



ERRIS

Il clima cambia. Riduciamo i rischi.

**GUIDELINES FOR THE INSURANCE AND
FINANCIAL SECTORS**

**DELIVERABLE NO. 33
GUIDANCE FOR THE INSURANCE SECTOR
ACTION D2**

SUMMARY

In the last decade, a growing attention was given by various international organisations to the role that insurers can play in identifying innovative and efficient solutions to reduce climate risks either as risk managers (sharing knowledge and rewarding actions that increase resilience) either as investors (creating innovative financial instruments to move capital dedicated to risk reduction and resilience).

The DERRIS project experimented an innovative model of multi-stakeholder collaboration involving public administrations, insurers, academic institutions and SMEs. The ultimate goal of the project was to build an innovative public-private insurance scheme that triggers virtuous behaviours regarding protection, prevention and adaptation to the effects of climate change and increases local resilience, thus reducing the costs of extreme weather events that are covered by public spending.

The DERRIS project activated two main levers. On the one hand, the project will enhance know-how and skills transfer from insurers to SMEs and the public administration thanks to the setting of a self-assessment tool that enables businesses to assess and reduce their risks related to climate change and to handle emergencies. On the other hand, DERRIS has carried out an analysis on innovative financial instruments, involving both public and private players, to fund climate change adaptation actions and to promote urban resilience. This is all the more challenging considering that climate change adaptation interventions do not have direct and easily measurable economic returns.

This guidance for the insurance sector aims at discussing the role that insurers can play both as risk managers and investors to prevent, manage and transfer risks linked to the effects of climate change, especially given the growing attention that is given to insurers in the current international debate. Based on some international case studies, the document highlights the role that insurers can play in increasing risk awareness and risk control culture. It then discusses the role that insurers can play as investors to create new financial instruments to boost climate risk prevention. Finally, on the basis of the lessons learnt from the project and on discussions with other organisations from the insurance and financial sector, the guidance presents some recommendations both for the public and the insurance sector.

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1. INTRODUCTION

1.1 IMPACTS OF THE CLIMATE CHANGES ON THE FINANCIAL SYSTEM: THE INSTITUTIONAL FRAMEWORK AT WORLD AND NATIONAL LEVELS

The Paris Agreement (COP 21) - redirect cash flows to contribute to a climate-resilient development model

COP 21 closed in Paris on 12 December 2015 and was marked by a more widespread awareness of the need to be equipped with measurable objectives in the fight against climate changes and of the importance of involving all parts of civil society, including companies. Article 2.1 (c) of the Paris Agreement specifies that the agreement “aims at strengthening the global response to the threat of climate changes, (...), also by (...) making the cash flows consistent with the path leading to climate-resilient development with low greenhouse gas emissions.

Despite this important step and wide-ranging approval of intents at a global level, the adaptation and resilience themes continue to not be adequately approached. Most efforts are again put forth on mitigation (particularly as regards funding). Nevertheless, some changes are to be noted: two days after COP 23 ended, the UN Secretary General Antonio Guterres said: “Reducing greenhouse gas emissions is essential, but the climate’s distortion is already a reality and will worsen over the years. This is why it is necessary to also implement some adaptation policies and strengthen our resilience.” “Insuring Coal No More” was presented in the margin of the COP 23 proceedings. This new report of the coalition of NGOs and associations of the international civil society called Unfriend Coal points out that 15 of the leading insurance companies have decided to disinvest from coal extraction projects coming to the amount of \$20 billion.

Greater attention focused on identifying, managing and reporting risks arising from climate change

In 2015, following a request of the G20 ministers of finance, the Financial Stability Board launched a Task force on Climate-related Financial Disclosures (TCFD). The TCFD published its final recommendations in June 2017 and established a coherent framework for identifying, assessing, managing and reporting risks and opportunities tied to the climate in all sectors, with some specific operational suggestions for financial institutions, including insurance companies as underwriters and asset owners.

The G20 green finance study group

In 2016, under China's chairmanship, the G20 launched its own Green Finance Study Group and brought several finance ministers and central banks to the table to reason on how to make private cash flows make a sizeable leap toward green investments.

One Planet Summit: mobilize all players to fund mitigation and adaptation to climate changes

On 12 December 2017, a new summit on climate entitled "One Planet Summit" was held in Paris. It was primarily dedicated to discussing ways to finance the fight against climate change. The meeting was an important chance to:

- Mobilize the players of the public and private sector, including the representatives of the private sector (e.g. energy, transportation and insurance sectors) in addition to the so-called philanthropists;
- Reaffirm commitments on several basic questions, on which strong decisions were taken, including: interrupt investments in and support given to fossil energies, adjust carbon pricing, promote the energy transition (by redirecting public and private funding);
- Reiterate the United States' commitment to attaining the goals of the Paris Agreement with the participation of high-level representatives of the "We are still in" coalition
- Insist on the fundamental role of cities in the fight against climate changes and hence on the need to define actions at the local level.

The European Commission's action plan for sustainable finance

On 8 March 2018, the European Commission, in applying the eight recommendations of the High Level Expert Group (HLEG), presented its action plan for sustainable finance ("Financing sustainable growth") with ten actions aimed at defining the role of finance for Europe's sustainable future.

The Italian Observatory for sustainable finance

The observatory was formalised on 24 January 2018 with the objective of:

- promoting the sustainable finance activities of the Italian financial centres in association with the international financial centres;
- encouraging the role of green finance to supporting sustainable re-industrialisation;
- integrating international green and sustainable finance developments at the national level;
- checking the possibility of mobilizing private capital for sustainable development.

Next steps

“Talanoa Dialogue” will be held in 2018 to review the so-called NDCs (Nationally Determined Contributions) in preparation for COP 24, which will be held in Katowice, Poland. The aim is to make the objectives by 2020 even more ambitious, in order to be able to implement the transition to a renewable future. In Poland, the states will have to choose a system of shared rules in order to make the commitments made three years ago in Paris operational. Then they will have to define the measures to take before 2020, when the Paris Agreement will become actually operational. Lastly, it will be necessary to discuss, once and for all, the prickly question of the funds necessary for the fight against climate changes and for the most vulnerable nations to adapt to them.

1.2 INSURANCE SECTOR AND CLIMATE CHANGES

Climate changes are more and more considered to be a core theme of the insurance business. A recent study of the Geneva Association demonstrated that 38% of those in the insurance sector interviewed:

- considers climate change a strategic theme that associates the climate-connected risks and opportunities with governance, strategic planning, risk management and operations;
- has adopted cross-sector mechanisms/work groups to assess the risks and opportunities tied to climate and to support the decisions of the board and top management;
- considers climate change a strategic theme that is increasingly integrated in the business in the various work areas¹.

According to the Task Force on Climate Disclosure (TFCD) guidelines, there are 3 types of risks that might impact financial institutions, including insurance companies:

- financial risks (represented by impacts on debt and on the value of the financial assets, caused by the consequences of climatic events such as floods and storms on property and trade),
- liability risks (represented by future compensation applications forwarded in case of losses or damages caused by the effects of climate change),

¹ Geneva Association, *Climate change and the insurance industry: taking action as risk managers and investors*, January 2018

- transition risks (represented by financial risks that might emerge from precisely the transition to a low emission economy processes)².

The growing attention paid to the impacts that the climate changes will have on the insurance sector requires that the boards of the insurance companies fully consider this theme a strategic theme in risk policy terms. It is necessary to further propagate attention to these topics to all decision-making levels by integrating them, where possible and advisable, also in the assessments made at the top management level.

1.3 INSURANCE COMPANIES AS KEY PLAYERS IN DEALING WITH CLIMATE CHANGE

When extreme weather events increase in frequency and intensity, the impacts of climate changes on the insurance sector become crucial for the future of companies that will have to be protected from increased climate change-associated risks, which will be harder and harder to forecast and cover.

Insurance companies are one of the key players in dealing with climate changes. Actually, on the basis of their very activities, insurance companies can play a specific and effective role in understanding, preventing, reducing and transferring climate change-linked risks.

As emphasised by UNEP FI's *Principles for Sustainable Insurance Initiative*, insurance companies play a triple role in fighting climate changes: **risk carrier role** (handling technical insurance risk), **risk manager role** (handling physical insurance risk) and **investor role** (institutional investors). Their role is therefore not limited to just the more traditional risk transfer processes, particularly through the offer of insurance products (*risk carrier role*), but it is also essential in supporting the other players (both public and private) in implementing actions that can reduce climate risks and at the same time foster a greater resilience to climate changes (*risk manager role*) and lastly, in order to mobilize the resources necessary to fund adaptation to the climate changes and the resilience of the local communities (*investor role*).

All this has led, in recent years, to the ripening of an increasingly widespread awareness of the need to think of natural catastrophe prevention and management models shared by the public and private sectors, and that adopt insurance mechanisms to manage the uncertainty and substantial compensation.

² FEEM, *Rischi climatici: mitigazione e disclosure nelle imprese italiane* ("Climate Risks: Mitigation and Disclosure in Italian Companies"), 2017

As early as 2010 the OECD stressed that “instruments for funding and transferring risk like insurance products might play a fundamental role in reducing economic impacts of catastrophe risks” (OECD 2010). In line with this view, the European Union in Action 8 of the Community Strategy for adapting to climate changes, published in 2013, set for itself the goal of promoting insurance and financial products, which are instruments able to increase resilience to climate changes. The Green Book on Insurance Against Natural and Anthropogenic Calamities (European Commission, 2013) recognises the need to increase penetration on the natural catastrophe insurance market and to “fully develop the potentials of the premiums of the insurance and of other financial products for raising awareness on the prevention and mitigation of risks and for the long-term resilience of investments and trade decisions”.

The adoption of an overall financial strategy on the subject of disasters is highly important at the European level. In the awareness that disasters can produce repercussions of vast reach in an increasingly connected world, the finance ministers of the G20 countries asked OECD to draw up an optional protocol that might help the national governments to design adequate financial strategies on the subject of disaster risk³. There are many financing instruments that can be used in this area, and each one of them aims at getting different results. One strategy that is based on a diversified pool of financial instruments and institutions integrated with each other will be better suited to tackling and responding to the various types of environmental and man-induced risks⁴.

1.4 THE DERRIS PROJECT: OBJECTIVES

Italy is one of the countries most vulnerable to climate change at the European level. Floods, torrential rains, landslides, heat and intense cold waves and other extreme weather conditions are rising, and make the risks for Italy go up.

From 2010 to today 126 Italian municipalities have recorded significant impacts with 242 weather phenomena. Particularly occurring in the aftermath of intense rains were 52 cases of floods, 98 cases of damage to infrastructure, 8 cases of damage to historical assets, 44 cases of landslides caused by intense rains and whirlwinds, and 40 events following river overflows.

³ OECD, *OECD Recommendation on Disaster Risk Financing Strategies*, February 2017

⁴ FEEM, *Cambiamento climatico in Italia: impatti e adattamento (“Climate Change in Italy: Impacts and Adaptation”)*, Equilibri 2/2017

Moreover, there were 55 days of blackouts due to bad weather, with heavy consequences also for companies that had to slow down or interrupt their activities.

Eighty-eight percent of Italy's municipalities are found in areas considered at high hydrogeological risk, with almost 7 million people who live or work in these areas.

The extreme events are a risk for people's safety. Between 2010 and 2016, floods alone caused the death of over 145 people and the evacuation of over 40,000 people. They pose a risk to companies, too. In Italy, there are over 1.6 million companies exposed to flood risk⁵.

The damage caused by these disasters has grave repercussions on the economic stability and growth of the areas hit. Of the 28 EU member states, Italy is the one that sustained the greatest economic damage caused by natural events⁶. In response to the damage caused by floods or landslides totalling about € 7.6 billion from 2013 to 2016, the state assigned approximately 10% of the necessary amount⁷. Ninety percent of the SMEs forced to interrupt production for more than a week due to a catastrophic event goes bankrupt within one year (Source: AIBA).

In this context, two strong critical issues are distinguishable:

- The Italian SMEs do not have sufficient tools for assessing and managing these phenomena;
- Italy is one of the countries where companies underestimate the impact of this type of risk the most. In fact, a recent study revealed that 37% of companies interviewed feared no negative effect tied to climate changes on their businesses⁸.

Since September 2015 the Unipol Group - together with the partners ANCI, CINEAS, City of Turin, Coordinamento Agende 21, Locali Italiane and UnipolSai - is leader of a project entitled DERRIS (DisastEr Risk Reduction InSurance), co-financed by the European Commission within

⁵ Legambiente, *Le città italiane alla sfida del clima* ("The Italian Cities Challenging Climate"), May 2017

⁶ FEEM, *Cambiamento climatico in Italia: Impatti e adattamento* (Climate Change in Italy: Impacts and Adaptation"), Equilibri 2/2017, 2017

⁷ Ibidem

⁸ Zurich, *Effetto potenziale sulle attività delle piccole e medie imprese (PMI) a causa dei cambiamenti climatici nel 2016, Rapporto di indagine globale* ("Potential Effect on the Businesses of Small and Medium Enterprises (SMEs) due to Climate Changes in 2016, Global Survey Report"), November 2016.

the financial instrument LIFE. DERRIS is the first European project that combines public administration, companies and insurance sector to reduce risks caused by extraordinary climatic events.

The major objectives of DERRIS are to:

- Implement innovative forms of public-private partnership between insurance, public administration (PA) and companies that sparks off virtuous conduct in the area of climate risk prevention and management and, at the same time, increases the resilience of local communities, in this way reducing the costs of the extreme weather events that are covered by public spending;
- Encourage a greater risk culture by transferring knowledge and know-how from the insurance companies to the SMEs and public administration;
- Make adequate climate risk prevention and management tools available to the SMEs;
- Analyse possible innovative financial instruments that allow the transfer of capital for reducing risk, for adapting to climate changes and for the resilience of the local communities.

2. PUBLIC-PRIVATE PARTNERSHIP FOR INCREASING THE RESILIENCE OF LOCAL COMMUNITIES

As mentioned previously, extreme weather events also carry with them an increase in costs of direct and indirect damages, which increase the financial charges for public administration, insurance companies and companies. This augments the need to think of natural disaster prevention and management models that are shared by public and private players. At the same time, it would be necessary to adopt insurance mechanisms to manage the uncertainty and to cover the growing costs of the damage. In fact, a governance model that involves adopting public-private insurance mechanisms may be a strategic choice since it makes the expenses for catastrophe events more sustainable for the state.

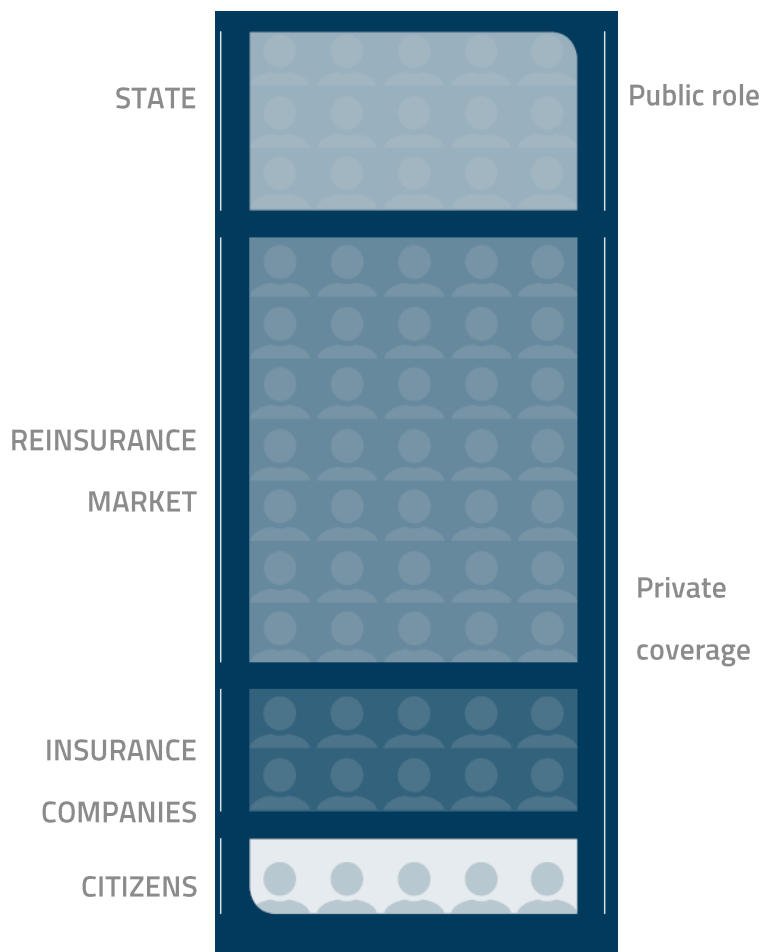
The role that insurance companies play becomes significant for forecasting the risk characteristics in close collaboration with the public institutions. This collaboration is necessary to identify the prevention and intervention policies in order to increase the resilience, spread and increase in capabilities and knowledge of risks between entrepreneurs and citizens.

In this context, the adoption of public-private insurance mechanisms not only is responsible for a more effective and sustainable distribution of risks, but can also bring an essential contribution to the climate change adaptation process and spread the risk prevention and management culture, encourage virtuous conduct and introduce effective damage and loss management tools. Enhanced resilience of the territory, and as a result a reduction of its exposure to risks, is an element that interests both the risk carriers (an insurance or reinsurance company) and the Public Administration that has to manage the territory.

Collaboration between the Public Administration and the insurance sector can become one of the basic pillars in those countries that have a low insurance penetration rate (like Italy) in order to increase the resilience of their local communities against extreme and catastrophic climatic events.

The transfer of knowledge and tools, the sharing and redistribution of risk, and the promotion of prevention and protection conduct are all incentives for guaranteeing sustainable development and greater competitiveness.

Multistakeholder partnerships



Public role vs. Private role:

- contribute to construction of the baseline (data, maps, information); serve as a reinsurer of last resort; guarantee observance of the rules and functioning of the mutualistic mechanism; monitor the territory
- transfer the risk that the individuals are unable (or cannot) support (protection, universality, mutualism), create incentives, transfer knowledge and tools.

In the United States, the National Flood Insurance Programme – NFIP was created by Congress in 1968 because the private insurers often refused to cover flood-associated losses. The programme was created with three major goals:

1. better communicate the flood risks,
2. provide safety measures to help property owners and companies to rebuild following losses caused by floods,
3. encourage local bodies to improve their land use and mitigation practices to reduce losses caused by floods.

The programme has four main components:

1. mapping of the flood plains to mark the boundaries of the areas at risk of floods,
2. insurance coverage purchasing requirements,
3. minimum standards for the development of flood plains,
4. incentives and loans to implement flood risk mitigation measures.

The Federal Emergency Management Agency (FEMA) is in charge of administering the programme. Congress should finance a study at the national level to identify strategies in view of the creation of a national initiative to map floods that coordinates the federal efforts, streamlines the process and creates clear standards for developing flood plain maps⁹.

This model works if the risk is widely distributed. Building a governance model that includes adoption of public-private insurance mechanisms not only makes the costs tied to catastrophe events more sustainable for the State's coffers, in this way relieving the company from having to pay for their total costs, but it can also help raise the level of attention and knowledge of the risks tied to climate change, sparking off virtuous protection, prevention and adaptation conduct. The premium for a risk is, in fact, determined by weighing the level of exposure of the

⁹ http://www.100resilientcities.org/wp-content/uploads/2017/11/Resilient-Cities-stand-alone-ch3_revised_11.7.17.pdf

individual insured party: the lower the exposure, the lower the cost of the policy. Moreover, the insurance works thanks to a mutualistic mechanism to redistribute the risk amongst weaker or more exposed parties (families and SMEs) to technically better equipped parties (national insurance companies and international reinsurance market) or those less vulnerable. In a scenario like Italy's, which is marked by a very low propensity to insure, the insurance model alone cannot work. The risk of non-selection (i.e. the phenomenon for which only the parties most exposed to the risk are insured) and at the same time the high risk of moral hazard (i.e. the phenomenon for which the parties do not conduct themselves virtuously since they do not have the right incentives to do so) make the model not economically sustainable. The role of the legislator is to define the rules of the system and to set up the conditions so that it can work, thereby generating a market of reference that brings demand and supply into line efficiently, and has the duty to step in where some needs are not met in the market¹⁰. This can take place by extending insurance coverage through adequate incentive policies in an attempt to spread the mutualistic principle of risk coverage. One alternative can be that of introducing economic incentives on insurance premiums and on steps taken on the adaptation plan to foster adoption of virtuous conduct. For example, the insurance policy tax exemption policy introduced on private homes to SMEs could be extended, linking these incentives to a climate change adaptation plan with mitigation and risk prevention measures.

¹⁰ Unipol per il clima, 2015

3. INSURERS' ROLE IN INCREASING AWARENESS AND THE RISK PREVENTION AND MANAGEMENT CULTURE

As the DERRIS project demonstrated, insurance companies can play a fundamental role in increasing the awareness of other players such as the public administrations, trade associations and companies on the theme of climate change risks in order to promote a greater risk prevention and management culture. The experience gained from the DERRIS project showed the need to start up a widespread model of involving a vast range of players (public administration, trade associations, chambers of commerce, agencies and branches...) in the local areas in order to remedy the low level of awareness (confirmed during project implementation) of the impacts of climate changes. This activity is extremely costly in terms of time, but essential as it increases the impact of the project by strengthening the collaboration between all the parties involved. Building the capacity of the other parties (like the public administration and companies) is essential in order to get effective results¹¹.

Furthermore, the specific knowledge that the insurance companies have on managing risk can foster fruitful collaboration with the public institutions that record the climatic data to make them easily available to those that want and need to access them (local authorities and companies in particular). In all this, the monitoring and modelling of the data are not the real problem since many private data owners can provide the necessary information. The real problem is the capacity of the insurance companies together with other institutions (such as the public research centres) to make these data and models usable and understandable for those that need to protect themselves, local public authorities and companies in particular.

Possible interventions:

- Transfer of knowledge and know-how on risk prevention and management from insurance companies to other players (public authorities, companies, citizens) to help develop a widespread risk culture;
- Set-up of easy to use tools and processes to augment the capacity of other players (public authorities, companies, citizens) to know which interventions can be

¹¹ In the report *Insurance of Weather and Climate-related Disaster Risk* (Ramboll, VU), DERRIS was mentioned as an example in the recommendation of policy 15 "Increase capacity development on the subject of insurance and climate resilience".

implemented to reduce the risks (through prevention) and be more resilient to climate changes;

- Build partnerships with the public institutions that have the climate change data and knowledge in order to share the information, develop models that can meet the needs of the various players and make the existing climatic services usable (e.g. the data of the Copernicus programme).

3.1 SPREAD A GREATER RISK CULTURE AMONGST PUBLIC AND PRIVATE PARTIES

The insurance companies can contribute toward reducing risks arising from climate changes not only by proposing insurance products and effectively covering damages, but also by encouraging virtuous risk prevention and reduction conduct. The model that the DERRIS project developed is aimed at helping SMEs to:

- Learn about and assess the climate risks to which they are exposed (thanks to the climate risk self-assessment tool that makes the climate risk data easily accessible to the SMEs and thanks to the training and webtraining sessions);
- Know which interventions might be implemented to prevent and manage the risks (owing to the climate risk self-assessment tool that provides suggestions on the interventions to undertake to reduce vulnerability and to the inspections in the company conducted by the project experts);
- Transfer the residual risk (using the insurance tool as result of the previous self-assessment, and/or through greater ones with the local public authorities to define consistent resilience actions and plans).

However, the project crashed into the difficulty of involving the SMEs along the way due to a poor risk culture and awareness of the possible impacts of the climate changes on their businesses. It is a topic on which it is necessary to reflect within the insurance sector and with the public institutions in order to better understand how and what to communicate to the SMES to spread a more extensive risk culture.

After several floods that took place in 2002, 2010 and 2013, Germany decided to tackle the need to reduce the impacts of catastrophic events by paying more attention to risk prevention. A public awareness campaign on natural risks was launched, involving the federal states, consumer associations and

insurance sector, in order to raise the level of awareness of citizens on the risks to which they are exposed. A public GIS portal (Kompass Naturgefahren) provides citizens with information on the level of danger of the area where their property is located with reference to the various catastrophe risks (flood, lightning, earthquake, whirlwinds). A Flood Resilience Certificate - Hochwasserpass) was created. It is an online self-assessment questionnaire that generates a brief report with recommendations to reduce one's vulnerability. The user can choose a premium version and receive support from experts. The German Insurance Association (GDV) drew up guidelines on preventing flood, wind, lightning, hail and fire risk that offer suggestions for risk prevention and management interventions and on emergency plans. The guidelines include the obligations of property owners, who must demonstrate they are adequately aware of the risks and existing coverage. The decision was to not make catastrophe risk insurance mandatory. The German government does not give out any benefits in the case in which the owner - although aware of the potentially existing risks - decides to not take out any insurance coverage. The rate of insurance penetration on catastrophe risks considerably went up after the public awareness campaign¹².

¹² <http://www.internationalinsuranceforum.com/prop/wp-content/uploads/2014/10/10-thyrolf-german.pdf>

3.2 INCREASE RISK ANALYSIS CAPACITY TO PROMOTE ITS PREVENTION AND MANAGEMENT

Data driven efficiency

The data driven efficiency processes can help companies improve their risk assessment and actions needed to reduce the risk. These processes facilitate an early detection of risks through a full-scale analysis of all production processes and, as a result, allow exposure to risks to be reduced. In this way, they contribute to the competitiveness of the companies.

The implementation of climate change adaptation actions can lead the company to improve the efficiency of its production process and/or to develop innovative products and services.

Insurance companies can boost the development of the data driven efficiency process by promoting risk assessment activities and offering services to reduce the vulnerability areas, and not only through the risk coverage insurance products.

In this sense, the insurance companies are also called upon to become an infrastructure of services for companies, offering business continuity services, ready recovery of activities and quick settlement of claims in order to prevent interruption of the production processes and possible bankruptcies.

It is necessary to alter the perception that the other parties (including the insurance companies' very own sales networks) have of the insurance companies. First and foremost, insurance companies are perceived for their role of transferring risk by offering insurance products. On the other hand, as emphasised above, they have a much broader role to play starting from the offer of services and skills like those associated with risk engineering, in such a way as to provide risk assessment and risk prevention and management action definition services before taking out catastrophe coverage.

In France, Generali launched the Generali Performance Global programme. Its aim is to help SMEs understand the risks to which they are exposed through an analysis based on some certifications of reference (ISO 26000 on the RSI or ISO 31000 for risk management) and several specific elements regarding the CSR. Following this assessment, a shared improvement plan is drawn up, aimed at accompanying the SMEs through an ongoing improvement process. Each company is assigned a score based on its ability to handle risks. The

companies with the highest scores obtain the “Generali Performance Global” label that lets them gain access to a wider range of services (e.g. help in drawing up a business continuity plan)¹³.

Support companies in defining the priority intervention areas in a dynamic context

In order to develop an efficient plan to adapt to the climate changes, companies have to launch into an analysis of the possible scenarios to define the priority areas of intervention in order to guarantee business continuity. **The insurance companies can help companies** analyse these scenarios and understand the impacts climate changes have on their businesses in the short and medium term. The challenge is to make the analysis of the scenarios easily available and usable for other players (particularly the small enterprises, given the difficulty they run into in accessing the necessary data in countries like Italy).

In addition to the analysis of the scenarios, it is essential **to identify and quantify the socio-economic risks linked to the climate changes** (through regular updates) and to conduct a costs to benefits analysis supporting decision-making processes for planning climate risk management interventions. This type of analysis is useful both to the public administration for planning its interventions and for companies and SMEs since a cost to benefit analysis of the risk management and climate change adaptation interventions would make it easier to involve companies, by making the communication linked to these themes more understandable and convincing (e.g. the theme of energy efficiency for which the bond between costs and benefits is by now fully shared and accepted).

3.3 THE NECESSARY COLLABORATION BETWEEN INSURANCE COMPANIES AND RESEARCHERS/ACADEMICIANS

The insurance companies have developed specific technical expertise to determine the future trends of complex variables, such as those regarding climate changes, since they are trying to forecast, monitor and quantify the emerging risks and the cost to protect them. They also have a database of costs of damages linked to catastrophic events that have occurred in the past, and therefore of the economic impacts of a lack of resilience of the local communities. They have IT tools available to measure the risks tied to catastrophic events and their probability of occurring. To further improve the analysis capability, it is essential to promote greater

¹³ <http://institutionnel.generali.fr/generali-performance-globale-infographie>

circulation of data between areas that hold views on the theme, such as risk management, loss prevention and claims management, within the same sector.

The knowledge of data, their processing and the sharing of effective forecasting models can generate precious synergies with the public institutions, research centres and interested parties.

Open data and integrated data in terms of risk assessment

Insurance risk assessment can make connecting data analysis and analysis of the impacts linked to the costs of climate change easier. Academic research has set historic records in the monitoring of climate-weather data and in building forecasting models. The potential economic effects of risks tied to climate and the development of cost-based tools to consider the variability of the impacts of climate changes inside and outside various sectors and markets are, however, less analysed. Furthermore, these data are not easily accessible and understandable for the other players, such as the public authorities and local enterprises (especially the small ones).

The insurance companies can offer some interesting ideas for academic research and for the cost-based risk assessment through **shared methods for collecting and analysing data**.

The insurance companies can benefit from the transfer of knowledge from academic research and can give back open source initiatives for assessing climate risk. By using standardized risk maps, the hazard analysis costs can be cut and information for a more accessible, smarter and easier to use management to cover the costs arising in most of the world can be provided.

What have we learned from DERRIS? The data collected by the public institutions are not always available, and are often not homogeneous. This is why an enormous effort to process these data became necessary in order to develop hazard maps available for the entire Italian territory. The partnership with the research institutes was fundamental in order to access the data and process them, in this way making them pertinent to the theme of climate change impact on the SMEs. The goal of the climate risk self-assessment tool developed by the project is to provide this information to the SMEs simply and intuitively.

In Austria, the HORA (Natural Hazard Overview and Risk Assessment Austria) digital risk map is a joint project between the Austrian ministry of agriculture and the Austrian insurers' association (VVO), which led to the making of an

online public tool on flood risk and earthquakes. HORA allows citizens to learn about the risk to which their property is exposed by entering their addresses. It also contains a flood risk alert system. The public authorities have provided the GIS data, while the insurance and reinsurance sectors have contributed to the modelling¹⁴.

In Italy, ANIA Servizi S.r.l. with the support of CNR – Institute for the Dynamics of the Environmental Processes (IDPA) has defined and validated a service entitled “Italy Map 1.0” that allows member companies to access an easy to consult IT system that contains a wealth of information on the risks to which the Italian territory is exposed. This service uses institutional big data and open data, which correlated by customized algorithms prepared by ANIA Servizi can be used by the insurance companies during the assumptive and settlement phases. The service is currently available for hydrogeological risk, but it may be extended to other types of risk if it should prove useful for the insurance market.

Big data and dynamic risk

The risks linked to climate change are dynamic risks. Knowledge of past data is a useful tool for being able to assess the risks that constantly and homogeneously arise, but it does not suffice to assess a risk that is continuously developing and related to even more complex variables. **We therefore need a dynamic data analysis that identifies the emerging trends through some forms of predictive models.** Big data and the continuous acquisition and analysis of data through the use of electronic devices are a key tool for analysing the emerging risks connected with climate change, for assessing when and where a risk may become a threat, and for developing tailor-made insurance products.

The insurance companies can help in this process by effectively collaborating with the academic and research centres, collecting data recorded by the various devices and electronic

¹⁴ UNISDR, *Adaptation to Climate Change: Linking Disaster Risk Reduction and Insurance*, 2009

infrastructures, applying actuarial methodologies and the risk assessment activities that reduce exposure to hazards.

Beyond the difficulties encountered in Italy in availability of homogeneous data relating to the weather and climate data, the activity performed at the European level through the Copernicus programme and numerous research and modelling activities has ensured that a huge amount of weather-climate data, and not only, are now available. Like for all big data, **the challenge no longer lies in the ability to record and monitor the data, but in the ability to analyse and process these data.**

3.4 SUPPORT THE PROCESSING AND PLANNING OF PUBLIC POLICIES BY SHARING DATA

Different partnerships in Europe demonstrate the role that insurers can play in drawing up catastrophe risk reduction plans thanks to their collaboration with the local public authorities, particularly owing to the sharing of loss data.

The Norwegian insurance sector and Norwegian authorities collaborated on a public-private pilot project that focused on how claims data could help the municipalities in planning risk assessment. The goal was to assess whether access to local claims data of the insurance companies was able to strengthen the municipalities' ability to prevent future natural climate-associated hazards. The project recommends collaboration between the municipalities and the government authorities so that the municipalities can have access to claims data on a more continuous basis¹⁵.

Mission Risques Naturels in France is implementing an aggregated claims database at the municipal level and by event¹⁶.

¹⁵ <https://insuranceeurope.eu/sites/default/files/attachments/Target%20Two%20Degrees%20examples.pdf#page>

¹⁶ Ibidem

The Resilience Brokers Programme is a world initiative aimed at supporting transition toward resilient development paths in 200 cities-regions by 2023. The goal is to support a pioneering holistic approach to the change of the systems, guided by the power of collaboration and by sensational technological innovation. The programme sets out to meet the sustainable development goals (SDGs) of the United Nations by acting as “brokers” for the communities in order to help them tackle the global questions by developing innovative (resilience) tools and tools to access an open and technology and innovative funding model-enabled global ecosystem, and connecting all players to provide for a fully collaborative environment for the co-creation of quickly scalable solutions. One of the work pillars of the programme regards the investments (aggregation of projects, mobilization of capital and insurance). The objective is to contribute to the creation of urban development investment funds (UDIFs) in the cities-regions, aggregate city-region scaled projects, involve the private sector, develop innovative funding models. The UDIFs will allow the global capital flows to be re-routed into resilient and low-risk aggregations of initiatives to improve the development of the cities-regions. They will involve the private sector through the promotion of innovations in project finances; risk insurance and finances); and the use of blockchains and cryptocurrencies. It is expected that the project aggregation on a city-region scale will reduce the total investment cost to reach the SDGs up to 40%¹⁷.

These collaborations are facilitated when the state acts as reinsurer of last resort and, as a result, shares a common interest with the insurance companies in studying the claims data analysis in-depth.

¹⁷ <https://resiliencebrokers.org/programme/>

4. THE INNOVATIVE ROLE THAT THE INSURANCE COMPANIES CAN PLAY AS INVESTORS TO CREATE NEW FINANCIAL INSTRUMENTS THAT CAN BOOST INTERVENTIONS TO REDUCE CLIMATE RISKS AND INCREASE THE RESILIENCE OF COMMUNITIES

As mentioned previously, one basic question will be the ability of the public players and investors to redirect the flows of capital to the fight against climate change while balancing the needs for funding for mitigation with those for adaptation. In fact, one problem raised both during COP 23 and One Planet Summit was that regarding the attention that is currently paid to mitigation to the detriment of adaptation

4.1 INTEGRATE SUSTAINABILITY IN RISK MANAGEMENT

As confirmed in the *Financing Sustainable Growth* action plan, "the financial sector does not always adequately take environmental and climate risks into consideration. The increase in natural disasters tied to weather conditions means that the insurance companies have to prepare themselves for higher and higher costs".

For the insurance sector, climate change-associated risks entail the business's evolution in different phases of the value chain. The insurance companies therefore find themselves having to develop increasingly holistic risk management structures able to precisely identify the possible effects of the emerging risks over the long term, in addition to performing a more extensive ex ante risk assessment activity¹⁸.

This is the reason why the ESG factors have to be fully taken into consideration when calculating insurers' risk and when managing investments, particularly in one's own assessment of the risk and solvency (as recommended by the EIOPA).

4.2 GREEN BONDS, CLIMATE BONDS, SOCIAL IMPACT BONDS: OPPORTUNITIES AND LIMITS OF THESE INSTRUMENTS

The European Commission action plan for a greener and cleaner economy calls for the adoption of a "taxonomy" for sustainable finance to define what is sustainable and identify the areas in

¹⁸ FEEM, Cambiamenti climatici in Italia: impatti e adattamento ("Climate Changes in Italy: Impacts and Adaptation"), Equilibri 2/2017

which sustainable investments can make the biggest impact. The technical work group that was formed to work on it will first concentrate on the mitigation theme and will later analyse the theme of adaptation and other environmental impacts. This work on the taxonomy on adaptation and resilience that will be performed by the European Commission will be of fundamental importance for re-routing sustainable tailor-made investments concerning adaptation. Although recognising the basic aspect of setting up a European classification system for sustainable businesses and for the standards and labels of the sustainable financial products, a key question remains the ability of public organisations to implement this type of financial product. If, for example, we consider the Italian case, the rules regulating public debt and the lack of the public authorities' capability to establish projects able to attract capital block the development of those financial markets.

It is necessary to create a regulatory context at the European and Italian level that helps testing and fosters the spread of these tools.

Another two obstacles to green finance are the level of risk and the scale (need to aggregate the projects to make them fundable).

At the end of 2017, Luxembourg and the European Investment Bank (EIB) launched a climate finance platform whose goal is to mobilize investments for projects with a strong impact in the fight against climate changes, which are financed through funds based in Luxembourg. The platform will allow Luxembourg to provide loans catalysing these funds and - partnered by the EIB - mobilize other investors, especially in the private sector. With this approach, the platform sets out to contribute to the implementation of the Paris Agreement and is a concrete step taken toward implementation of the EIB's climate strategy¹⁹.

4.3 RESPONSIBLE ASSET MANAGEMENT

In the role of institutional investors, the insurance companies play a key role in redirecting and promoting investments in sustainable projects and in companies. In this way, the insurance

¹⁹ <http://www.eib.org/infocentre/press/releases/all/2017/2017-322-first-ever-investment-from-luxembourg-eib-climate-finance-platform-to-support-green-for-growth-fund-in-the-mena-region.htm>

sector is able to play a key role in directing the flows of capital to a more sustainable economy that will promote the resilience of the local communities.

From this viewpoint, studies and research capable of demonstrating a correlation between attention paid to environmental, social and governance (ESG) factors and financial performance are of fundamental importance. A recent study conducted by Banor Sim and Politecnico of Milano on the securities of the Stoxx® Europe 600 index during the period running from 2012 to 2017 showed that the companies distinguished by higher ESG ratings get higher differential yields, with a standard deviation that is not significantly different. The market seems to particularly reward companies that pursue good practices as a whole in the three ESG components: environment, social and governance²⁰.

²⁰ Banor Sim, Politecnico di Milano, La relazione fra rating ESG e performance di mercato: uno studio sui titoli dell'indice Stoxx® Europe 600, 2018 (<https://www.banor.it/wp-content/uploads/2018/05/La-relazione-fra-rating-ESG-e-performance-di-mercato.pdf>)

5. AUTHORISING AN INSTITUTIONAL AND REGULATORY CONTEXT (AT EUROPEAN AND ITALIAN LEVEL) TO MAKE REDUCING CLIMATE CHANGE-ASSOCIATED RISKS EASIER

Insurance companies can play a primary role in creating an institutional context aware of the need to assess, reduce and transfer the risks arising from climate changes and, as a result, in implementing the policies necessary to attain these goals.

5.1 INTEGRATING CATASTROPHE RISK REDUCTION THEMES IN EXISTING STRATEGIES

To encourage a widespread use of climate risk prevention and management interventions, it is necessary to integrate disaster risk reduction across the board in strategic and planning documents. For example, although referring to the need to reduce hydrogeological risk in the national strategy for internal areas, no reference is made to the need to promote the execution of disaster risk reduction interventions.

5.2 DEVELOPING A PUBLIC-PRIVATE PARTNERSHIP TO FIGHT CLIMATE CHANGES

Conventionally, the role of insurance companies in fighting climate changes is based on separating public action and playing a role within the overall framework established by the public stakeholders. This is a narrow area of action for the insurance companies, often restricted to transferring the risk paradigm. The UNFCCC international agreement has proposed to use insurance as a risk sharing tool. Innovation for the insurance companies has traditionally meant creating new tools explicitly designed to transfer the financial risk of emerging risks, such as climate change-associated risks. Insurance companies have limited their requests to a more favourable institutional system and have contributed to this risk transfer paradigm.

Rather than limit their role in undertaking financial risks, the insurance companies are presently engaged in a new and more efficient partnership between public and private.

In view of their specific capabilities and knowledge, insurance companies should take part in any public debate concerning a strategy to adapt to the climate changes and to reduce risks, for example by mapping the emerging risks with open tools available to people who have fewer skills in reducing risk.

For example, in France the French insurance association (FFA) and the natural risks mission, Mission Risques Naturels - MRN, actively participated in the

design and implementation of the National Strategy to manage flood risk (SNGRI) at the national and regional levels. More specifically, at the national level the mixed flood mission (Mission Mixte Inondation - CMI) assesses and endorses the projects presented by the local authorities tasked with managing subsidies²¹.

Even though the adaptation is a global challenge, it demands local solutions that are coherent in view of the differences in exposure to risk, and must take into consideration the needs of the non-public players such as companies (often the climate change adaptation plans are conceived following a public policy approach that does not sufficiently take into consideration the impacts on the resilience capacity of other organisations, especially the production fabric).

5.3 THE NEED FOR A CONSISTENT REGULATORY FRAMEWORK

One of the most important conditions for implementing a climate change adaptation plan is the existence of a consistent legal and institutional framework. The insurance companies have to find reciprocal interests with the institutional stakeholders. If the economic consequences of the impacts caused by climate changes are limited, a growing exposure to the risk might be turned into a demand for protection from the hazards. Governments have to work with economic players that take this responsibility upon themselves and ask them not only to accept the financial risks, but also to submit long-term proposals, especially for the increasingly frequent and critical extreme climate event adaptation measures. An integrated and comprehensive approach to climate change adaptation is the most powerful tool that can help resolve the adverse selection problems - the heavy impact of insurance products on the people with high loss prospects - and the governments should offer greater incentives to catalyse the reduction of the risk in order to create more resilient communities.

One important action that governments should take is **drafting and regulating stricter building codes based on the risk maps, land use planning, and building requirements to guarantee that the infrastructures meet the appropriate standards with the purpose of reducing the impacts of the catastrophe phenomena. In fact, infrastructure standards are basic tools that help resilience over the long term.**

²¹

<https://insuranceeurope.eu/sites/default/files/attachments/Target%20Two%20Degrees%20examples.pdf#page=7>

The insurance sector could play a specific role, for example by monitoring before drawing up posthumous ten-year policies.

The insurance offer could coordinate on this (for example, for residential and production buildings) with certification: provide for discounts on premiums for buildings that meet certain requirements, offer evolved services together with the insurance coverage that might also include risk reduction interventions.

Lastly, it is necessary to pay special attention to the new ways of sharing living space (co-housing) in order to understand whether these new approaches to managing properties will lead to greater attention paid to risk prevention and management thanks to enhanced awareness “of the common assets”, sharing risks and more attention paid to building maintenance.

Works to establish a **national certificate for buildings** are currently in progress in Austria. In addition to the geographical position of the risk, this document will provide information on how the building resources provide a certain resilience to natural hazards, such as hail, whirlwinds, floods, landslides, etc. In its final version, this certificate will have a function similar to the energy performance certificates already existing for the buildings²².

5.4 PROMOTE AN INCENTIVE SYSTEM FOR COMPANIES

Tax relief from carrying out some risk prevention or management interventions

At a more local level, it is interesting to analyse how insurance companies can shift flows of capital from rebuilding to prevention. **Risk-based premiums and the discounts on the premiums are not the only tools for stimulating companies and citizens to implement interventions to reduce risk.** The insurance companies can also support national governments in **transferring part of the public loans allocated to the reconstruction works to some incentives aimed at promoting prevention and risk management, and hence the resilience capacity of the local communities.**

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<https://insuranceeurope.eu/sites/default/files/attachments/Target%20Two%20Degrees%20examples.pdf#page=7>

It is necessary to reflect on rewarding mechanisms for the SMEs that conduct themselves virtuously, through the rating system or considerable discounts on the premiums (even if the average insurance premiums of the Italian SMEs are reduced and the discounts on the premiums cannot cover the investments that are made to measures for risk prevention and management).

Introduction of rewarding criteria in public tenders and/or public calls for tenders

The European regulatory framework on the subject of public concessions and tenders was renewed in 2014²³. In Italy, these amendments were implemented in Italian Legislative Decree 50/2016. This revision of the European public concession and tender directives favoured the possibility to develop social and environmental aspects in the public procedures for acquiring works, services and supplies. Through their public tender and purchasing procedures, local bodies have at their disposal an effective tool for rewarding virtuous companies that have implemented interventions to reduce climate risk and to adapt to the climate changes as part of a consolidated adaptation plan.

In the same way, public bodies could reward virtuous companies in the area of public calls for tenders.

Beyond favouring the virtuous conduct of companies, socially responsible tenders and public purchasing and public calls for tenders would become a real tool at the disposal of the public body to generate positive impacts on the territory and on the communities through the orientations given to public investments. Nevertheless, this requires a certain change, even cultural, and an ability to innovate inside the public body in drafting its tenders and calls for tenders²⁴.

²³Particularly with Directives no. 2014/24/EU on public tenders, no. 2014/25/EU on tender procedures of supplier bodies in the water, energy, transportation and postal services sectors and no. 2014/23/EU on the awarding of concession contracts.

²⁴ Impronta Etica, Nuova Quasco, ANCPL, *La valorizzazione degli aspetti sociali negli appalti pubblici nel settore delle costruzioni* (The Promotion of Social Aspects in Public Tenders in the Building Sector), 2014

Making access to the capital market easier

SMEs able to identify the ESG risks to which they are exposed - including those tied to climate change - can also be given opportunities by including them as selection criteria for entering PIRs, in this way to help them gain access to the capital market.

6. CONCLUSIONS

6.1 ADAPTATION TO CLIMATE CHANGES: INSURANCE COMPANIES AS RISK MANAGERS - CHALLENGES AND RECOMMENDATIONS

<i>OBSTACLES</i>	<i>RECOMMENDATIONS</i>
Absence of risk culture, particularly SMEs, trade associations and public administrations, which hold back the adoption and spread of risk prevention and management actions	The public bodies can play an active role, for example, through greater involvement of the companies in civil protection drills Safety consultants (Italian Legislative Decree 81/2008 and the certification bodies (ISO 9001 or ISO 14001) can be circulation agents by promoting the adoption of a risk analysis that also comprises climate risks.
Difficulty in drawing up risk maps (unavailability or lack of homogeneity of data, difficulty in analysing dynamic data and in building scenarios, lack of sharing of vulnerability and exposure data between the public sector and insurance companies) that can make even defining the premium difficult (and can place the economic accessibility of the coverage at risk since greater risk is associated with a higher premium).	It is necessary to promote round tables or discussion tables between research bodies (which supply the climate services) and insurance companies to share vulnerability data and analyses.
Difficulty in networking the existing data and knowledge to make them usable	Need to encourage greater exchange between the various players (world of research, public administration and insurance companies)
Difficulty in measuring costs and benefits of resilience interventions (for example, in terms of impacts on the competitiveness of companies)	It is necessary to promote academic research on these themes since they would favour the involvement of the companies on resilience and better highlight the benefits, also in economic terms
Difficulty in reconciling public and private resilience planning: conflicting scheduled interventions and misaligned time frames (short/medium-term vs. long-term)	It is necessary to promote the co-design processes of the public plans by activating consolidated processes that involve private stakeholders

6.2 ADAPTATION TO CLIMATE CHANGES: INSURANCE COMPANIES AS INVESTORS - OBSTACLES AND RECOMMENDATIONS

<i>OBSTACLES</i>	<i>RECOMMENDATIONS</i>
Difficulty in circulating financial products to promote adaptation and resilience to climate changes without sharing definitions and common standards	The work that will be carried out by the European Commission on sustainable finance taxonomy will play a basic role in circulating financial products able to promote adaptation and resilience. It would also further support the introduction of the “ESG-propensity” variable in the profiling of customers required in the IDD.
Difficulty in redirecting loans from mitigation to climate change adaptation	In their role of risk takers, it is advisable for the insurers to promote institutional reflection on resilience costs and timing.