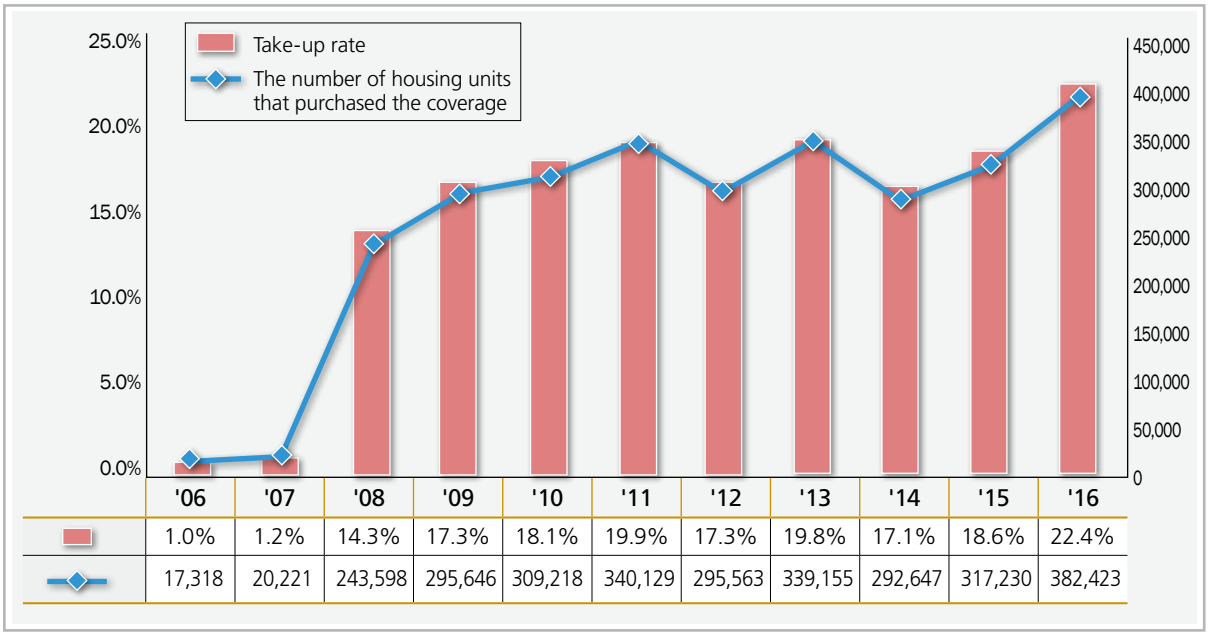
Natural perils insurance is designed to encourage people to enhance the level of their preparedness and protection against damage to their homes and greenhouses arising from typhoons, floods, heavy rain, strong winds, storm surges, coastal flooding (including tsunamis), heavy snow and earthquakes. It is a government-sponsored insurance program where 55-86% of the insurance premium is subsidized. It provides individuals with an affordable means of financing disaster recovery costs.

When the insurance was launched, it was more like social insurance that supports the right to survival and social relief, but it has continuously evolved in a way that reflects consumer needs. Beyond a means of disaster relief that ensures a minimum level of livelihood, it has now turned into a kind of private insurance that can cover a substantial portion of natural disaster losses. Thanks to ongoing marketing efforts, the number of policyholders (households) soared to 382,000 in 2016 from 17,000 in the early years of introduction.

2.2 Insurance claim payment

Insurance can work in the most ideal way when insurance premiums collected from a number of the insureds who have the shared perception of risks remain higher than the total amount of claims against a loss occurring in a limited area. However, in the case of natural perils, people who live in the same area would have different perceptions of risks depending on the location and type of residence and past experiences of flood damage. Therefore, people who are relatively at higher risk are tempted to buy insurance, while those at lower risk would be reluctant to purchase insurance. This creates a problem of adverse selection.

When it comes to natural disaster insurance, a huge amount of insurance claims may result from a single event as opposed to general insurance such as motor insurance. It is also impossible for an insurer to predict how much damage it can sustain in the future based on



	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
Take-up rate	1.0%	1.2%	14.3%	17.3%	18.1%	19.9%	17.3%	19.8%	17.1%	18.6%	22.4%
The number of housing units that purchased the coverage	17,318	20,221	243,598	295,646	309,218	340,129	295,563	339,155	292,647	317,230	382,423

Figure 2. Take-up rate of natural perils coverage by endorsement to fire insurance

its past loss data. Given this nature of natural disaster risks, government intervention and support is essential for the operation of natural perils insurance even if the insurance is operated by private insurers.

From 2008 to 2016, KRW 84.9 billion was paid by the government as subsidies for natural perils insurance while insurance claims amounted to KRW 53.6 billion, resulting in an annual average loss ratio of 63%. In 2012, the loss ratio surged to 225% due to massive losses from Typhoons Bolaven and Tembin.

2.3 Setbacks for natural perils insurance market growth

There are several setbacks facing the natural perils insurance market in terms of growth prospects. First of all, marketing efforts in areas vulnerable to natural disasters have been restricted due to potential housing market impacts of disclosure as to which areas are prone to natural catastrophes by municipal governments.

Second, unlike farmers and fishermen, small business owners have not been eligible for natural perils insurance as the government's policy stance on them has been somewhat different from the agricultural business community. Third, insurers were required to assign their retained earnings from the natural perils insurance business to deficit compensation reserves, which kept them from making strong sales activities. Another setback is that the coverage trigger is too high to cover small losses, allowing only a limited number of policyholders to file claims when a loss occurs.

3. MEASURES TO IMPROVE NATURAL PERILS INSURANCE PRODUCTS TO ENSURE EFFICIENT OPERATION OF THE PROGRAM

3.1 Increase in insurance take-up ratea mong residents vulnerable to disasters

A. Trend of insurance purchase

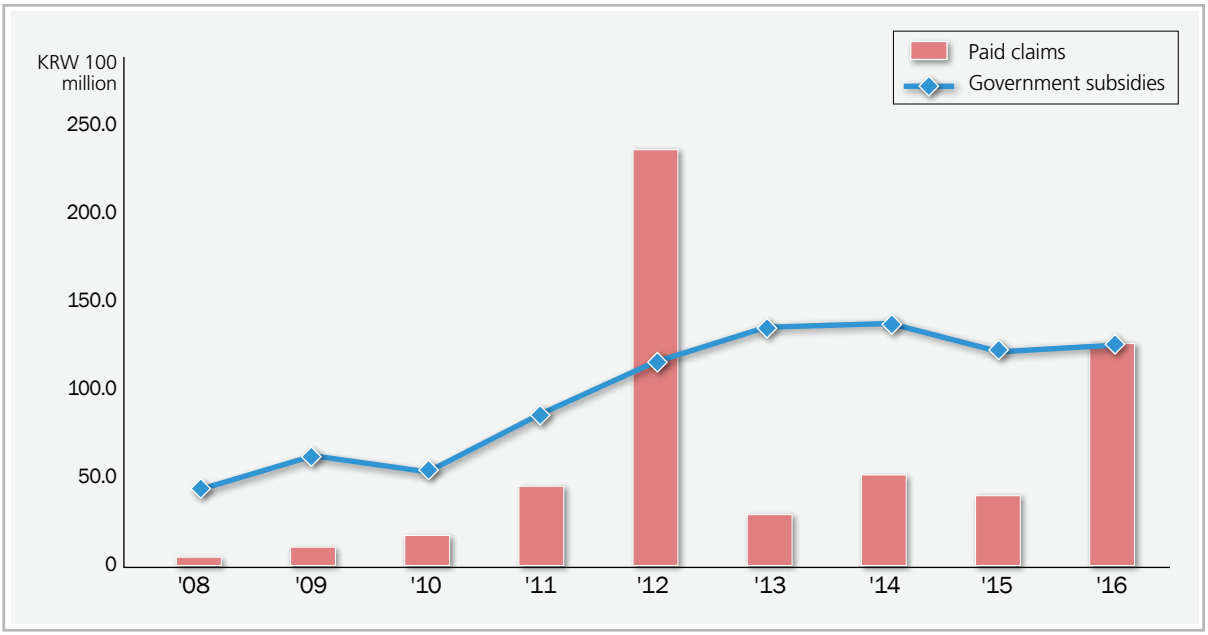


Figure 3. Paid claims relative to government subsidies

The Gyeongju earthquake on September 12, 2016 became a kind of turning point for the natural perils insurance market as it sparked interest in the insurance program among the general public. Previously, the insurance was sold mostly to a group of people in the lowest-income bracket and those on public welfare as designated by municipal governments. After the earthquake, however, many ordinary citizens are voluntarily opting to buy the insurance.

Between January and July 2017, the number of individuals who purchased the natural perils insurance was 10,872, up more than threefold from the same period a year earlier (3,320 persons from January to July 2016).

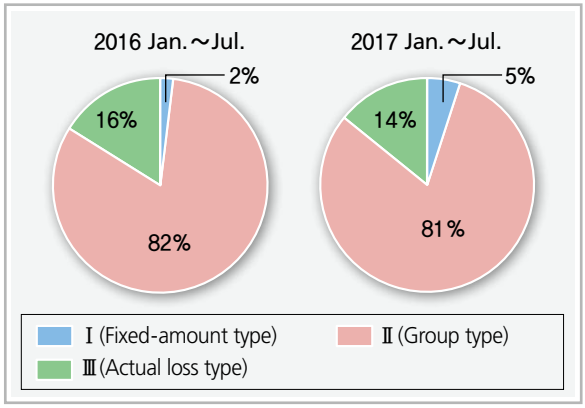


Figure 4. Types of natural perils insurance

B. Disaster vulnerable areas

In the United States, the National Flood Insurance Program (NFIP) was launched to require property owners in the communities that participate in the program to buy flood insurance when they want to obtain loans or lines of credit that are secured by existing buildings, manufactured homes or buildings under construction in the special flood hazard areas. Lenders are allowed to make decisions on the insurance obligations in the flood areas.

The NFIP is designed to prevent property owners in flood prone areas who borrowed money from falling into poverty when a flood damaged their properties, leaving them with no resource to repair the damage and repay their debt. It also helps financial companies obtain security in the loans that they provide, thereby ensuring the stability of the financial industry.

In Korea, mayors or district governors are required to identify, designate and publicly notify vulnerable areas according to Article 12 of the Countermeasures against Natural Disasters Act. This is to protect the public against loss of or damage to their property and life from natural disasters such as typhoons, floods, heavy rain and tsunami by designating vulnerable


Figure 5. Flood trace map and building overlap in Seocho-Gu, Seoul, Korea

Table 2. The number of housing in areas vulnerable to disasters

Disaster relief aid recipient zone	Disaster hazard zone	Disaster damage-prone area	Flood trace area	Disaster risk improvement zone	Total
23,201	6,544	11,227	27,204	11,217	79,393

areas to make sure that greater investments in disaster prevention are made in such areas to reduce or address their vulnerability to natural disasters in a preemptive manner.

C. Improvement measures

A total of 79,393 houses are located in the areas vulnerable to disasters, which are categorized into disaster relief aid recipient zones, disaster hazard zones, disaster damage-prone areas, flood trace areas and disaster risk improvement zones. Efforts should be made to increase insurance penetration in those areas in collaboration with local governments based on the sharing of information and data regarding the vulnerable areas.

One way would be to make it mandatory for residents in vulnerable areas to buy natural perils insurance when they take out housing loans or use other lines of credit supported by the government. This requirement can help protect their property and recover from losses when a disaster occurs, contributing to the stability of public livelihood. It may also allow financial companies to reduce their financial risks, helping to ensure the stability of the financial industry.

3.2 Expansion to small business owners

A. Need for coverage

Small business owners are those who have less than 10 employees for the mining, manufacturing, construction, and transportation industries, and less than 5 employees for other industries such as wholesale and retail commerce (Article 2 of the Act on Special Measures to Support Small Businesses). There are 3,060,000 small businesses nationwide (or 86.4% of the total number of businesses as of 2014).

Annually, 2,826 cases of natural disaster losses are reported on average by small business owners, resulting in an average loss of KRW 27.87 million per company. However, the take-up rate of natural perils insurance remains low as private insurers are limiting the amount of risks they would underwrite due to the catastrophic nature of natural perils.

The average monthly operating profit of small businesses is KRW 1.87 million, which is lower than the monthly average income of farmers and fishers (KRW 2.11 million for farmers, KRW 3.18 million for fishers). The majority (82.6%) of small enterprises started their business as they had lost their jobs or failed to find jobs, which means their livelihood can be threatened directly when their business is affected by natural disasters.

B. Disaster relief system for small business owners

Small businesses tend to suffer greater losses from natural disasters than farmers and fishers, but they have less support. While several insurance programs are available for the agricultural and fishery sector, such as agricultural disaster insurance, livestock disaster insurance, and aquaculture disaster insurance, small businesses have access to some forms of indirect support only, such as emergency aid and special

Table 3. The numbers of small businesses and their employees

The number of companies (thousand)			The number of employees (thousand)		
Total	Small business owners	Ratio (%)	Total	Small business owners	Ratio (%)
3,545	3,063	86.4	15,962	6,046	37.9

guarantee programs (Article 61 of the 「Small and Medium Enterprises Promotion Act」).

C. Improvement measures

Small business owners would have little resort when bankruptcy or unemployment is caused by a lack of funds for recovery in the event of damage caused by a natural disaster. It is thus necessary for the government and municipalities to reinforce a social safety net for small business owners by encouraging them to buy natural perils insurance, which is an affordable means to recover from natural disaster losses.

Natural perils insurance is a government-sponsored insurance plan that can help reduce financial burden of small business owners. It is an effective means of spreading large risks with the support of deficit compensation reserves, making it possible for insurers to become more active in providing coverage through natural perils insurance rather than through add-on covers with fire insurance.

Figure 6 Flood trace map and building overlap in Mapo-Gu, Seoul, Korea

D. Proposed natural perils coverage for small business owners

In the United States, all small and medium-sized businesses are eligible for flood insurance, while France has a flood insurance program that covers industrial and commercial risks. In Japan, flood cover is available through the cooperative insurance scheme operated by the Federation of Small Businesses. In Korea, however, since the introduction of the natural perils insurance

Table 4. The number of affected companies and the amount of damage

Category	'06	'07	'08	'09	'10	'11	'12
The number of small businesses	2,597	2,682	2,675	2,686	2,749	2,835	2,919
The number of affected companies	1,745	3,064	43	184	3,608	7,297	4,217
The amount of damage (KRW 100 million)	335	745	17	127	989	835	1,405

Category	'13	'14	'15	'16	Total	Yearly average
The number of small businesses	2,962	3,063	-	-	-	-
The number of affected companies	596	4,339	59	5,932	31,084	2,826
The amount of damage (KRW 100 million)	184	1,115	28	2,883	8,663	0.787

Table 5. Indirect support measures for small business owners

Category	Support Contents
Support fund for small business owners	- Support limit: up to KRW 50 million per company (excluding existing loans) - Support condition: 1.23%p deducted from loan rate offered by the public capital management fund - Support procedure: financial companies provide loans uponspecial guarantee by regional credit guarantee foundations
Special guarantee	- Regionalcredit guarantee foundation provides small business owners with additional guarantee ofup to KRW 50 million (or KRW 100 million for manufacturing companies) - The guarantee rate is deducted 0.5% from the general guarantee rate (special disaster area 0.1%)

Table 6. Case study: small business owners

▣ Case study 1 (Store, Her own property)

- INSURANCE POLICYHOLDER: MS. KIM (THE OWNER, 55 YEARS OLD, WOMAN)
- location: taehwa-dong, ulsan (2nd grade land, 3rd grade building)
- occupation / building ownership: shoe store, her own property
- POLICY: MAIN POLICY / BUILDING AND ITS FACILITIES, ENDORSEMENT / INVENTORY
  - MAIN POLICY: KRW 100MIL. (BUILDING, FACILITIES), ENDORSEMENT: INVENTORY KRW 30 MIL.

Category		Sum Insured	Premium rate(%)*	Premium
Security target	Building & Facilities	1.0KRW 100 million	0.1439	143,900won
	Inventory	3Ten million won	0.1439	43,200won
Total		1.3KRW 100 million		187,100won

* REFERENCE: PREMIUM RATE OF NATURAL PERILS COVERAGE ENDORSEMENT TOFIRE INSURANCE

program, attempts have been made to expand the program to provide coverage for small business owners only to fail.

The biggest obstacle was the justification of the government's support with the protection of private property. Considering the fact that it is difficult to provide direct support, the insurance industry is in consultation with relevant government agencies on ways to support small businesses indirectly by subsidizing operation costs as is the case with support for traditional market business owners. In other words, when the government subsidizes a premium load, which is 30% of the current insurance premium, and municipalities subsidize a municipal tax of 8.4%, individual burden will be reduced by 38.4%.

The insurance object should be a small business owner's properties (buildings, structure, facilities, machinery, fixtures, inventory stocks, etc.). The principle of indemnity applies with the coverage limit of up to KRW 300 million for buildings, machinery, facilities and fixtures. For inventories such as raw materials, in-process or finished goods, by-products and stocks, the actual losses sustained should be covered for up to KRW 30 million.

Figure 7. Earthquake damage in Gyeongju, Korea

3.3 Need for greater engagement by insurers

A. Background of legislative change

For the operation of natural perils insurance, an insurer was required to set aside retained earnings for a deficit compensation reserve. This means the insurer generated no profit from the business, making it less interested in the business. It is against this background that the requirement to accumulate earnings retained at the time of account closing for the deficit compensation reserve (Article 20(1) of the Storm and Flood Insurance Act) was abolished on March 21, 2017 by amending the law. This change was designed to increase the sales of natural perils insurance.

B. Major amendments

To promote active marketing of natural perils insurance, the relevant law was amended to recognize the profit of the insurer to the extent of causing no losses to the national finances. At the same time, the limit of liability for the insurer was raised. Specifically, the portion of risk premium to be set aside for the deficit compensation reserve was increased from 4.5% to 9% to finance funds to be used in the event of a major disaster. The limit of liability for the insurer was raised from 180% of total premium income to 200%. With a 5% reduction in operating expenses, the portion of risk premium to be paid for claims was increased to 85%, potentially reducing the amount of premium paid by the insured.

C. The role of insurance companies

As a result of these changes, insurance companies are expected to step up sales drives for natural perils insurance to boost their profit, leading to the growth of the market.

3.4 Other improvement measures

A. Sub-categorization of coverage triggers for fixed amount payment

Under the current natural perils insurance program, the compensation amount is fixed in proportion to the extent of damage, which is categorized into three: total loss (100% of the insured amount), half loss (50%) and partial loss (25%). In order to increase the level of compensation for the actual damage, new categories will be added to expand insurance benefits so that smaller damage than a partial loss and greater damage than a half loss can be compensated for as below:

B. Development of additional coverage for housing

Although window breakage is the most common type of damage to houses from natural disasters, it is not covered by natural perils insurance unless the damage falls into a partial or greater loss. A new add-on cover will be developed to address this problem. If the windows of a house are broken and all of them need to be replaced, the deductible is 10% of the total amount of losses and the rest will be compensated for by that cover within the limit of 5% of the insured amount.

C. Natural perils insurance Ⅲ coverage extension to single-unit housing

Natural perils insurance Ⅲ covers damage to multi-unit residential housing only, but the coverage is expected to extend to single-family housing in 2018.

Before	Change
Total loss (100%)	Total loss (100%)
Half loss (50%)	**Substantial loss (75%)**
	Half loss (50%)
Partial loss (25%)	Partial loss (25%)
<New>	**Roof damage (5~25%)**
Flooding	Flooding

4. CONCLUSION

In Korea, people would still turn to the government for compensation in times of natural disasters, with a lack of insurance schemes. This calls for a comprehensive natural disaster insurance system to be established and implemented nationwide as soon as possible so that the nation's social safety net should be strengthened to the level of advanced countries'.

In many developed countries, a natural disaster insurance system has been developed in one form or another in a way that accommodates their local circumstances. After going through trials and errors, they have improved the way insurance coverage is provided and the way the insurance system is operated. Korea needs to take a leaf out of their book and expand the natural disaster insurance system based on the suggestions provided in this article.

The insurance coverage gap would always be there no matter what, but it needs to be narrowed as much as possible. The best way to address this challenge would be to figure out ways to tailor insurance products and support systems depending on local conditions and the type of damage.

Table 7. Changes to deficit compensation reserves

Category	Before		After	Note
Deficit compensation reserves	Private insurer	Accumulate earnings retained at the time of account closing as deficit compensation reserves	recognize retained earnings as operating profit of insurers	Amendment to the Storm and Flood Insurance Act
	Government	4.5% of premiums to be set aside for deficit compensation reserves	9% of premiums to be set aside for deficit compensation reserves(4.5 → 9%)	Revision of natural perils insurance business agreement
Limit of liability for insurers	Up to 180% of total premiums		Up to 200% of total premiums	
Premium	Operating expense 30%		Operating expense 25% (5% decrease)	

Richard Southall
McLarens Korea
Managing Director

TRENDS IN INTERNATIONAL AND REINSURANCE LOSS ADJUSTING

1. INTRODUCTION

A long time ago, in the days of home-foreign adjusting, it would not be unusual for an experienced and trusted loss adjuster to be instructed on a major loss, which would require him to travel halfway around the globe to meet the Insured and begin his investigations. With his experience and reputation alone, that adjuster was considered to be the jack of all trades, capable of handling any type of loss in any industry irrespective of any cultural differences.

Those days have long since gone. McLarens and other major international adjusting firms can now be expected to have an office in the main insurance centres of the world with a team of adjusters on the ground, trained in multiple disciplines, perhaps supported by a CILA-qualified adjuster, ready to receive an instruction and attend the loss site at a moment's notice. We offer this in our Korea operation.

But is this enough?

In this article we set out a number of case studies to show that it is increasingly the trend that in handling major losses, the adjuster's role today is more one of project manager in which, far from acting alone, he or she is expected to coordinate with and direct a panel of experts in various disciplines in bringing about a satisfactory resolution of the claim.

However, before we look at these case studies, let us take a step back to discuss exactly what a loss adjuster is and what his or her role is in the claims handling process.

A simple definition of a loss adjuster is "an independent professional who specialises in the handling and settlement of insurance claims."

The loss adjuster may be instructed by the Insurer with or without consultation with the lead Reinsurer or the broker. In the case of global accounts or on construction projects, it is increasingly the trend in mature markets for one or more adjusting firms to have been vetted at the time the insurance was arranged and be written into the policy as a Nominated Adjuster. With a prior agreement between the parties to the contract, the loss adjuster can be engaged forthwith without any unnecessary delay in arranging site attendance.

The loss adjuster is required to attend the site swiftly and to report on the loss upon their return to the office. After a catastrophe, the international adjuster might have to respond to the firm's contingency plan and attend site in another country as occurred following the Thai floods where initial inspections were undertaken by boat.

Prompt attendance is essential particularly when handling a major loss. Site conditions can change quickly especially with a diligent Insured who puts all efforts into urgent clean-up and loss mitigation. At this early stage the Insurer might have very limited information about the nature of the loss or how serious it is and the loss adjuster is therefore expected to promptly issue preliminary loss advice setting out brief details of the incident with a recommended reserve or estimate. This initial advice is important to ensure all Insurers and Reinsurers can be informed of the loss and to help identify what additional resources may be needed in the claims handling process.

Duties also include investigating the cause of the incident and reviewing the insurance policy to advise on the extent of coverage and whether any limitations or exclusions are applicable. He or she is expected to comment in the report on the site conditions at the time of the loss confirming whether or not any warranties attaching to the policy have been complied with.

Investigation of the exact cause of the incident is key in determining policy liability and what, if any, rights of subrogation arise. There is an increasing trend particularly with major losses that this investigation is

Figure 1. McLarens adjusters conducting initial inspections by boat in the Thai floods of 2011

undertaken by independent, professional consultants appointed by Insurers, perhaps a firm of forensic scientists or specialist engineers with experience in the relevant field and who hold the necessary qualifications such that their findings will not be in question and will stand firmly in a court of law.

Indeed, there is also a trend with major losses for a legal team to be appointed at the outset and for the entire investigation to be undertaken under an umbrella of "attorney-client privilege."

One other noticeable trend is the tendency for the loss adjuster, and any consultants who might be instructed to assist them, to be required to sign a non-disclosure agreement. The Insured might, understandably, be concerned about sensitive information getting into the wrong hands or for potential bad publicity that might have an adverse effect on their business. A typical agreement forbids unauthorised dissemination of information gathered from the Insured in relation to the claim under investigation thereby making it more challenging to find suitable case studies for discussion in an article such as this. Even without such an agreement the adjuster must treat the information received confidentially.

The loss adjuster is expected to use their experience in advising on loss mitigation. The Insured might consider that their machinery is a total loss without realising that there are specialist firms who might be able to save money by restoring the machinery to the condition it was in prior to the loss.

There may be an exposure under the business interruption section of the policy and the loss adjuster may suggest taking a particular course of action (recovery of machinery for example) which enables the Insured to maintain sales or return to normal trading conditions more quickly resulting in a reduced loss amount and thus a saving to Insurers and the Insured.

The loss adjuster is expected to assist the Insured in all efforts made after the incident and to communicate with the Insured in quantifying the loss under the terms of the policy.

There are various parties involved in the formation of the insurance contract including the Insured or policyholder, the Insurer or cedant, the broker and reinsurance broker, and the Reinsurers. The Insured may decide to appoint a public loss adjuster to act on his behalf in preparing the claim submission and attending meetings, although such an appointment is still relatively rare in Korea. The loss adjuster is expected to be able to communicate effectively with all interested parties.

We now turn to our case studies.

2. CASE STUDY I

McLarens was appointed by Insurers with support from Reinsurers to handle the claim following a major fire at a thermal power plant in Asia. At the time of the incident the plant provided about 14% of the country's electricity demand.

The primary boiler furnace fuel was gas and the steam produced drove two independent turbines with a combined maximum output of 1,470MW. The secondary fuel was bunker oil stored on site. The exhaust gas when bunker oil was used had high sulphur content and was therefore passed through a flue gas desulphurisation plant (FGD), which reduced the sulphur content below environmental limits before it was released to the atmosphere via a stack. Without the FGD, only gas could be used to run the furnace and exhaust gases were sent to the stack via ducting that bypassed the FGD.

An inspection on the day after the fire revealed

obvious damage to the FGD and bypass exhaust ducting. Further checking revealed damage to the stack.

The fire had been caused by a sub-contractor who was carrying out welding work in the FGD during a planned shutdown, which was scheduled to be completed the following month.

The initial major concern, as far as business interruption was concerned, was that due to the damage the unit would not be available at the end of the shutdown and perhaps for many months thereafter - so it was agreed that the owner would attempt emergency temporary repairs to the bypass ducting and stack so that the unit could continue to generate electricity using gas. Forensic accountants had calculated daily revenue losses at around USD225,000.

McLarens had concerns about whether the emergency repair of the stack would last until the permanent repairs could be carried out and therefore engaged a disaster management company to assist in locating specialists to either undertake the repairs or supervise them.

Ultimately the construction arm of the owner carried out the repairs under the supervision of a chimney specialist.

The temporary repairs cost USD1.3million but significantly the unit was re-synchronised to the grid within the 30-day business interruption waiting period and therefore with no additional loss to Insurers.

The critical business interruption exposure then became either a failure of the temporary repair or loss of the gas supply as without the FGD the use of bunker oil was not possible and the unit would have to be shut down.

It was agreed that it was not economic to shut down the unit for the permanent repairs and that they should be carried out during the next major maintenance outage.

McLarens set up an escrow account into which Reinsurers placed funds so that the Insured was always in acash positive position and contractors/ consultants knew they would be paid quickly. This

Figure 2. Thermal power plant

Figure 3. Damaged FGD

Figure 4. Part of the cracked stack

helped encourage them to join the Project and improved McLarens negotiating position to agree on pricing/ contract terms.

In view of the critical timeframe and the advised lead times on major equipment for the FGD, it was agreed to source the main replacement parts for the FGD from the original suppliers and source other items locally where possible and utilise a local contractor(s) for the demolition/reconstruction work.

However the original suppliers, whilst keen to do the work, quoted a 120-day repair period and repair costs several million U.S.Dollars higher than alternative contractors found by McLarens.

They recommended that the stack and all ducting should be replaced. This would have taken 9-12 months and mean the unit could not be operated during this period, which would have led to a significant business interruption loss.

McLarens located specialised contractors who were confident that they could complete the work without extending the planned outage thereby avoiding a business interruption loss.

For the permanent repairs, McLarens sourced a Project Manager who was at the site every day until completion of the work 21 months later. This allowed us to monitor closely the cost and scheduling of the Project on a day-to-day basis and added hidden benefits including mitigation of the risk of accidents. For example,we identified that the reconstruction contractor intended to use a crane of insufficient lifting capacity for the lift of the critical Gas-Gas Heater.

McLarens managed all on-site Project activities; chaired the weekly and monthly Senior Management meetings with the Insured and each of the Project's key contractors; reported to Insurers; managed the contractors' costs, performance, and compliance to contractual requirements; controlled the escrow account and monthly cashflow; advisedthe Insured on specific areas warranting further cost reduction consideration; and provided them with construction, commissioning, and performance testing consultancy services.

As a direct result of the cooperative working relationships that McLarens established and nurtured amongst all of the contractors, and with the effective and timely execution of our comprehensive planning, the entire FGD Restoration Project was a success in every aspect.

The overall construction progress concluded ahead of schedule every month of the permanent repair work.

Safe working practices were consistently stressed to

Figure 5. Reconstructed FGD facility

all contractors throughout the Project. To the credit of the safety representatives of all of the contractors, over 1,000,000 man-hours were worked on the Project with only three minor safety incidents.

McLarens was directly responsible for managing the loss and issued a total of 30 reports to the cedant throughout the Project including project schedules, escrow account summaries and cashflow projections and analysis.

In view of the significant financial exposure of Reinsurers in Singapore, London and Zurich, particularly to the business interruption aspect, McLarens in Singapore and London were closely involved in issuing reports to their markets and holding regular market meetings to provide the Reinsurers with a constant flow of information on the project progress and major milestones.

A detailed understanding of the reinsurance arrangements enabled McLarens to advise in advance when payments into the escrow account would be necessary and to recommend interim payments at levels that enabled some Reinsurers to pay up to their individual exposures allowing them to withdraw from further involvement in the loss.

3. CASE STUDY Ⅱ

Facilities at the Insured's manufacturing plant comprised a large and highly integrated refining, petrochemicals and polymer production complex.

At the plant, crude oil and condensate from both overseas and the on and off-shore oil and gas fields are first refined in two parallel Atmospheric Distillation Units (ADU-1 and -2). The naphtha fraction is the feed for the cracker that produces the ethylene and propylene monomers required by the various downstream polymerisation units. Naphtha is also the feedstock for an Aromatics Plant, which provides the benzene needed to produce various styrenic polymers.

Gas oil from the ADU's together with Vacuum Gasoil (VGO) from the Vacuum Distillation Unit (VDU) is the feedstock for a Deep Catalytic Cracking unit (DCC), which is designed to produce more propylene and other valuable by-products. The residue from the VDU units is processed in a Lube Base Oil complex. Other by-products from the ADU's are further processed to produce transport fuels and fuel gas for the complex.

The loss involved the Vacuum Gasoil Hydrotreater unit (VGOHT) which feeds the DCC in Complex No. 3 (Refining). This unit takes a mixture of heavy gas oils from the Vacuum Distillation Unit (VDU) in the Lube Oil Complex and treats the gas oil before it is used as feed to the DCC.

Several explosions and a fire, which was brought under control within one hour, damaged a substantial part of the high-pressure hydrogen recovery system in the VGOHT.

An emergency shut-down of the entire site and flaring of various units took place.

The plant was restarted without the VGOHT unit.

McLarens was appointed to manage the claim in which the following consultants were engaged:

- A chemical engineer for understanding the effects on the production process and mitigation measures
- Forensic accountants to assist in the business interruption/inventory loss measurements
- A consultant to produce a critical path analysis
- A forensic scientist for causation and a fitness-for-service analysis for the four high-pressure vessels that were initially on the critical path
- A consultant alsofor a fitness-for-service analysis for the four high-pressure vessels
- A linear programmer to review the production optimisation during the interruption period
- A disaster management specialist to assist expediting procurement of critical path items
- An on-site "clerk of works" during the repair to monitor the project progress against schedule

The cause of the incident was an accidental leak of hydrocarbon vapour from an elbow in the high-pressure pipework between two separators within the VGOHT (hot gas separator 30D002 and cold gas separator 30D003). The rupture of the pipe was sufficient enough to ignite the vapour and cause the explosions and fire. The elbow ruptured because of the loss of wall thickness by erosion corrosion.

In the course of adjusting the claim for property damage, McLarens reviewed more than 5,600 purchase orders as well as numerous invoices. We developed a master adjustment spreadsheet and attended weekly meetings to review this against the purchase orders,

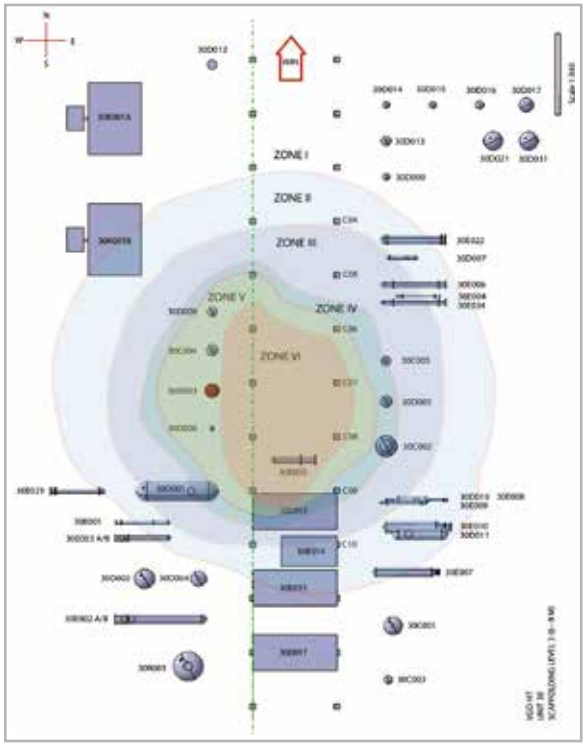


Figure 6. Damage zones

Figure 7. The main fire/explosion damaged area of the VGOHT–before and after

marked up drawings, photos, and other supporting documents.

The loss site was divided into zones depending on temperatures reached at the time of the incident with zone 6 being the worst effected with temperatures exceeding 730°C. Facilities in zones 4, 5&6 were treated as a total loss. The claim for work in zones 1, 2 & 3 was closely scrutinised on why it was required and mostly excluded.

The overall claim including business interruption was agreed at USD90 million.

4. CASE STUDY Ⅲ

A 150MW steam turbine supplying power to a large pulp and paper mill suffered a failure. It was returned to operation after an outage period of almost three months during which repairs were undertaken by the OEM (Original Equipment Manufacturer).

As is often the case involving a major turbine failure, an expensive and potentially complex claim was anticipated. This particular claim,however,proved to be far more complex than most claims of its type, and again illustrates the emerging trend and needfor the loss adjuster to also perform duties as a project manager in large and complex losses.

McLarens was appointed and we coordinated with and directed a panel of experts in various disciplines in bringing about a satisfactory resolution of the claim.
The claim ultimately involved:

- Turbine experts in connection with the causes of the damage
- Lawyers in connection with providing a legal opinion on coverage issues arising from the various damage and when this damage occurred
- Experts in pulp and paper mills in connection with the impact of the loss on the business
- Forensic accountants in connection with valuing the amount of the business interruption loss sustained as a consequence of the insured damage

Initial inspection of the turbine at the site by borescope revealed damage consistent with the reported loss event, a trip during operation due to a lube oil failure with consequent damage to bearings.However, when the machine was opened several parts were found to be damaged.

It was not clear that all the damage could have been caused by the failure and therefore, with Insurers' approval, McLarens arranged for investigations to be undertaken by turbine experts.

The expertsestablished that the damage at the turbine blades and the HP nozzles did not occur at the time of the failure but had arisen earlier. They identified different incidents of damage with separate causations. From an analysis of operating logs, they were able to assign probable dates to each of five incidents of damage.

This had implications on coverage, some of the damagehaving occurred prior to theinception of the current policy.

The policy for both relevant periods was a manuscript 'All Risks with Machinery Breakdown' Insurance Policy combining cover for Property All Risks, Machinery Breakdown and Business Interruption.

It was clear that there had been direct physical damage to property insured, which resulted from an occurrence (as defined in the policy). Some of the damage had occurred during the expiring policy period and some during the current policy period.

The claim proved even more complex when one of the five occurrences was deemed to be excluded. The other four occurrences were deemed covered events.

Lawyers were appointed by the Insurers for each

Damaged steam turbine

Blade damage

Journal damage

Damaged rotor shaft

Blades were missing

Figure 8. Steam turbine

policy to provide an opinion on how the policies may be involved in responding to the various incidents of damage.

Experts in pulp and paper mills were consulted in connection with establishing the impact of the loss on the business.

The claim ultimately was for a loss of gross profit from a reduction of pulp, paper, and tissue products during the entire outage period (an initial claim for additional expenditure arising from the difference in fuel efficiency was withdrawn after detailed analysis revealed this could not be supported). It was accepted that the loss of output during the outage could not be made up subsequently and did translate into the equivalent volume of lost sales.

The pulp and paper mill experts were able following very lengthy and detailed investigations to identify the loss attributable solely to the turbine outage.

A firm of forensic accountants was engaged with the approval of Insurers to assist us in adjusting the business interruption claim utilising the loss data extracted by the other experts. We discussed with them the scope of the policy cover and attended meetings with them in calculating the losses deemed to be a result of the incident.

The forensic accountants examined the complex data from the mill and valued the loss of gross profit. Significant savings in chemical usage and a reduction in power consumption were identified and credited against the loss.

We provided our estimates for the net values of losses based on the accountants' calculations, and these were used to agree on settlement (net of deductibles) under the two policy periods.

5. CASE STUDY Ⅳ

A Sikorsky S-76C++ helicopter performed an emergency water landing while on approach to land at an off-shore oil platform off the coast of a remote island in Indonesia. The crew reported rapid loss of altitude while on approach due to windshear. At approximately 45 feet above the water, the crew deployed the Emergency Floatation Gear as the aircraft continued to descend rapidly. It came down in the sea, but was fortunately kept on the surface by the floats.

The crew was able to recover the aircraft and continued its flight to the oil platform. After off-loading the ten passengers, the crew was able to return the aircraft to the island's onshore facility and maintenance base.

Initial inspections revealed damage to the fuselage's right side 'I' Beam, lower belly panels, undercarriage fairings and the tail boom. The aircraft's instruments confirmed that the main rotor gearbox and engines had recorded a major over-torque event and these would require an overhaul.

Following notification of the event, Insurers appointed McLarens Aviation to handle the claim. A surveyor travelled to the remote island where a detailed survey was performed together with the Operator's engineers, and whilst it was determined that the USD12 million aircraft was repairable, a review of the extensive repair work required meant that the aircraft had to be moved to the Operator's main base near Jakarta to enable repairs to be performed as repair facilities on the island's maintenance base were very limited.

McLarens Aviation researched the available options to transport the aircraft from the island to Jakarta. There was a shipping service available which could transport the S-76C++, but the transit time was approximately

a week on the water. We consulted the aircraft manufacturer for guidance as these large helicopters are not normally transported by sea, and it was advised that for the sea passage, all the dynamic components including the engines would need to be removed from aircraft and the fuselage would need to be wrapped in a weather protective plastic covering to prevent corrosion resulting from the hostile marine environment. Additionally, due to a prevailing monsoon, there was a concern that the aircraft could be further damaged during this transit in rough weather.

The other option was to transport the damaged S-76C++ to Jakarta by air with a flight time of three hours. The only available aircraft in the region that could accommodate the S-76C++ in partially disassembled condition, and also operate from the island's short 1,190 metre long airstrip, was a military transport aircraft, the Transall C-160.

After reviewing the risk-benefit factors of air versus sea transport, it was agreed by the involved parties–the Operator, Insurers, Sikorsky, and McLarens–that air transport would be the preferred option.

After the necessary tooling was transported to the island, the Operator's technicians prepared the

Figure 9. Aircraft with floatation devices deployed after the water landing event

Sikorsky for air transport. Concurrently we sourced for and arranged the charter of the C-160 to transport the partially disassembled damaged aircraft to the maintenance base.

As preparations were in progress to move the Sikorsky, we engaged in discussions with various repair organisations, both in the Asian region as well as in the USA, Canada and Australia, to identify the ideal repairers for the S-76C++. Although it may seem that the original aircraft manufacturer would be the logical choice, in our experience the OEM's high

Figure 10. Lower fuselage deformation

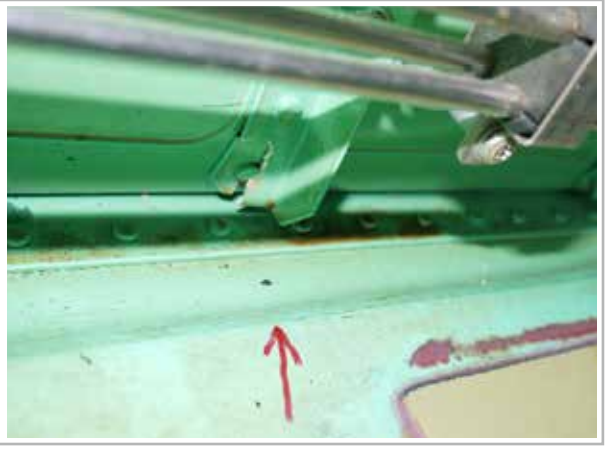


Figure 11. Structural stringers with cracks

Figure 12. The Transall C-160

cost and inflexibility makes an approved and qualified independent repairer a better choice.

Damage assessment inspections of the S-76C++ were performed by two repair organisations, one a subsidiary of Sikorsky in Australia, and the other an independent, FAA approved repairer from Canada. Following discussions with the two potential repairers, the selection was made based on their capability as well as pricing, and the Canadian repair company was engaged.

In order to control costs, we also agreed with the Operator a work sharing arrangement with the Canadian repairers to have the more routine component inspection/assembly and tests performed by the Operator's own personnel and only the specialised structural repair works that were beyond their capability, to be performed by the Canadian repairer.

A major issue did arise during the repair process. Following detailed mapping of the S-76C++'s damaged tail boom, extensive structural buckling was found. As Sikorsky no longer manufactured the S-76C++ tail boom, the aircraft manufacturer recommended

Figure 13. View of the Sikorsky S-76C++ being loaded on the C-160

that a new S-76D tail boom be purchased at a cost of over USD800,000 and this then be modified to fit the S-76C++. This was not an ideal solution as there was a lead time of eight months for this part to be available, and the modification (the process which at that time had yet to be determined) would have taken a further four months. This would have resulted in an unacceptable delay of over a year before the aircraft could fly again.

As such, we had to arrange various discussions with the Canadian repairer's engineers, as well as Sikorsky's design engineers, to devise an alternate, but acceptable repair for the damaged tail boom. The modified repair required the use of a specialised repair jig only available in Canada, and as such the tail boom was shipped on a priority basis to the specialised repair facility. The tail boom repairs were completed within three months, at a cost of below USD400,000. This provided a substantial cost saving for Insurers, as well as ensuring the initial repair timeline of six months could continue to be adhered to.

McLarens Aviation closely managed the repair project by reviewing the daily activity reports prepared by the repairers, madeteleconference calls when required and scheduledmonthly meetings to review the progress of repairs as well as costs of parts/material and components sent for overhaul repairs. An escrow account was set up and managed by McLarens Aviation, into which Insurers made advance payments, and staged payments were made as required to ensure the repairers and suppliers were paid on a timely basis.

Following completion of repairs, McLarens Aviation's tasks continued with adjustments being made for bettermentdue to the refurbishment and overhaul of various life parts on the S-76C++. A review of all costs and expenses presented by the Canadian repairers was also undertaken.

Figure 14. The repaired tail boom

Adjustments of over USD350,000 were identified for non-incident related repairs and overhaul life betterment adjustments.

6. CONCLUSION

The loss adjuster has always played a crucial role handling large and complex losses, however, inevitably the future is trending towards significant changes for both Insurers and Reinsurers, as well as for Loss Adjusters.

We have seen a trend, particularly with international Insurers, of the inclusion of Nominated Adjusters when policies are issued. This protects all parties with agreed upon terms and, when a loss occurs, it prevents unnecessary delays. With 24-hour news cycles and the 'everyone can be a news reporter if you have a smartphone' mentality, Insurers and Reinsurers have become more cautious. Many are adding legal representation to oversee projects so they have the protection of "attorney-client privilege," whilst Insureds are requiring everyone working on the project to sign non-disclosure agreements.

As claims have become bigger and more complex,

we have noticed the trend to deploy greater levels of expertise in handling them. Today's successful loss adjuster has to juggle many, many more items thanwhen I started in the profession 34 years ago. Some would argue that this has caused the loss adjusting profession to become polarised with specialist adjusters capable of managing the major claims and general adjusters handling the more straightforward 'volume' claims.

Is there a risk that with fewer adjusters occupying the centre ground, there may be a shortfall of experienced adjusters capable of handling the major losses of the future? This risk will be exacerbated if some adjusters, attracted by greater rewards, are enticed to move elsewhere within our industry or beyond it. At McLarens, to address this we are taking less experienced adjusters and pairing them with seasoned adjusters. They will earn valuable experience and be able to quickly advance to the larger, more complex projects.

The reality is that today's requirements for accountability are higher. Loss adjusters have to coordinate and manage numerous experts, contractors and vendors. In addition, major and large loss investigations today require the expertise of forensic scientists, specialist engineers or specialised independent consultants. Part of the loss adjuster's job is not just to identify the potential need for expert assistance, but to also recommend to Insurers and the Insured, the most capable firms or individuals to consult. Loss adjusters also need to be flexible and adaptable and it is an added advantage to become increasingly specialised themselves as project managers.

The bottom line is that the insurance industry needs to take care to ensure that the loss adjusting profession remains attractive to young, talented people, and to invest in their development so that the claims of the future can continue to be managed efficiently and cost effectively.

Figure 15. The repaired Sikorsky S-76C++ preparing for test flights

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