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INSURANCE-LINKED SECURITIES INNOVATION FRAMEWORK FOR COMPLEX AND CLIMATE RISKS FOR AFRICA

By

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I, Anselmi Anselmi Mushy, declare that this thesis and the work presented in it are my own and have been generated by me as the result of my own original research. **Insurance Linked Securities Innovation Framework for Complex and Climate Risks in Africa**.

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Date **12th April, 2023**

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DEDICATION

This thesis is dedicated to the insurance and capital markets in Africa, for the great potential that exist in their synergy.

EXECUTIVE SUMMARY

Globally, protection gap in health, mortality, and disaster is estimated at $1.4 trillion (UNDP, 2021). Climate change is increasing extreme weather events, and Africa is greatly exposed. Drought, flooding, extreme heat and tropical cyclones are all major risks with the consequence that 30 of the world's 40 most climate-vulnerable countries are in sub-Saharan Africa. Only 3% of global climate finance (CPI, 2019) finds its way to Africa to drive mitigation and adaptation. Disaster recovery costs the world's 77 poorest countries an average of $29 billion annually, 3% of which is insured (UNDP, 2021).

Disaster recovery costs the world's 77 poorest countries an average of $29 billion annually, 3% of which is insured (UNDP, 2021). In 2020, 980 disasters caused by natural hazards cost the global economy over US$210 billion (UNDP, 2021). According to UNCTAD, 26 of the world's 40 most climate vulnerable countries are in Sub Saharan Africa. The significance of environmental change to Africa's development ambitions is huge. Baarsch et al (2020) in a recent analysis concluded that the majority of African countries have already experienced average annual losses induced by climate variability of between -15% to -10% in GDP per capita growth over the 1986-2015 period.

There is evident gap in the reinsurance needs in region with regards to mega and complex infrastructure projects (such as ports and harbors development, roads and bridges, hydroelectric dams, railways), agriculture and climate change risks, oil and gas risks, technology change and cybercrimes.

The insurance growth trends in the Africa, SADC and East Africa countries, indicates the need for more capacity to underwrite insurance business. Africa's policymakers encourage insurance protection (Pulse report, 2019). Alongside, supervisors are introducing tighter regulatory regimes, improving the long-term resilience of the continent's insurance markets.

The researcher intended to develop a model that entices all kinds of capital, from insurance experts to hedge funds to financial instrument and commodity traders to institutional traders like pension funds, to invest in and bear reinsurance risk; Broaden the ability to take on difficult-to-price risks, by combining insurance and trading expertise and willingness to take risks, to benefit insurers and intermediaries rather than compete with them; and provide real-time ability to take-on and lay-off risk, from binding as it develops through resolution of reinsured risk, evolving beyond current ILS models. Hence, this study will develop ILS innovation framework for climatic risks in developing economies.

The main objective of this research was to develop a framework that will guide the capital market and insurance players in implementing innovative Insurance Linked Securities (ILS) that will improve the underwriting capacity of the insurance industry for complex and climate change-increasing events.

This study's research strategy was a combination of survey and grounded theory based on the above descriptions and the research's stated exploratory purpose. Generally subjective information was gathered through interviews, with a development by reviews through an appropriate questionnaire and a case study. This study used both qualitative and qualitative data collection techniques. Interviews, questionnaires, and observations were employed. Primary data collection was required due to the lack of prior research on this topic. Suitable questionnaire and iinterview guide with high-level questions and topics to be discussed were created prior to the above-mentioned interviews as seen in appendix 1 and 2. Because of the exploratory idea of this study, the meetings were led in a semi-organized structure. Quantitative analysis involved collecting and analyzing numerical data using statistical methods. Quantitative research helped the researcher to identify patterns and relationships between different variables (Bernard, H. R. 2017). This type of analysis was used in survey questionnaire data collection. Quantitative analysis method used was included descriptive statistics. Qualitative analysis involved analyzing non-numerical data, such as text from open ended questionnaire responses, interviews and observation findings (Johnson, and Onwuegbuzie, 2004). Qualitative research helped the researcher to gain a deep understanding of the experiences, perspectives, and attitudes of individuals involved in the ILS and insurance market in Africa. Qualitative analysis methods include thematic analysis and grounded theory (Creswell and Poth, 2016).

Grounded theory was a valuable qualitative research method that allowed the researcher to develop theories that are grounded in the data, rather than imposed on it. This method led to new insights and understanding of the underwriting capacity in Africa for complex and climate risks which is a complex phenomena and has the potential to generate important findings in a range of research areas. The purpose of grounded theory was to discover new insights, patterns, and relationships that emerged from the data, rather than to test a pre-existing hypothesis (Creswell and Poth, 2016). The method encouraged the researcher to approach the data without preconceived ideas or biases and to analyze it using a systematic, iterative process of coding and categorizing. The grounded theory process involved three main stages: open coding, axial coding, and selective coding (Goulding, 2002). In the open coding stage, the researcher examined the data closely and identified and labeled concepts or categories that emerged. In axial coding, the relationships between categories were analyzed and connections were made between them. Finally, in the selective coding stage, the researcher identified a core category as a central concept that connected all other categories, and developed a theory and explanation based on that core category (Locke, 2001).

This thesis looks at risk as a system (complex risk) which is a set of elements (risk components) connected by relations that affect the purpose of the entities's activities and its financial result.

Risk in recent climate change assessments has been defined as the potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. Many risks to health and property in modern life emerge from the interaction between people and businesses. On the one hand, there are everyday risks such as when a worker has an accident in the workplace or a customer is injured in a store. On the other hand, there are large-scale catastrophes such as bodily injury from toxic chemical exposures or property damage from accidents during energy production. The large-scale events can involve hundreds of thousands or even millions of injured parties, and tens to hundreds of businesses.

The study identifies in chapter 4 complex and climate related risks in Africa employing the Cambridge taxonomy of macro-catastrophe threats framework. Five categories of risks are identified including finance and trade risks; geopolitics and society risks; natural catastrophes and climate risks; technology and space risks; and other risks emerging in the landscape. Individually, the study identifies a number of risks

qualifying as complex risks including agriculture risks, health risks, energy risks, infrastructure breakdown or failure, water crisis, war and civil unrest, natural calamities, systemic sectorial risks such as financial sector, logistics, environmental pollution, climate action failure, extreme weather, cyber crime, food crisis, biodiversity loss, political risks and governance failure, mass unemployment, fiscal crisis, unmanageable inflation/deflation, failure of urban planning, and illicit trade.

Based on the demand-side data available through the FinScope datasets, on chapter 5 the study defined the risk protection gap as the number of individuals who used coping mechanisms other than insurance to manage insurable risks, or who did nothing and therefore could not manage the risk event. Inferencing model used by Cenfri (2020) to establish individual protection gap, the study establish that 32.13% of the population did nothing to manage risks they faced, 1.98% used insurance and 65.898% used other coping mechanisms. At high health per capita cost as per the UN 2022 of $ 129 the Africa health protection gap expand to five (5) times. Africa agriculture risk protection gap stands at $ 48.79bn. Based on Africa GDP estimates by the AfDP of 2022 whereas Africa GDP stood at $ 2.6 trillion and the estimated loss on GDP from climate change of between 5% - 15% the study establishes that Africa climate protection gap is between $ 62billion to $ 322bn. With the insurance gross written premium of $ 68 billion for year 2022, the African insurance market has a significant protection gap which requires new products and business models to cater for this growing gap.

Chapter 6 of distinguishes between risk transfer through alternative carriers as encompassing self-insurance, pools, captives and risk retention groups (RRGs) and risk transfer through alternative products: includes transactions such as integrated multiline products, insurance-linked securities (or CAT bonds as they are commonly referred to), credit securitization, committed capital, weather derivatives, and finite risk products.

The study finds that the global capital market size in year 2021 was $ 256.6 trillion whereas $150.8 trillion was bond capitalization and 105.8 was equity. While reinsurance capital has grown from $ 386 billion in 2006 to $ 527billion in year 2022 a 73% growth; the alternative capital has grown from $ 17 billion in 2006 to $ 94 billion in 2022, a growth ratio of 180.85%.

Chapter 7 demonstrate ILS innovation that instead of simply transferring risk up through a chain of different insurance entities, but essentially keeping it within the insurance market, the major innovation was to transfer risk directly to the capital markets. ILSs are generally thought to have little or no correlation with the wider financial markets, as their value is linked to insurance risks (such as natural disasters, longevity risk and life insurance mortality) but in any case they increase interconnectedness between insurers and investors (via insurance securitisations). These solutions have been developed especially in those economic cycles where traditional reinsurance premiums are very high or coverage is not available.

The study in chapter 8 establishes that regulatory framework for ILS is designed to ensure that investors are protected and that the transactions are conducted in a transparent and fair manner. It is important for issuers and investors to be familiar with the regulatory requirements in their jurisdiction in order to ensure compliance and avoid potential legal or financial consequences. Regulators should develop a new competitive corporate and tax structure for allowing Insurance Linked Securities vehicles to be domiciled in the their jurisdiction. working closely with the Taskforce to understand the ILS market and the structures used in ILS deals. With the right framework, jurisdiction can make a major contribution to the continued growth and development of ILS business. By supporting innovation within a trusted and robust regulatory framework, jurisdiction should be well placed to become a leading market for alternative risk transfer. What

will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles.

Chapter 9 is a case study of Tanzania - Increasing Capitalization of the Re/Insurers in Tanzania Using Insurance Linked Securities (ILS). In Tanzania, the insurance industry has been suffering capacity challenge which has been forcing the insurers to front and reinsure a significant portion of the premium. Opportunities from emerging risks such as oil and gas risks and other specialty risks that our market fails to accommodate cannot be adequately enjoyed at the existing capitalization of the insurers. Circular no.055/2017 on dealing with foreign reinsurers and reinsurance brokers underscored the Local Content policy of the Government of the United Republic of Tanzania as implemented in the insurance industry. at a writing capacity of 3% - 10% of the capitalization. Risks in the emerging areas and solvency condition of the industry indicate a continuous weak position to retain risks internally. Taking the oil and gas sector as an example, the industry has been working on formation of a pool; rough estimates of the pool indicate that utmost the pool will have a capacity to retain about 5% of the risks (disclaimer: there is lack of information regarding exposure and potential pool size at max or min levels). Nigeria took more than 43 years since starting exploration of oil and gas until putting in place a framework that was relevant to their context.

The total market capitalization of 28 companies listed on the DSE is TZS 21 trillion as of 2022. The capitalization of corporate and Government bonds is TZS 7 trillion. Total outstanding amount in Collective Investment Schemes operated by UTT-AMIS is TZS 285 billion. Value of Collective Investment Schemes by Watumishi Housing and Umande is TZS 50 billion. Therefore, total market capitalization in the capital markets sector is TZS 28.3 trillion. The total net worth of the insurance industry with 31 insurance companies in 2016 stood at Tzs. 268.1bn. The Capital Market through ILS offers an opportunity to address deficit retention deficit timely and strategically. If the insurance industry could tap only 1o% of the funds available in the capital market, its capacity will shoot from about Tzs. 66 bn to about Tzs. 2.8 trillion, a 39 times growth.

It is time Tanzania find a solution that works for Tanzania market. Tanzania must initiate a process that will tell us what will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles. The Authorities should work with the insurance industry to help strengthen the sector's contribution to the economy and enhance the Tanzania's position as a financial hub in East and Central Africa. Tanzania should develop a fit-for-purpose regulatory and tax framework for ILS business to enable the industry participates competitively in the alternative risk transfer market.

This study affirms that alternative solutions for the transfer of risks or techniques other than insurance or reinsurance capable of covering the risk of losses have for some time been added to traditional insurance/reinsurance products. According to the estimates of specialised intermediaries, today these solutions, in terms of volume, account for around 15-20% of total reinsurance business, measured in terms of dedicated capital. The development of these products is due to the limited capabilities of the reinsurance market, especially in the most severe downturns, to offer traditional risk mitigation techniques in a market that is increasingly characterized by complex risks such as those arising from natural disasters (earthquakes, floods, etc.) or business interruption, also in light of the changes in weather conditions resulting from climate change. In addition to that, the need for insurance undertakings to reduce the volatility of their solvency position based on Solvency II market consistent principles, has also prompted the search on the reinsurance market for products with a specific or primarily financial content, designed to mitigate both insurance and market risks.

It should be looked into in future studies whether insurance securitization only affects companies that issue insurance-linked securities. Insurance securitization may have had (universal) effects on systemic stability, as previously argued, or it may have increased competition for catastrophe reinsurance, resulting in lower premiums for all insurers (Froot, 2001). quantitative findings of this study should be complemented by more robust qualitative data from subsequent studies. Future studies on insurance securitization may use questionnaires and interviews with insurance and reinsurance companies, potential investors, and fund managers to gather additional primary data for this purpose. In this area, which is relatively new for the insurance market in Africa, a more in-depth qualitative analysis is still essential. This approach is particularly suited to the reasons that insurance and reinsurance companies engage in insurance securitization. Additionally, this method may enable a deeper comprehension of how insurance securitization affects non-listed insurance and reinsurance companies.

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CHAPTER ONE

1 INTRODUCTION

1.1 Background to the study

Insurance is a contract to compensate financial losses suffered (indemnity) by the insured party when probable events (risks) occurs [or payment of benefits for life and medical insurance] for a consideration called premium. Premium as a consideration in the insurance contract does not reflect actual price of a good/service as known is other sales of goods of service due to the fact that insurance is sell of a promise, and thus it is a liability.

Globally, protection gap in health, mortality, and disaster is estimated at $1.4 trillion (UNDP, 2021). Climate change is increasing extreme weather events, and Africa is greatly exposed. Drought, flooding, extreme heat and tropical cyclones are all major risks with the consequence that 30 of the world's 40 most climate-vulnerable countries are in sub-Saharan Africa (Notre Dame Research). Given Africa's high dependence on its natural resources, with agriculture contributing 16% of the continent's GDP and employing roughly 60% of the population, these climate extremes pose a very high risk in the continents' economies and household livelihoods. At the same time, only 3% of global climate finance (CPI, 2019) finds its way to Africa to drive mitigation and adaptation. There is also a large protection gap with a very low percentage of African weather-related losses currently being insured. In Kenya, for example, in the three drought years in 2009, 2010 and 2011, the drought cost the country 11%, 7% and 9% of its entire GDP. Another example is Cyclone Idai which in 2019 affected Mozambique, Malawi and Zimbabwe. Of the $200bn losses, only 7% were covered by insurance (Swiss Re Institute, 2019).

As the frequency and severity of weather events increases, if more is not done to change this situation and increase resilience, then the cost of climate disasters will render sustainable development virtually impossible in Africa. We thus face a major sustainable development crisis for which urgent action is required. The insurance industry has a vital role to play in responding to help drive both mitigation and adaptation. Insurers are underwriters and asset managers of long-term capital and, in both capacities, can meaningfully contribute towards reaching net-zero carbon emissions.

The insurance industry is expert at managing complex long-term risks, and so when it comes to managing the unavoidable long-term consequences of a warming planet, the industry has much to contribute. The starting point in managing risk is understanding it and having the right data

and models to make informed decisions on how to respond. Catastrophe models have been used for many years by insurers to model these types of impacts and price the risk. By incorporating climate risk modelling into these projections, insurers can help businesses and governments make informed decisions on what resilience initiatives to pursue. Insurers play an essential role in facilitating the flow of capital to mitigation projects through providing de-risking solutions to investors.

1.2 Statement of the Problem

Right now, risk is not the problem in insurance industry in Africa, capital is the problem. There's not enough capital to cover the risk domiciled in Africa. Disaster recovery costs the world's 77 poorest countries an average of $29 billion annually, 3% of which is insured (UNDP, 2021). In 2020, 980 disasters caused by natural hazards cost the global economy over US$210 billion (UNDP, 2021). According to UNCTAD, 26 of the world's 40 most climate vulnerable countries are in Sub Saharan Africa. The significance of environmental change to Africa's development ambitions is huge. Baarsch et al (2020) in a recent analysis concluded that the majority of African countries have already experienced average annual losses induced by climate variability of between -15% to -10% in GDP per capita growth over the 1986-2015 period.

There is evident gap in the reinsurance needs in region with regards to mega and complex infrastructure projects (such as ports and harbors development, roads and bridges, hydroelectric dams, railways), agriculture and climate change risks, oil and gas risks, technology change and cybercrimes.

The insurance growth trends in the Africa, SADC and East Africa countries, indicates the need for more capacity to underwrite insurance business. Africa's policymakers encourage insurance protection (Pulse report, 2019). Alongside, supervisors are introducing tighter regulatory regimes, improving the long-term resilience of the continent's insurance markets.

The researcher intended to develop a model that entices all kinds of capital, from insurance experts to hedge funds to financial instrument and commodity traders to institutional traders like pension funds, to invest in and bear reinsurance risk; Broaden the ability to take on difficult-to-price risks, by combining insurance and trading expertise and willingness to take risks, to benefit insurers and intermediaries rather than compete with them; and provide real-time ability to take-on and lay-off risk, from binding as it develops through resolution of reinsured risk, evolving beyond current ILS models. Hence, this study will develop ILS innovation framework for climatic risks in developing economies.

1.3 Research Aims

The main objective of this research was to develop a framework that will guide the capital market and insurance players in implementing innovative Insurance Linked Securities (ILS)

that will improve the underwriting capacity of the insurance industry for complex and climate change-increasing events.

The following specific questions were be enquired upon so as to develop answers to this main issue:

1. Identify complex and climatic risks found in the economic sectors in Africa.
2. Assess the underwriting capacity for complex and climatic risks industry in Africa.
3. Establish underwriting capacity gap for priority complex and climatic risks in Africa.
4. Establish ILS solutions that can be used to cover the underwriting capacity gap.
5. Establish how ILS solutions can be structured to enable strategic insuring of complex and climatic risks in Africa.
6. Establish conducive regulatory requirements for ILS ecosystem to prosper.

1.4 Research Questions

The following specific research questions were addressed by the research:

1. What are the complex and climatic risks found in the economic sectors in Africa?
2. What is the underwriting capacity for complex and climatic risks industry in Africa?
3. What is the underwriting capacity gap for priority complex and climatic risks in Africa?
4. Which ILS solutions can be used to cover the underwriting capacity gap?
5. How can ILS solutions be structured to enable strategic insuring of complex and climatic risks in Africa?
6. What is the conducive regulatory requirements for the ILS ecosystem to prosper?

1.5 Originality and Contribution

In a world of growing and converging risks, developing countries and their communities are often the worst affected and the least able to rebuild and recover. Without financial resilience, the most vulnerable can be locked into a downward spiral of debt and poverty making it difficult to attain the Sustainable Development Goals (SDGs) 2030. Faced with these challenges, insurance and risk-finance products, tools and services can secure our critical infrastructure, protect our agriculture and businesses and preserve critical ecosystems that make life on earth possible.

The factors the had significant influence in the development of ILS includes the limitations of traditional insurance as manifested itself in the form of, inadequate underwriting capacity to cater for large risks, narrow scope of cover and failure to provide wholesome cover for financial risks. Furthermore, in the aftermath of September 11 attacks in the USA twin towers, insurance rates stiffened resulting in the cost of insurance shooting through the roof. This pattern has been repeating itself whenever there is significant risk manifestation such as hurricanes and Covid-19, and Africa underwriters have been enduring the most of the rates and limited capacity available to the insurance industry. The question emerges how will the Africa underwriters cope with this situation sustainably.

Africa has higher risks exposure from developmental mega projects and climate change disasters, but limited capacity to insure them within the insurance market. Governments are not in position to mitigate the impact of these risks timely, usually relying on international community intervention. This calls for a need to find innovative models to increase risk protection capacity within the Continent, which can be deployed timely, efficiently, affordable and sustainable. While ILS have emerged since 1990s in developed world (Cummins, 2008), Africa is yet to see its first ILS product issued. This study will contribute critically in building theory, framework, tools, products and regulatory guide to enable insurance markets in Africa to access capital market capacity so as to increase risk protection capacity arising from complex-mega project and climate change risks.

With the trajectory development of the Continent both for complex projects such as mega hydro-electric dams, oil and gas exploration and extraction, mining, acquisition of wide-body aircrafts, climate change impacts and similar complex risks the insurance underwriters will be forced so seek alternative capital to enhance their underwriting capacity. When insurance underwriters realize they have to embrace Alternative Risk Transfer (ART) techniques in particular Insurance Linked Securities (ILS), it will arouse suspicion and interest alike. Thus it is significant to ascertain the optimal conditions required for this phenomenon to work within the Continent. ILS which on the face of it, is novelty, must be fully appraised, for the guidance of managers, insurance underwriters and regulators amongst others.

1.6 Motivation for this research project

Enthusiasm for this study apart from mastering of the advanced research skills and the honor of a PhD, the gap of empirical knowledge in insurance especially insurance linked securities for complex and climatic risks and scarcity of studies from Africa and ILS withstanding their contribution to the economy pushes me to endeavor this project. Theory developed will guide policy formulation for enhanced capacity of insurance industry for economic growth from ability of insurers to protect climatic risks through insurance linked securities. My background as an academician combined with my experience working in various technical positions in the insurance industry locally and internationally have been added advantages to this project including access to data from various players.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Theoretical and Empirical Literature

According to Cummings J, (2008) risk-linked securities are innovative financing devices that enable insurance risk to be sold in capital markets, raising funds that insurers and reinsurers can use to pay claims arising from mega-catastrophes and other loss events. The most prominent type of risk-linked security is the catastrophic risk (CAT) bond, which is a fully collateralized instrument that pays off on the occurrence of a defined catastrophic event. CAT bonds and other risk-linked securities are potentially quite important because they have the ability to access the capital markets to provide capacity for insurance and reinsurance markets. Industry experts observe that nontraditional risk financing instruments includes cat bonds (including cat bonds "light"), ILWs, collateralized reinsurance, sidecars, embedded value securitizations, XXX /AXXX securitizations, contingent capital, and insurance futures, options, and swaps (Cummins and Weiss, 2009; Wu and Soanes, 2007) dominates the property-casualty (P&C) and life/health- related retrocession market (Ammar et al, 2015). In P&C ILS are used to transfer risk, while in life/health ILS currently serve as financing tools to relieve capital or monetize future cash flows (Swiss Re, 2014; Krutov, 2010). there are rare cases in which correlations could arise, the reason being natural disasters such as severe earthquakes or hurricanes in densely populated areas (especially in developing countries) may increase the rate of mortality through direct casualties and subsequent pandemics.

A broad definition of ILS as financial instruments whose values are driven by insurance loss events. In a narrow sense, ILS need to be "securitized" meaning that (1) a special purpose vehicle (SPV) is created (2) which then issues securities either as pass- through securities (i.e., the investor receives a pro rata share of any cash- flow) or as multi-class collateralized obligations (i.e., different tranches are created). the provision of an insurance cover whereby an insurance policy is solicited, offered, negotiated and contracted online (Arora, 2003).

This study will adopt the definition by (Cummins J, 2008; Cummins & Weiss, 2009) where ILS is defined as transferal of insurance risk to the capital market including but not limited to financial instruments (catastrophe bonds, insurance derivatives, and contingent capital structures) and hybrid financial products (Industry Loss Warranties (ILW), side cars).

Financial innovations have been defined as the process of ongoing change which results in new instruments, techniques, markets, institutions, and mechanisms that influence

the situation of the financial market participants (Blach, Wieczorek-Kosmala and Gorczyńska (2014).

ILS can be divided into two groups based on the type of insurance risk: ILS based on life insurance securitisation and ILS based on non-life insurance securitisation (Weber, 2011, pp. 95-130). However, in the analysis, this paper focuses on the second approach to ILS classification based on the forms of instruments. Regarding the current state and forms of ILS as innovations, at least five broad classes need to be mentioned. There is one group of ILS covering three types of financial instruments: catastrophe bonds (cat bonds), insurance derivatives (including cat and weather derivatives), and contingent capital (CC). However, ILS innovations also include two types of hybrid financial products: ILW and side-cars. ILS in the form of financial instruments closely resemble instruments traded on capital markets. Hybrid financial products incorporate features of both financial instruments and (re)insurance (Cummins & Weiss, 2009, pp. 506-507).

ILS emerged from limited underwriting capacity and liquidity to support increasing and eratic global exposure (for longevity aloneestimated excess of $20tr (Loeys et al., 2007) of the insurance industry and thus the capital markets offers additional capacity and liquidity to the market, leading in turn to more transparent and competitive pricing (Biffis and Blake, 2009).

Innovation in ILS has been studied including such studies as Blach, Wieczorek-Kosmala and Gorczyńska (2014), who broadly researched the application of ILS in non-financial companies. In particular, the purpose of this paper was to provide answers to the crucial questions: (1) What are the potential areas of the use of ILS in non-financial companies? (2) What are the consequences of the use of ILS in non-financial companies? The paper is based on the application of document analysis and literature studies as its main research methods.

Biffis E, and Blake D., (2009) reviewed the main drivers behind the branch of financial innovation that focuses on capital market solutions for managing longevity risk and found that Substantial progress has been made in product design and some key transactions have taken place. However, it this study did not conclude whether insurance linked financial securities and derivatives will provide a valid alternative to the more traditional insurance solutions and offer new capacity for the transfer of longevity risk exposures (Biffis E, and Blake D. 2009).

Sibindi A (2015) in the studyA comparative study of the application of alternative risk transfer methods of insurance in South Africa and Zimbabwe investigated the nature of ART techniques, reasons for insurance companies have or (or have not) in using them, or why they should embrace them, their effectiveness and how they should be transacted. This study analysed the nature and motivation for the use of ART products in Zimbabwe and similarly for South Africa, evaluated their practical efficacy and

determined what a comparative study of these two analyses revealed (Sibindi, 2015). Sibindi (2015) concludes that the Zimbabwean market is at a nascent stage of development, whilst the South African market is fully developed with overall positive prospects for development of ART.

Climatic risks 2017 resulted into 330 separate disasters, which together caused global economic losses of roughly U.S.$353 billion (Artemis, 2017). These events impacted a massive number of people, with Hurricanes Harvey, Irma, and Maria alone estimated to have killed more than 200 people and affected over 6 million (Wallemacq, 2017). Climate change and shifting patterns of development have changed the number and types of vulnerabilities of people and property to a variety of hazards, both natural and technological, that when combined result in disasters (Aon Benfield, 2018, p. 3).

Pasch K. in 2018 examined the integration of financial risk-sharing mechanisms into the disaster politics nexus through new public–private partnerships between insurance and reinsurance firms, international financial institutions, and governments to transfer catastrophic risk to global capital markets (ILS).

2.2 Sectoral review/Landscape Africa Economy, Insurance and Capital Markets

2.2.1 The Economy at A Glance

Global Economy

Recovering from COVID 19, the global economy has been teetering back to normalcy. The global economy is projected to grow 6.0 % in 2021 and 4.9 % in 2022 (IMF, 2021). The World Bank (2021) projects the global economy to grow by 5.6% in 2021 being the strongest post-recession pace in 80 years. PWC (2021) projects the global economy to grow in 2021 by around 5% in market exchange rates - the fastest rate recorded in the 21st century. Both WB (2021) and PWC (2021) reports underscores this resounding global economic growth will be un-even across the regions depending on covid vaccines efforts, monetary and fiscal policies and climate-sensitive infrastructure investments.

Pre pandemic global economic growth were at 3.6 % in 2018 (which was the highest since 2011) and slowed to 2.9 % in 2019 (IMF, 2020).

Africa Economy

Real GDP in Africa is projected to grow by 3.4 % in 2021, after contracting by 2.1 % in 2020 (AfDB, 2021) from the growth rate of 4.0 % in 2019. East Africa's economic growth is expected to recover to an average of 4.1% in 2021, up from 0.4% posted in 2020, according to the African Development Bank's latest economic outlook report for the region. In 2022, average growth is projected to hit 4.9% (AfDB, 2021).

Africa with a GDP of $ 2.6 Trillion in nominal value (2019) has been on the rising. African Continental Free Trade Area (AfCFTA) agreement which is made up of 54 African countries merging into a single market of 1.3 billion people, is not simply a free trade agreement; it is a

vehicle for Africa's economic transformation. This resource, with the merit of enhancing sustainable markets, could create an economic bloc with a combined GDP of $3.4 trillion. Intra-African trade is expected to grow by 33%. In addition, the AfCFTA could generate combined consumer and business spending of $6.7 trillion by 2030, according to the Mo Ibrahim Foundation. Once it is fully implemented, the AfCFTA agreement will be the biggest trade deal in the world, in terms of the number of participating countries, since the establishment of the World Trade Organization in 1994.

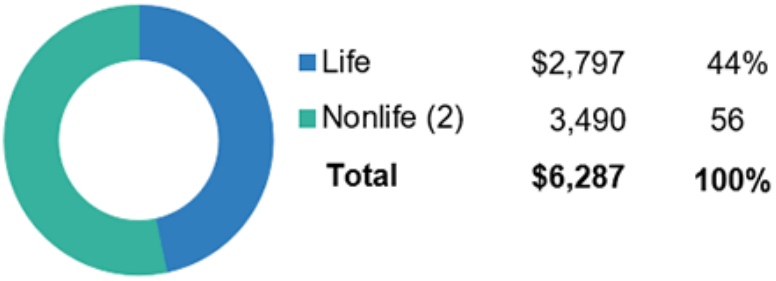
2.3 The insurance sector assessment

2.3.1 Global Insurance in the era of covid 19

Assessment of any business beginning year 2020 must consider the significant impact of Corona Virus Pandemic which halted business across the globe. Thus, our review of insurance business for year 2020 onwards (until the pandemic ends) factor in the impact of Covid 19.

World insurance premiums in 2020, adjusted for inflation reached to $6.287 trillion; with Nonlife premiums reaching $3.490 trillion and Life insurance premiums to $2.797 trillion[1]. World insurance premiums fell 1.3 % in 2020 whereas Nonlife premiums grew 1.5 % in 2020 while Life insurance premiums fell by 4.4%.

Figure 2.1: World Life and Nonlife Insurance Gross Written Premiums, 2020 (US$ billions)



Source: Swiss Re, *sigma*, 3/2021.

2.3.2 Global insurance Industry Pre – Covid 19

Global insurance industry had moderate growth of 4.9 % in 2019 over 2018, a slightly higher level than its Compound Annual Growth Rate (CAGR) from 2010 to 2018 of 3 %. In 2018, global direct premiums surpassed the USD 5 trillion mark for the first time ever, reaching USD 5 193 billion (6.1% of global GDP). In 2017overall global insurance premiums increased by 1.5% in real terms to nearly USD 5 trillion. Global life premiums increased 0.5% to roughly USD 2.7 trillion, while global non-life premiums rose 2.8% to approximately USD 2.2 trillion. Between 2018 and 2019 global insurance premium grew by about $ 1Trillion between 2020 and 2022 the GWP is expected to grow by another $ 1Trillion to a total GWP of $ 7 Trillion and Africa will be the fastest growing insurance market in the world (McKinsey, 2021).

[1] Swiss Re's sigma 3/2021, World insurance: the recovery gains pace is based on direct premium data from 147 countries, adjusted to inflation

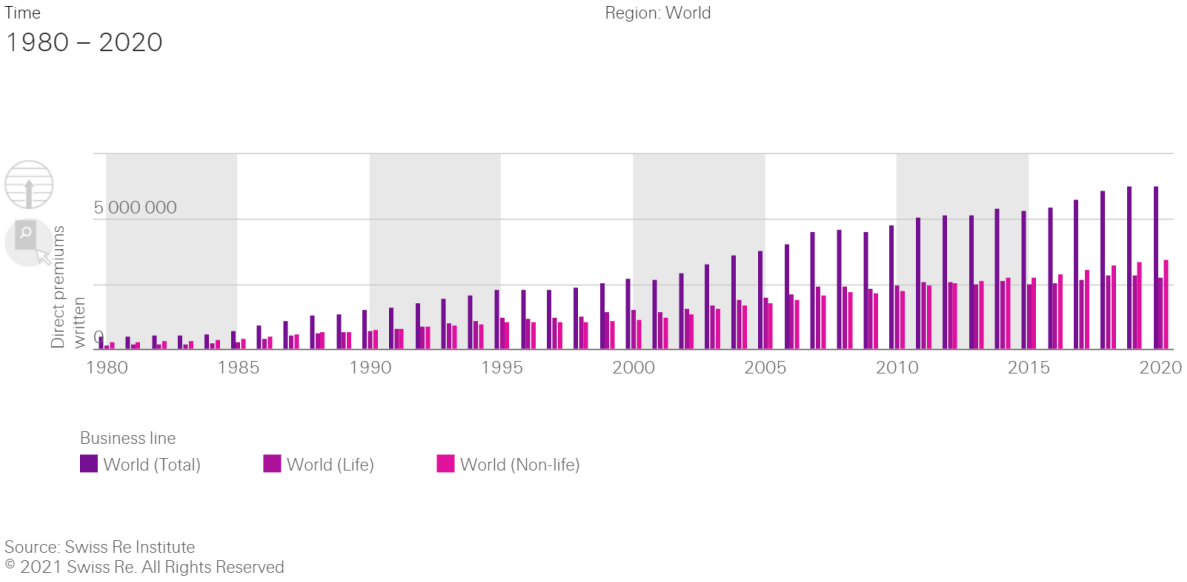
Table 2.1: World Life and Nonlife Insurance Direct Premiums Written, 2018-2020 (US$ millions)

Year	Life	Nonlife	Total
2018	$2,866,868	$3,273,005	$6,139,873
2019	2,889,249	3,396,112	6,284,360
2020	2,797,437	3,489,608	6,287,044

Source: Swiss Re (2021), S*igma* database.

These growth trends of the global insurance industry and its resilience during the Covid 19 crisis are substantiated by various studies including the Swiss Re Institute (2021) which shows that the insurance industry globally has been growing gradually from year 1980 to 2020 as seen below on figure 1.2:

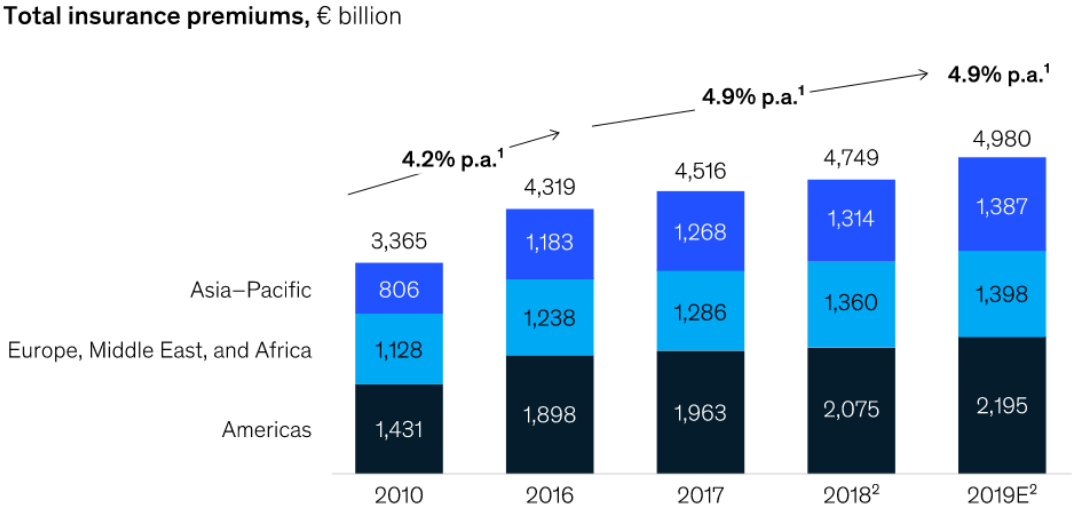
Figure 2.2: Global growth of insurance from year 1980 to 2020



Source: Swiss Re Institute

A study by McKinsey Global Insurance Pools (2020) shows that the global insurance industry has been on a growth trajectory with a growth of 4.9 % in 2019.

Figure 2.3: Global insurance growth rate 2010 – 2019e



2.3.3 Return on Equity in Global Insurance Market

Analysis of OECD Global Insurance Statistics (2021) has the the average ROE for selected countries in 2019 at 17.3% for life insurers, 14.4% for general insurers and 18.4% for composite insurers[2]. Highest ROE are in life insurance with Russia 52.3%, Argentina 49.3% and Turkey 42.4%. Composite insurers come in as a secondary ranked high ROE with Argentina at 35.1% general insurers highest ROE was at 26.2% in Sweden.

2.3.4 Developing and emerging issues

Covid 19

The insurance industry has demonstrated resilience with mild growth amid pandemic, whereas it remains well capitalized with the top 20 global reinsurers with capital adequacy rated "AA" confidence level raised close to $10 billion in capital in 2020, some of it to prefund upcoming maturities, and the rest is incremental capital (S&P Ratings, 2021).

IFRS 17

Introduction of IFRS 17 eliminated significant accounting mismatches for primary insurers that would have created systemic risks in the sector. Despite the benefits, the transition to IFRS 17, including the adoption of new metrics, is a major challenge for insurance sector and users of their financial reporting. Effect of capital structure and solvency in short term from implementation of IFRS 17 is outweighed by the benefits of the IFRS 17.

[2] Composite insurers – transacting both life and general insurance

2.3.5 Global Insurance Outlook for 2021-2023

Following a drop of 2.9 % in real growth in 2020, Swiss Re estimates total global insurance premiums will rise 3.4 % in real terms in 2021 and 3.3 % in 2022 and 3.1 % in 2023. Slower economic growth in 2022 and 2023 is expected as a result of global supply chain issues, labor shortages and high energy prices. These factors will increase inflation in the near term. Global life premiums are estimated to grow 3.5 % in 2021 and 2.8 % from 2022 to 2023. Nonlife premiums are estimated to grow 3.3 % in 2021 and 3.5 %, 2022 to 2023, driven by rate hardening in commercial lines. Swiss Re expects global insurance premiums to exceed $7 trillion by mid-2022.

Global insurance demand will grow by an above-trend 3.3% in 2021 and 3.9% in 2022, Sigma forecast, a much faster rebound than from the global financial crisis (GFC) of 2008–09. The economic recovery and the strongest rate hardening for 20 years in non-life insurance commercial lines will push premiums 10% above pre-COVID-19-crisis levels this year and lift the global insurance market to more than USD 7 trillion by the end of 2022.

2.4 Insurance Trends in Africa

The African insurance industry currently holds a valuation of $68 billion as measured by gross written premiums. In 2017, Africa premium grew by 12% in $ terms to $ 66.6billion making Africa real premium growth second fastest in the world next to Asia (Africa Insurance Barometer, 2019). The total insurance penetration rate in Africa was just 2.98% in 2018, indicating the immense potential for the market to expand amid growing financial entrepreneurship and cross-sectoral projects across the continent. In 2018, the steepest growth of premiums occurred in the East Africa region at 4.9%, followed by North Africa, while the largest insurance market in South Africa experienced weak growth.

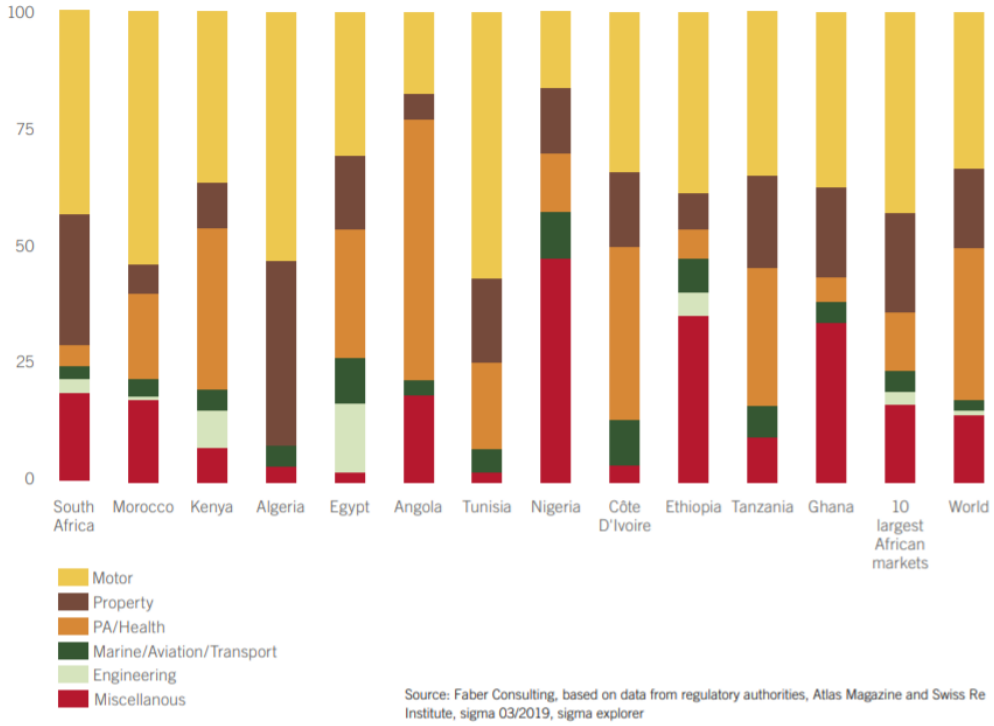
Landscape of Microinsurance in Africa report in the same year of 2018 reported that in the year in 2017 total of 15million lives covered which is about 2% of the estimated 700million people in the low-income bracket in the Continent out of the population of 1.3 billion. A total of $ 420million in GPW representing less than 1% of overall GPW in Africa was from Microinsurance. Similar study in 2014 reported 61.2million lives covered and $ 756m in GPW from Microinsurance, meaning less premium from the inclusive market segment while overall GWP continued to grow.

Countries like Namibia, Zambia, Ghana, Nigeria, and Tanzania have become new targets for insurance companies hoping to serve growing markets, particularly infrastructure development and industrialization processes that require insurance contracts to mitigate risk for investors and those with limited recovery capital. Changing climates and shifting patterns of development are increasing risk to private investors, and insurance companies are poised to capitalize on the opportunities growing on the African continent. Africa’s total insurance premium volume increased from US$ 59.4 billion in 2016 to US$ 68.15 billion in 2019.

The pandemic has accelerated the shift toward digitalization key for distribution. The rising demand for digital insurance products and solutions has been met by insurance technology innovations, startups, and mobile apps. These platforms aim to simplify, digitalize, and expand the insurance industry to penetrate deeper into the African market.

McKinsey (2021) forecasts that, after the pandemic, consumers will utilize in-person and direct communication channels—such as physical visits to bank branches and phone calls or video chats with bankers—less frequently a positive development in accelerating insurance distribution in Africa.

Figure 2.4: Non-life business lines split in leading markets in Africa 2018/2019



Outlook of the African insurance market

Currently the second fastest-growing insurance market in the world, trailing behind Latin America, the African insurance market was expected to grow, prior to the COVID-19 pandemic, at 7 % per annum from 2020 to 2025. Looking forward, IMARC Group expects the market to grow at a Compound Annual Growth Rate (CAGR) of around 7% during 2021-2026.[3] This projection placed the African insurance market's growth at approximately twice the rate of North America, more than three times the rate of Europe, and slightly higher than Asia's 6 % growth rate.

Four strategic considerations that may help insurance companies navigate their journey in Africa's insurance market:

[3] Africa Insurance Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026 ID: 5401525 Report August 2021 Region: Africa 109 Pages IMARC Group

1. Target unique customer segments and needs, while leveraging the power of partnerships.
2. Focus on digital and digital enablement of the agent to increase reach and productivity.
3. Collaborate with governments and regulatory bodies to help shape and reform the agenda.
4. Build capabilities to unleash Africa's talent.

Despite economic pressure and uncertainty, Africa's insurance industry's growth remains solid.

Table 2.3: Summary of opportunities and risk in the insurance business in Africa

OPPORTUNITIES	RISKS
Growing middle class	The COVID-19 Pandemic (increases likelihood for a global recession)
The African Continental Free Trade Agreement	Global Trade Tensions
Declining growth in advanced economies (can increase FDI inflows to Africa)	Declining Commodity Prices
Increasing urbanization	Mounting Debt in some Countries
Population growth	Security
New technologies (Digitalization and Fourth Industrial Revolution)	Policy uncertainty
The COVID-19 pandemic (Potential Higher demand for insurance)	Low Interest rates

Source: Author using data from Schanz, Alms Company, (2019) Africa Reinsurance Pulse 2019; Swiss Re institute (2020) World insurance: Regional review 2019, and Ernest & Young (2016) Waves of Change Revisited: Insurance opportunities in Sub-Saharan Africa.

2.5 Empirical Context and Theoretical framework

The theoretical and empirical context of this study is built on strategy and service innovation. Strategic management and organization theory suggest that organizational performance is a result of coherence between two or more factors such as strategy, structure and technology(Burns and Stalken, 1961 in Raymond and Bergeron, 2008). Since strategy synchronizes organization with its environment, it thus must guide organization's dynamism towards change (innovation and creativity). Services innovation is considered to be a more extensive construct than service development, involving either its (service) creation, re-design, re-arrangement or re- structuring (Schumpeter 1934, Sundbo 2001, Menor et al. 2002; Berry & Lampo 2002). Service innovation has different classes as argued by Carman & Langeard (1980), Johnson et al. (2000) and Fitzsimmons & Fitzsimmons (2006). The conceptual focus of this study is constructed on the service innovation development and design business strategy for a market segment. Thus, the research

model for this study fuses that of Sundbo (2001) and Berry & Lampo (2002) in Ahonen and Jarvinen (2005) and makes some changes to accommodate the unique needs of the study.

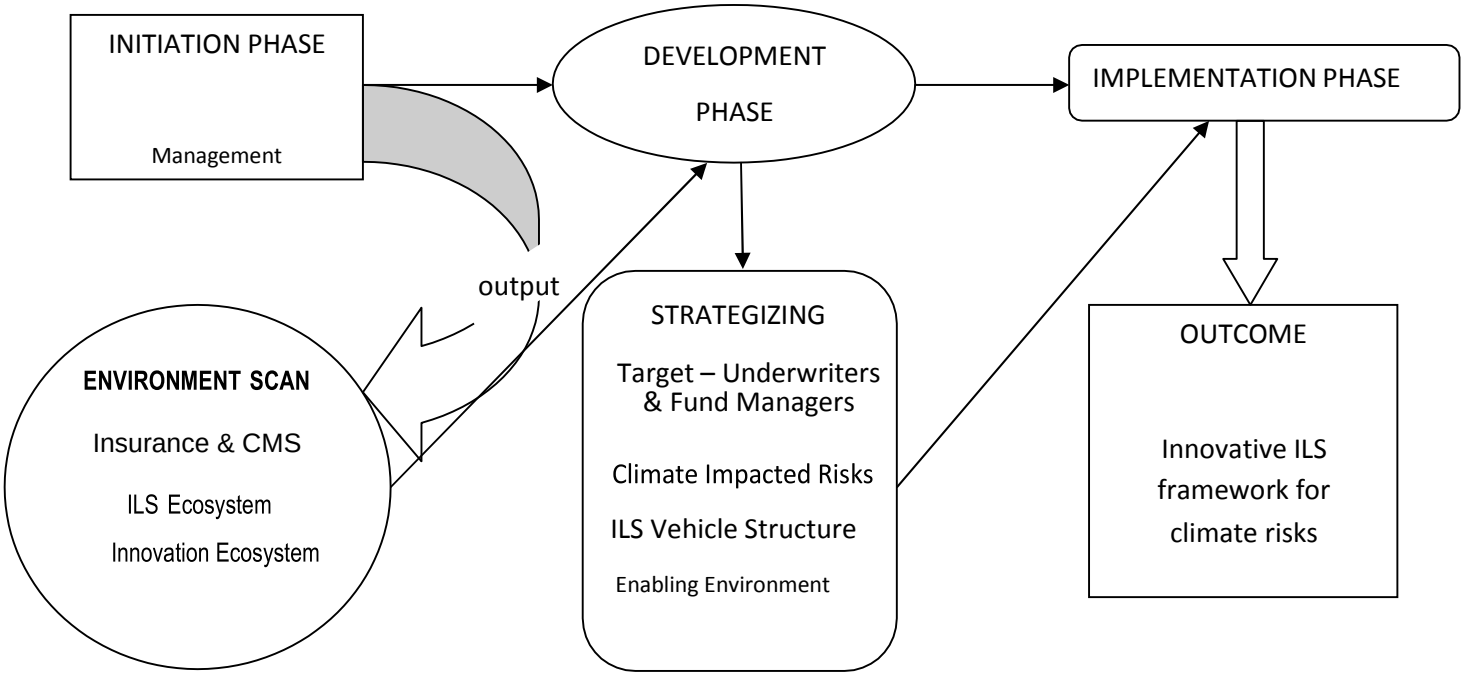


Figure 2.5: Research Model of the study

This research model can be used for services sector to guide innovation and framework for ILS climate solutions for insurance sector but as cautioned by Ahonen and Jarvinen (2005) the conventional nature of insurance is a challenge to be contrasted with other innovative-flexible sectors like banking and telecommunication.

CHAPTER THREE

3 RESEARCH METHODOLOGY

3.1 Overview

Due to the subject's focus, complexity, and interconnectedness of variables, an interpretive- qualitative methodology was used to search for patterns (Aodheen et al., 1999), and to comprehend rather than quantify things (Gordon and Langmaid, 1988). This method was more appropriate for comprehending the ILS (Gilmore et al., 2001).

This study examined the Insurance Linked Securities innovation framework for complex and climate risks in Africa through a survey of selected insurance market and capital market players, using strategy triangulation to ensure quality due to its nature.

Semi-structured in-depth interviews with three managers closely involved in the development of reinsurance solutions in insurance companies and fund managers in the capital market served as the source of the empirical data. A CFO, reinsurance manager, and the CEO or COO were all involved in this. As part of the study, ILS specialists from all over the world were consulted to provide insights. To avoid issues associated with research with a single respondent, this triumvirate served as the unit of analysis. An interview guide was created so that McCracken's "grand tour" style of nondirective and floating prompt questions could be used in an uninterrupted, in-depth discussion (1988). The brainstorming session was conducted through focus group discussion. To collect data, digital tools like zoom, WhatsApp, and emails were used.

In order to make it possible to conduct qualitative analysis, the data were organized into statements and concepts based on the recurring themes that would emerge from the data. Specific quotes to support the formulation of the theory were produced through further refinement (Gordon, 1999). Strauss and Corbin's (1998) coding strategies were combined in this process. The innovative matrix (Ahonen & Järvinen, 2005) and the ILS framework (Cummins, 2008) were utilized in order to avoid duplication of efforts and gain access to relevant ILS research. A panel of ILS researchers, regulators, and practitioners reviewed the variables to determine their validity and reliability.

3.2 Research Design

Theme and fundamental inquiry

The focal subject of this examination was Insurance Linked Securities Innovation Framework for Complex and Climate Risks for Africa.

The principal research question was: How can insurance-linked securities improve Africa's capacity to underwrite complex and climate risks?

Secondary questions and propositions

This thesis investigated the following lines of inqury:

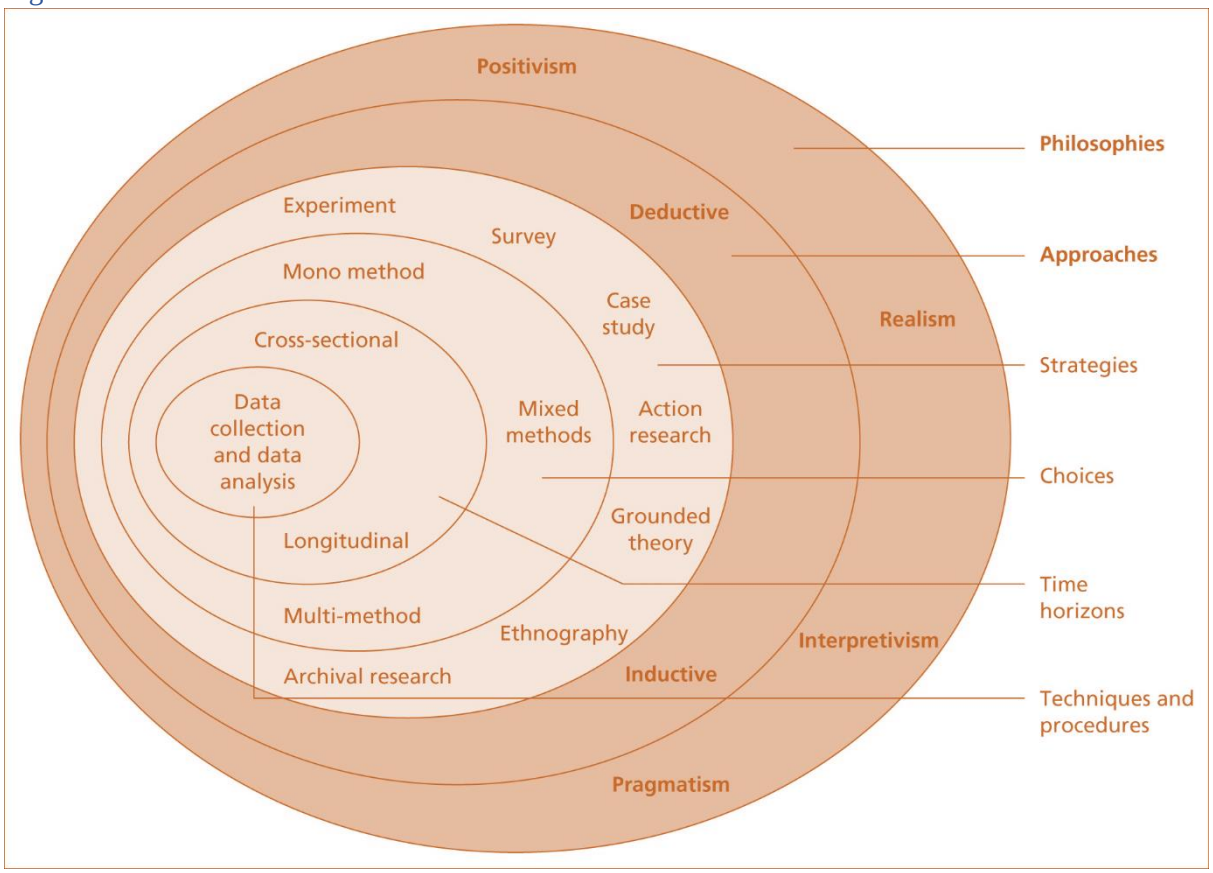
1. What are the complex and climatic risks found in the economic sectors in Africa?
2. What is the underwriting capacity for complex and climatic risks industry in Africa?
3. What is the underwriting capacity gap for priority complex and climatic risks in Africa?

4. Which ILS solutions can be used to cover the underwriting capacity gap?
5. How can ILS solutions be structured to enable strategic insuring of complex and climatic risks in Africa?
6. What is the conducive regulatory requirements for the ILS ecosystem to prosper?

The research design and methodology for this study are described in this chapter. This thesis acknowledges that there is a significant body of research methodology and methods literature available, each with its own distinct structure. The design of a research project is based on how the research questions will be answered (Robson, 2002), which in turn is determined by the research philosophy chosen. According to Saunders et al. (2007), the research design must include the research purpose, research strategy, and research methods. These three sections are addressed below.

Moreover, as Greener (2008) calls attention to a portion of the terms, like exploration strategy and techniques, are utilized conversely. The structural approach suggested by Saunders et al. (1997), who advocate the use of the "research onion" for a discussion of scientific research in business, is adopted in this thesis.

Figure 3.1: Research onion



Source: Saunders, Lewis, and Thornhill (2007)

3.3 Research philosophy

Research philosophy is about the nature and process of knowledge creation. The research strategy and methods used will be influenced by the research philosophy (Saunders et al., 2007). Researchers are

better able to support various research strategies if they comprehend the various philosophies (Dobson, 2002).

According to Saunders et al. (2007), a researcher investigating behavioral or attitudinal issues is more likely to have a different perspective on how research should be carried out than a researcher investigating factual information. The following are the three main strands of research philosophy:

Epistemology:

According to Saunders et al. (2007), epistemology is concerned with what research-appropriate knowledge is, while Burrell and Morgan (1979, p. 1) emphasize that it is about how knowledge is acquired and "how one might begin to understand the world and communicate this as knowledge to fellow humans." According to Erikson and Kovalainen (2008, p. 14), epistemology is concerned not only with the inquiry of "what is knowledge and what are the sources and limits of knowledge," but also with the process by which knowledge can be produced and defended. According to Greener (2008, p. 34), epistemology ought to provide responses to the following three fundamental inquiries:

• "How far can we tell if something is true?"

• Does a phenomenon, such as workplace gender discrimination, have an objective existence, or does it only exist in the minds of those who talk about it?

• Can we look into it directly, or do we have to rely on what people say about it to figure out what it means?'

According to Saunders et al. (2007), positivism, interpretivism, and realism are the three main epistemological strands. Interpretivism examines existing phenomena and attempts to explain them, whereas positivism is more closely associated with natural science and focuses primarily on empirical testing (Greener, 2008). In contrast, realism acknowledges that "a reality quite independent of the human mind" exists (Saunders et al., 2007, p. 104). Realists try to figure out the structures and mechanisms that drive observed activities (Dobson, 2002). A realist position, according to Bhaskar (2011, p. 10), is a "theory about the nature of the being." According to Blaikie (1993), realism studies phenomena but acknowledges that reality may exist regardless of what is being studied or observed.

Positivistic research, as previously mentioned, is closely related to natural science, and researchers typically work with an "observable social reality and that the end product of such research can be law-like generalisations [...]." In addition, the researcher is regarded as an "objective analyst and interpreter of tangible social reality" (Remenyi et al., 1998, p. 32). (Remenyi et al., 1998, p. 33) Using a positivistic research approach also means that hypotheses will probably be made based on theories that already exist. According to Saunders et al. (2007), these hypotheses serve as the foundation for gathering data that can be utilized for hypothesis testing in the future. Gill and Johnson (2002) assert that positivist research is likely to favor a highly structured research methodology to facilitate replication. According to Saunders et al. (2007), statistical analysis receives less attention as a result of the emphasis on quantifiable observations.

On the other hand, interpretivism tries to explain the differences between human beings as social objects. It is argued that interpretivism is better suited for research related to business or management (Saunders et al., 2007). A positivist approach seeks to achieve this goal by drawing general conclusions from the research findings because business processes are typically unique and complex by nature. Although empirical data could be collected for the purpose of this thesis, they would not necessarily reflect reality. It is also possible to argue that insurance-linked securities and complex climate risks are intangible phenomena that cannot be observed as easily as a manufacturing process. Since business processes are

always changing, an interpretivist approach might be better because it focuses on explaining phenomena rather than testing hypotheses.

Realism is parted into two strands: a critical and direct realism. Direct realism asserts that what you see is what you get, or that each person's perception of the world is accurate. On the other hand, critical realism recognizes that one's own perceptions may differ from reality. Saunders et al (2007) contend that as business research is inside the climate in which business exercises are being led, basic pragmatist epistemology could the most fitting strand. According to Bhaksar (2011), the phenomena being studied are only a subset of a larger social structure that must be comprehended.

Considerations from an ontological perspective

Ontology is concerned with the fundamental nature of reality and the topic under investigation. Therefore, social scientists will need to determine whether the subject matter under investigation is the result of an individual's self-determined behavior or of external pressure on employees in an organization (Burrell and Morgan, 1979). According to Chapter 3's definition of complex and climate risks, they can have varying degrees of subjectivity due to their relative severity and frequency, nature, and project size. In a similar vein, according to Kunreuther (1995), ILS is influenced by individuals' prior experiences and partially depends on the risk aversion or risk appetite of the individual who must make an (underwriting) decision.

Axiology:

Axiology is worried about decisions made as a feature of the examination. According to Saunders et al. (2007), the selection of the research topic is a value statement in and of itself, and additional statements will be required throughout the research. Given the study's subjective nature, an interpretivistic approach makes it easier to conduct research that is more value-based. Because research results can be interpreted through objective data (such as those from experiments) rather than through a subjective judgment of, for instance, the content of interviews, a positivistic approach is thought to be less biased. A phenomenological approach is more appropriate for this study because it focuses on the development of ILS solutions by those involved in the underwriting process. Innovation is by its very nature highly subjective, and both the researcher and the people who are participating in the research (such as underwriters, insurance brokers, and corporate buyers) will have different perspectives on the complex and climate-related risks, how ILS can be used to underwrite these risks, and how these two ideas can lead to innovation. As a result, no value-free research can be conducted on this topic.

3.4 Research paradigm

Research paradigm "stands for the entire constellation of beliefs, values, techniques, and so on [...]," according to Kuhn (1996, p. 175). According to Burrell and Morgan (1979, p. 23), paradigms are "the social theorists who operate within them's frame of reference, mode of theorizing, and modus operandi." According to Saunders et al. (2007, p. 112), the numerous definitions of the term "paradigm" make it "frequently used in social science, but one which can lead to confusion." Worldview is an approach to inspecting social peculiarities from which specific understandings of these peculiarities can be acquired and clarifications endeavored.' How ILS can be used to cover climate-related and complex risks in Africa will be the subject of our investigation. Although previous research has examined the use of ILS to insure climatic risks, such as through catastrophic bonds (CAT-BONDS), it has not examined how ILS can insure climatic and complex risks in Africa. Consequently, the specificities of these peculiarities should be additionally investigated, so a superior comprehension can be acquired.

According to Burrell and Morgan (1979), these four paradigms should make it easier for researchers to understand their assumptions about the nature of science, provide a better understanding of how researchers approach research, and provide a path for researchers to follow throughout the research

process. Burrell and Morgan (1979) introduced four additional conceptual dimensions in addition to these four research paradigms:

• A radical shift;

• Control;

• Subjectivist; and

• An Objectivist.

Ontological concepts, such as interpretivist (phenomenological) or positivistic philosophy, are referred to by these two terms. The term "radical change" implies that the researcher would make proposals to alter business or management practices and is critical of the way things are organized. The dimension is willing to accept the current framework, but it would make suggestions for enhancing the situation within this framework.

The radical humanist is associated with the radical change and subjectivist dimensions of the aforementioned paradigms, i.e., with a phenomenological approach that takes a critical view of how organizations operate and makes proposals to alter the existing framework. The radical structuralist paradigm, on the other hand, adheres to an objectivist philosophy. Instead of studying social phenomena, the researcher would focus on organizational structure, such as reporting lines or hierarchies, by observing what takes place within an organization.

The functionalist paradigm likewise follows an objectivist reasoning by looking for normal clarifications for issues happening in a business climate while likewise recommending enhancements to the hierarchical design (Saunders et al, 2007). This is the paradigm that is most commonly used in research on business and management, according to Burrell and Morgan (1979), and Saunders et al. (2007, p. 113) contend that a functionalist paradigm is appropriate because "organizations are rational entities, in which rational explanations offer solutions to rational problems."

An interpretive paradigm tries to figure out what's going on, as the name suggests. This paradigm aims to "understand the world as it is, to understand the fundamental nature of the social world [...]," according to Burrell and Morgan (1979, p. 28). Additionally, it views "the social world as an emergent social process created by the individuals involved"(Burrell and Morgan, 1979, page 28). For this thesis, a functionalist or interpretive paradigm could be considered. A functionalist paradigm, as previously stated, looks for rational explanations that can lead to practical solutions to a problem. An interpretive paradigm aims to comprehend how people act in a particular social or environmental setting.

3.5 Research approach

Saunders et al. (2007) distinguish between the deduction and induction methods of research. According to Adam and Healy (2000), research in natural science typically employs a deductive method, whereas business research typically employs an inductive method. In addition, the positivistic research philosophy is more closely associated with the deductive approach than the phenomenological philosophy is with the inductive approach. Greener (2008) also notes that while the inductive approach is associated with qualitative research, the deductive approach is associated with quantitative research. The following is a summary of the differences between deductive and inductive research methods provided by Saunders et al. (2007):

Table 3.1: Major differences in research

Deductive research	*Inductive research*
▪ Scientific principles ▪ Moving from theory to data ▪ The need to explain causal relationships between variables ▪ The collection of quantitative data ▪ The application of controls to ensure validity of data ▪ The operationalization of concepts to ensure clarity of definition	▪ Gaining an understanding of the meanings human attach to events ▪ A close understanding of the research context ▪ The collection of qualitative data ▪ A more flexible structure to permit changes of research emphasis as the research progresses
▪ A highly structured approach ▪ Researcher independence of what is being researched ▪ The necessity to select samples of sufficient size in order to generalize ▪ Conclusions	▪ A realization that the researcher is part of the research process less concerned with the need to generalize

Source: Saunders et al, 2007

According to Hallebone and Priest (2009), inductive research aims to comprehend what is happening, whereas deductive research aims to test a hypothesis through the collection of data. According to Ng and Hase (2008), a theory emerges from data, not a hypothesis tested through data. Additionally, whereas an inductive method requires data to be analyzed after all data have been collected, the latter research approach permits data analysis concurrently (after interviews have been conducted). According to Collis and Hussey (2009), this method of research assumes that the goal is actually the discovery of theories and that reality is independent of the research.

Positive research, on the other hand, has been criticized for being too detached from the subjects under investigation. There obviously is a contention that it is challenging to figure out individuals without grasping their discernments and intentions (Collis and Hussey, 2009). In addition, attempting to assign a statistical value might not accurately reflect complex phenomena like ILS structuring or underwriting decision-making. Positivism has the advantage of facilitating comparison and statistical analysis by allowing for the collection of a larger set of data through pre-determined questions (Patton, 1990). Phenomenological research, on the other hand, enables in-depth investigation of phenomena, but it is important to note that the two are not mutually exclusive. According to Adam and Healy (2000), the appropriateness and suitability of the research question should be taken into consideration.

A deductive research approach normaly conveys more solid outcomes through the information gathered, dependent upon a proper sample size which intends that there would be no significant distinction in results assuming the review was reworked (Collis and Hussey, 2009). On the other hand, qualitative data can be interpreted, but it reflects the phenomenon being studied, giving it more credibility (Collis and Hussey, 2009). Despite this, Greener (2008) points out that while qualitative research is widely used in social science, quantitative research is frequently associated with empirical testing. According to Saunders et al. (1997), a research strategy should be selected not only based on its ability to answer the research questions, but also on the resources and time available.

3.6 Research approach employed for this study

To comprehend how ILS can creatively guarantee complicated and climatic risks in Africa, the principal objective of this paper, requires a superior comprehension of the endorsing limit existing and how capital business sectors within the Continent could complement. As a result, it may be challenging to implement a deductive method with a large sample size. As a consequence of this, the purpose of this investigation was not to put any particular hypotheses to the test; rather, it is to employ an inductive and phenomenological method in order to acquire a deeper comprehension of how ILS-enhanced capital markets can increase Africa's underwriting capacity for climate-related and complex risks.

3.7 Research purpose

Saunders et al (2007) connect the examination reason to the exploration questions created which would bring about either unmistakable, illustrative or exploratory investigations. The goal of descriptive research is to "portray an accurate profile of persons, events, or situations" (Robson, 2002, p. 59), but the conclusions drawn from the collected data are ignored. According to Saunders et al. (2007), the goal of explanation studies is to establish causal links between variables through empirical testing. As a result, explanation studies are more closely associated with a deductive research methodology. On the other hand, the purpose of exploratory research is to investigate "what is happening; to seek new perspectives; to get clarification on some things and to evaluate peculiarities in another light' (Robson, 2002, p 59). It is especially useful when the goal of the research is to comprehend a problem, especially when the nature of the problem is unclear. However, this kind of research necessitates greater adaptability because new information may necessitate altering the course of the study (Saunders et al., 2007). In order to gain a deeper comprehension of the roles that ILS and capital markets play in expanding Africa's underwriting capacity for climate-related and complex risks, an exploratory research methodology has been used for this thesis.

3.8 Research strategy

Research strategy is in some cases named research philosophy as it manages the comprehension of exploration (Greener, 2008). The research questions and objectives, in addition to existing knowledge and research philosophy, served as guides for the selection of the research strategy. In any case, Saunders et al (2007) likewise bring up that there is no set in stone methodology and it is very conceivable to join different procedures, for example, an overview and a contextual analysis in any event, for a phenomenological research approach. Greener (2008) additionally takes note of that it is progressively normal for business exploration to blend research strategies. Remenyi et al. (1998) emphasize that the researcher's skills should also play a role in selecting a research strategy, and identify the following as appropriate for business research:

- Experiment
- Case study
- Action research
- Ethnography
- Archival research
- Grounded Theory
- Survey

3.8.1 Experiment

Experiment is a classical type of research that is more closely associated with natural science, but it is also a common research strategy in psychology. The design is to lay out causal connections among factors and whether any progressions in a single variable affects another variable (Hakim, 2000). Saunders et al. (2007) acknowledge that due to the nature of the research questions and the subject matter, business research experiments are uncommon. The sample size is also a problem because obtaining a sufficient number of participants can be difficult and expensive (Hakim, 2000).

3.8.2 Case study

A case study examines a single or multiple phenomena "Within its real life context using multiple sources of evidence," This is different from a survey (see below) because only a limited amount of data can be collected.

3.8.3 Action research

As the name suggests, action research is a combination of research and action in which the researcher collaborates with practitioners to solve problems while working on a specific problem (such as in an organizational setting). According to Coghlan and Brannick (2005), this means that the researcher becomes a part of the organization.

3.8.4 Ethnography

Ethnography involves immersing the researcher in the environment being studied, engaging in activities, and simultaneously observing what takes place. According to Saunders et al. (2007), this is uncommon in business research because it can take a lot of time. Due to the fact that it involves the analysis of historical records and documents, archival research is not appropriate for this study.

3.8.5 Grounded Hypothesis

This research strategy is discussed in more detail as it is viewed as generally proper for this exposition. According to Bryant and Charmaz (2011), Grounded Theory is the qualitative research strategy that is utilized the most frequently. It is regularly connected with inductive examination approach (Saunders et al, 2007); a point that Locke (2001), who views the discovery aspect of research without the construction of a priori hypotheses as a distinctive feature, also emphasizes. Goulding (2002) thinks about this exploration technique as extremely helpful for business research where social issues assume a part and Locke (2001) concurs with this by adding that Grounded Hypothesis is especially valuable in administration and hierarchical examinations which worry, for instance, navigation. Grounded Hypothesis includes the arrangement of an underlying hypothetical system by which information assortment prompts speculations which are then tried in additional perceptions. According to Glaser (2001, p. 5), "Grounded Theory does not generate findings:" Glaser is keen to emphasize this point. It generates hypotheses regarding how to explain the behavior that it was derived from.' This research strategy's bridging function between theory and practice is seen by Locke (2001) as a further positive argument. This examination system comprises of an iterative cycle beginning with a basic writing survey prompting a refinement of the exploration questions. The benefit is that information assortment can begin quickly as a component of this iterative cycle (Glaser, 2001). However, Locke (2001) thinks that this could be a problem because the overlapping process of collecting data and analyzing it could slow down the entire research.

3.8.6 Surveys

Because they permit the collection of a large amount of data at a relatively low cost, surveys are frequently utilized in quantitative research. When conducting surveys online, this becomes even more evident. In any case, Saunders et al (2007) bring up that there is a viable breaking point to the quantity of inquiries that can be posed to through a study to try not to strain the generosity of members.

3.9 RESEARCH STRATEGY ADOPTED FOR THIS STUDY

This study's research strategy was a combination of survey and grounded theory based on the above descriptions and the research's stated exploratory purpose. Generally subjective information was gathered through interviews, with a development by reviews through an appropriate questionnaire and a case study.

According to Harris and Brown (2010), results are frequently confirmed using a combination of quantitative and qualitative mixed methods like questionnaires and semi-structured interviews. However, this thesis proposed to begin with semi-structured interviews followed by surveys, whereas Harris and Brown (2010) only examined the sequence of questionnaires (surveys) followed by semi-structured interviews. Despite this, the benefit of employing mixed methods is that various research approaches "may complement each other, overcoming weaknesses in individual methods" (Harris and Brown, 2010, p 12).

"A false dichotomy exists between quantitative and qualitative research," according to Onwuegbuzie and Leech (2005, page 7). Additionally, research validity can be improved and bias reduced by employing mixed methods. According to Bryman (2006, p. 97), "quantitative and qualitative research has become increasingly common in recent years." Research using a combination of methods can yield a wealth of data that the researcher might not have discovered using just one approach.

There are two reasons for a combination of a grounded theory (via interviews), with subsequent surveys:

a) To test whether a wider population of ILS experts and underwriters in Africa in a more shares the patterns emerging through semi-structured interviews structured manner;

b) To possibly get around a drawback of semi-structured interviews, which is the difficulty of finding enough ILS experts who are willing to be interviewed.

3.10 Sample selection and data collection

Selection of sample and data collection In academic research, it is rarely possible to collect data from an entire population (such as all ILS experts and insurance players operating in the Africa market). This is due to time constraints and difficulties in accessing information. Instead, a decision regarding a representative sample from this population is required. According to Saunders et al. (2007), probability or representative sampling and non-probability sampling are the two main subsets of sampling methods. Non-probability sampling is frequently used in qualitative research, whereas probability sampling is more commonly associated with quantitative research (Greener, 2008). According to Saunders et al. (2007), the primary purpose of probability sampling is to draw conclusions about a population from the sample, so the sample should be representative of the entire population.

Non-probability sampling is deemed to be more appropriate and practical given the exploratory nature of this study. According to Greener (2008), the goal of qualitative research is not to draw conclusions about the population from a sample but rather to comprehend the data and construct theories from it.

Accordingly, even one meeting may be adequate. The researcher's level of confidence in the results' validity is crucial (Greener, 2008). In addition, Saunders et al. (2007) point out that probability sampling might not be appropriate for answering the research questions in business research. Non-probability sampling, on the other hand, necessitates some judgment regarding the appropriate sample size. Non-probability methods, according to Patton (1990), are appropriate when the information gathered and the data analyzed are more important than the sample size. There are a lot of different non-probability sampling methods, according to Saunders et al. (2007):

• Quota

• Snowball

• Convenience

• Self-selection

• Purposive

Quota sampling

Quota sampling is non-random and comparable to probability sampling in that the goal is to obtain a population-representative sample. However, due to the broader definition of the quota sample, it is less granular. The survey enabled the study to introduce probabilistic aspect of quota sampling.

Snowball sampling

Snowball sampling can result in a very homogeneous sample because it relies on the first person or people interviewed to recommend additional interviewees and so on. Specialized nature of ILS necessitated the study to use snowball sampling by engaging experts known to engage in ILS as starting pointers to other interviewees for the study.

Convenience sampling

Insurers, reinsurers, and brokers who deal with complex risks in any African market and expert working in ILS are examples of interviewees selected based on the ease with which they could be reached. This is known as convenience sampling. According to Saunders et al. (2007), this sampling method has the potential to become highly biased, which means that conclusions are likely to be limited.

Self-selection

Volunteers must come forward to be interviewed in order for self-selection to work, which may result in interviewees who are more motivated and produce better results. Exploiting researcher’s relationship network, some interviewees volunteered for the study.

Purposive sampling

Purposive sampling depends on the specialists' judgment on the example size and the determination measures. According to Saunders et al. (2007), this thesis's Grounded Theory research strategy makes use of this sampling method in particular. In conclusion, this thesis employs a purposive sampling strategy with homogenous subgroups, such as London insurance brokers or insurance underwriters. It was essential to select underwriters and brokers with sufficient experience in this market and a strong understanding of the dynamics of the face-to-face market place because the purpose of this research is to investigate particular phenomena, ILS innovative framework to enhance underwriting capacity for complex and climatic risks in Africa. Therefore, in order to obtain an appropriate sample, it was decided to approach brokers and underwriters with relevant experience.

Data collection

This study used both qualitative and qualitative data collection techniques. Interviews, questionnaires, and observations were employed. Primary data collection was required due to the lack of prior research on this topic.

Observations

This study considered observations due to its focus on behavioral issues and Saunders et al. (2007)'s claim that observations are an effective method for observing actual behavior. This means that in order to be able to make useful observations about behavior, the researcher had to totally immerse into the environment, which would require having the same authorities as other ILS experts, and the researcher would have to relatively quickly build up relationship with underwriters and other market participants.

Interviews and questionnaire

Both interviews and questionnaires were used for this study. Kvale (1983, p 174) considers meetings to be essential for research 'whose design is to assemble depictions of the life-universe of the interviewee regarding the understanding of the importance of the depicted peculiarities.' Saunders et al. (2007) believe that semi-structured and unstructured interviews are best for qualitative research. By their very nature, unstructured interviews do not have a set list of questions. According to Greener (2008), such interviews can deviate from the topic at hand, which is viewed negatively. However, this could be the point at which the interview becomes interesting. A minimum set of questions will always be asked during semi-structured interviews. The interviewee, on the other hand, is permitted to deviate from the questions to discuss topics that most interest them. According to Greener (2008, p. 89), since the "focus of a qualitative interview is the interviewee" this is viewed as a positive side effect.

Saunders et al. (2007) point out that semi-structured interviews may have quality issues, particularly with regard to validity, generalizability, reliability, and bias. The first and second issues concern the possibility that other interviewers would obtain the same data from the people they are interviewing. There is also the question of whether interviewees and interviewers react differently. It is acknowledged that genereralisability is a problem; However, since this is an exploratory study, it was not intended to draw generalizations about the population as a whole. Given the subjective nature of qualitative research, non-reliability and bias will always be a concern. This should be kept in mind. On the other hand, a high level of ability to probe and respond to interviewees' responses indicates that the interview is of higher quality when the researcher has extensive knowledge of the industry or the subject under investigation.

Arranging and carrying out semi-structured interviews

The interviews were scheduled by contacting senior ILS experts, insurers, reinsurers, and insurance intermediaries via phone call, email or WhatsApp to inquire about their willingness to be interviewed on this subject. In the beginning, only ten underwriters were contacted via phone call to see if this method of contacting them would work. Three of these underwriters consented to be interviewed. A 30% reaction rate could be considered fruitful; nonetheless, since time was running short consuming endeavors by the scientist to get either good or negative answers, it was felt that different channels ought to be investigated first. Further potential interviewees were designated through the researcher's immediate or roundabout contacts in the insurance market and three extra interviewees were enrolled through this channel. The major brokerage firms were contacted via email. All of the other interviewees were also found in the insurance market in Africa through either direct or indirect connections. One more model is the participation of an insurance seminars or conferences where by discussing the research project with a delegate it was possible to arrange further interviews.

A more in-depth list of topics, the professional background of the interviewer, and an assurance that all information collection would remain anonymous and confidential were sent to the prospective interviewee once a positive response was received.

The majority of the semi-structured interviews were carried out via video conferencing and phone calls. As Saunders et al. (2007) emphasize the importance of a face-to-face interview, telephone interviews were considered. First, personal interviews were frequently preferred by senior staff members over questionnaires. Second, the researcher was able to better determine whether the interviewee is attempting to avoid questions because it was be simpler to probe them. According to Easterby-Smith et al. (2008), semi-structured interviews are especially helpful when the questions are complicated and the order of the questions depends on how the interviewee responds. Additionally, the interviewer can learn a lot from the interviewee's responses, which may be more personal than a standard response to a standard question. According to Saunders et al. (2007), phenomenological research methods can benefit from semi-structured interviews. According to Saunders et al. (2007), p. 316, one of the factors that can contribute to the collection of "a rich and detailed set of data" is the opportunity to further investigate the concepts and ideas that the interviewees came up with.

3.11 Data sources

3.11.1 Questionnaires and interviews

A suitable questionnaire with high-level questions and topics to be discussed was created prior to the above-mentioned interviews as seen in appendix 1 and 2. Because of the exploratory idea of this study, the meetings were led in a semi-organized structure.

Twelve semi-structured interviews, each lasting 45 to 60 minutes, were carried out. Six interviews were conducted with insurer underwriters active in the Africa market; one interview was conducted with an insurance intermediary representative; and five interviews were conducted with capital market brokers.

There is a wide range of opinion regarding the number of interviews that are required for qualitative research in terms of the appropriateness of the sample size. Adler and Adler (2012) contend that it could be hard to tell how much information is expected to investigate the peculiarity. Therefore, a sample of just one to one hundred could be considered adequate. Additionally, Becker (2012, page 12) emphasizes that there is "no reasonable answer, no magic number you can do and then you're out of danger." Also, Becker (2012) agrees with Adler and Adler (2012) that even one interview might be enough, and that the decision to stop trying to arrange more interviews will be based on a lot of arbitrary factors like time or money. Denzin (2012, p 23) likewise upholds the contention that even just a single meeting could do the trick in light of the fact that the eye to eye interviews with a particular individual from a local area gives a 'set of social understandings as of now accessible for use by social individuals.' Flick (2012) places that the response to the example size question relies upon the examination question, yet additionally the accessibility of potential meeting accomplices. Charmaz (2012, p. 22) also makes a significant point about this issue by stating that "mixed qualitative methods can strengthen a study with a small number of interviews" and that researchers do not always appreciate other aspects of their qualitative research. Artisan (2010) calls attention to that the aptitude of the interviewer can essentially impact concerning the number of meetings that are important to reveal rich discoveries and replies to the research questions.

The people who were interviewed to for this study all had a lot of experience in this field. As a result, they were able to consider the questions from a variety of perspectives and from those of various business types. As a result, it could be argued that enough interviews were conducted to investigate the research question. It is also important to keep in mind that the research was done on a part-time basis, which means that the researcher had limited resources for arranging interviews, carrying them out, and analyzing them.

3.11.2 Web-based questionnaires for a survey

Saunders et al. (2007) highlight the widespread use of questionnaires as part of a survey research strategy, despite the fact that there are divergent opinions regarding what a questionnaire is. For De Vaus' (2002) questionnaires include posing similar inquiries in a similar order to review members.

Structured interviews and telephone questionnaires, and online surveys in which the interviewer is not present are all examples of questionnaires. According to Saunders et al. (2007), questionnaire design is not as simple as it may appear at first. It is not possible to contact the person who filled out the survey and ask for clarification due to the nature of the survey (such as anonymous online surveys). This indicates that it is important to ensure that the questionnaire will collect the appropriate information in order to achieve the research objectives. Greener (2008) agree that designing questionnaires is particularly challenging and highlight a number of issues that the researcher should consider during the design process:

a) The design which ought not be excessively lengthy and not too challenging to understand;
b) The level of personal information required (such as age, gender, and work experience);
c) The ratio of open questions to closed ones;
d) How the questions should be structured, such as with tick boxes or scales;
e) How much space is required for an open response;
f) Whether it is necessary to ask check questions in order to get consistent responses; and
g) How much information about the survey's aim should be given to respondents?

According to Saunders et al. (2007), questionnaires are not very good for exploratory research, especially when there are questions that are more open-ended. However, the authors also point out that in-depth interviews and questionnaires can be used to better understand customer attitudes. In contrast, Harris and Brown (2010) emphasize that mixed research methods, such as semi-structured interviews and questionnaires, may be challenging to compare due to the manner in which data are collected. The fact that various research methods could work together to overcome individual methods' shortcomings is the main draw.

Online surveys are becoming increasingly popular (Eysenbach, 2003); in any case, the benefits and impediments over more conventional study strategies, for example, mail or phone, should be recognized (Wyatt, 2000). "The collection of data through self-administered electronic set of questions on the Web" is the definition of a web-based survey. 2003, Archer). According to Wyatt (2000), two main criteria should be used to evaluate survey methods: How information is caught and how study members are being recognized. According to Rhodes et al. (2003), web-based data collection is a relatively straightforward process, and Couper (2000) adds that conducting a survey can be significantly less expensive than sending mail or conducting in-person surveys.

Rhodes et al. (2003) point out that there are a number of advantages and disadvantages to take into account when collecting behavioral data for purposes like medical research. Additionally, there are ethical concerns that should not be overlooked. In addition to their cost-effectiveness, Rhodes et al. (2003) identified a number of benefits and drawbacks associated with web-based surveys:

a) Merits:

i. Electronic dexterity: Self-administered, mail-in, and interviewer-administered questionnaires, as well as web-based surveys, can serve the same purpose. However, if new information or preliminary findings necessitate a modification to the questionnaire, it may be simpler to include new questions in an electronic format. A web-based survey also makes it possible to record the amount of time it took to complete the questionnaire for future analysis.

ii. A possible larger sample size: Rhodes et al (2003) contend that online overview can beat the customarily low reaction rate for mail-based reviews as through the web the specialist can contact a fundamentally more extensive crowd. In any case, Eysenbach (2004) challenges this by contending that contrasted with the guests of a specific site the reaction is entirely low which brings up the issues of the legitimacy of the outcomes.

iii. The speed of the process: Since respondents can access the website at any time, the internet makes it easier for Rhodes et al. (2003) to collect data. While this is true for private computers accessing web-based surveys, it does not necessarily hold true for workplace surveys. The survey will only be accessible during working hours because the majority of employees will leave their laptop or desktop computer in the office. However, because the survey can be accessed via a popular website or a straightforward email, the rollout may be accelerated.

iv. Improved data: According to Rhodes et al. (2003), the structured format of the web-based questionnaire and the possibility of including explanatory material (such as drop-down menus) leave less room for error. With a paper-based review members can make invalid sections in this manner either returning to the respondent for explanation or disregard the response subsequently lessening the populace for a particular inquiry.

v. Touchy points and the decrease of bias: In a web-based survey, it appears that respondents are more willing to respond to sensitive questions. This attitude is not supported by any empirical evidence in Rhodes et al. (2003). however, makes the assumption that respondents might feel more secure when they answer questions online.

b) Demerits:

i. Sampling: The survey's anonymity makes it hard to sample, even at random, and it's hard to predict response rates. There is also the possibility of one or more participants submitting multiple submissions.

ii. Contest: Due to survey fatigue, it can be challenging to draw attention to a specific survey request when opening a website (such as a travel booking site or a newspaper).

iii. Error in measurement: Couper (2000, p 475) characterizes estimation blunder as 'the deviation of the responses of respondents from their actual qualities on the action.' These errors could be caused by the participant's behavior or by the survey's design. Participants may not be motivated, may not fully comprehend the question, may interpret the closed-ended questions and answers in an unintended manner, may rush through the survey, or may intentionally answer the questions dishonestly.

iv. The issue of which web browser respondents use, which can make it difficult for respondents to scroll through the survey, is one aspect of the survey's design. There are likewise restrictions in regard of plan capacities of the study programming, (for example, Survey Monkey) which can affect how the overview is seen by members. Despite these difficulties, Couper (2000, p 476) contends that 'electronic reviews offer gigantic open doors for minimal expense self-controlled reviews utilizing a wide assortment of boost material.'

3.12 Problems experienced

The principal issue experienced was the low reaction rate, notwithstanding various endeavors to find financiers who were able to partake in the review. A survey request was initially sent to the underwriters who had been interviewed. The majority of them had been made aware of the plan to conduct a web-

based survey, and they had agreed to spread the survey to their coworkers in support of it. The majority of interviewees, however, did not respond to the request via email.

3.13 Data Analysis

Involving the meeting records as a window to the interviewee's insight (Silverman 2000) and information (Evade, Ospina, and Foldy 2005), concentrate on utilized a few unique codes directed by the focal exploration question and the three optional examination questions but remained open to both new and existing codes (Strauss and Corbin, 1998).

Quantitative analysis

Quantitative analysis involved collecting and analyzing numerical data using statistical methods. Quantitative research helped the researcher to identify patterns and relationships between different variables (Bernard, H. R. 2017). This type of analysis was used in survey questionnaire data collection. Quantitative analysis method used was included descriptive statistics.

Descriptive statistical analysis involved summarizing and describing data in a meaningful way (Chatterjee and Hadi, 2012). It provided a way to organize and simplify raw data and made it easy to understand and interpret (Groebner, Shannon and Fry, 2018). Descriptive statistics was used to summarize single variables and explored the relationships between multiple variables in datasets. It is often used in research to describe and characterize data before applying other statistical tests. Descriptive statistics analyzed were presented in a variety of formats, such as tables, charts, scatterplots and graphs, to help make the information more interpretable.

Qualitative analysis

Qualitative analysis involved analyzing non-numerical data, such as text from open ended questionnaire responses, interviews and observation findings (Johnson, and Onwuegbuzie, 2004). Qualitative research helped the researcher to gain a deep understanding of the experiences, perspectives, and attitudes of individuals involved in the ILS and insurance market in Africa. Qualitative analysis methods include thematic analysis and grounded theory (Creswell and Poth, 2016).

Grounded theory was a valuable qualitative research method that allowed the researcher to develop theories that are grounded in the data, rather than imposed on it. This method led to new insights and understanding of the underwriting capacity in Africa for complex and climate risks which is a complex phenomena and has the potential to generate important findings in a range of research areas. The purpose of grounded theory was to discover new insights, patterns, and relationships that emerged from the data, rather than to test a pre-existing hypothesis (Creswell and Poth, 2016). The method encouraged the researcher to approach the data without preconceived ideas or biases and to analyze it using a systematic, iterative process of coding and categorizing. The grounded theory process involved three main stages: open coding, axial coding, and selective coding (Goulding, 2002). In the open coding stage, the researcher examined the data closely and identified and labeled concepts or categories that emerged. In axial coding, the relationships between categories were analyzed and connections were made between them. Finally, in the selective coding stage, the researcher identified a core category as a central concept that connected all other categories, and developed a theory and explanation based on that core category (Locke, 2001).

CHAPTER FOUR

4 COMPLEX AND CLIMATIC RISKS FOUND IN THE ECONOMIC SECTORS IN AFRICA

4.1 Africa Economic Development On 50 Years Lens

Africa Economic Development in History

Greatness leadership of Africa in Trade and development can be traced from the era of Mansah Kankan Mussa, the richest person of all time. Mansa Musa's wealth was the equivalent of US$400 billion[4]. Mansa Musa traveled through the cities of Timbuktu and Gao on his way to Mecca, and made them a part of his empire when he returned around 1325. He brought architects from Andalusia, a region in Spain, and Cairo to build his grand palace in Timbuktu and the great Djinguereber Mosque that still stands today.

Timbuktu soon became the center of trade, culture, and Islam; markets brought in merchants from Hausaland, Egypt, and other African kingdoms, a university was founded in the city (as well as in the Malian cities of Djenné and Ségou), and Islam was spread through the markets and university, making Timbuktu a new area for Islamic scholarship.[64] News of the Malian empire's city of wealth even traveled across the Mediterranean to southern Europe, where traders from Venice, Granada, and Genoa soon added Timbuktu to their maps to trade manufactured goods for gold.

The parallel story of Africa's greatness in infrastructure is told by the pyramids. The pyramid tell a story of greatness of Africans in a manner that cannot be understood withstanding today's technology. Although Egypt is famous for pyramids, **Sudan** has 220 pyramids, making it the country with the most numerous pyramids. For more than 43 centuries, the 481-foot Great Pyramid was ranked as the tallest structure on earth, surpassed in height only by skyscrapers of the last century. The Meroe pyramids are in the eastern desert of Sudan and are part of the Nubian Pyramids. **At least 118 Egyptian pyramids have been identified**. **Ethiopia and Zimbabwe have more pyramids.** The Giza pyramids are in remarkable condition considering their age. Although their outside covering of limestone and onyx is long gone, they are still standing intact.

Africa is home to much biodiversity; it is the Continent with the largest number of megafauna species (the large or giant animals of an area, habitat, or geological period, extinct and/or extant), as it was least affected by the extinction of the Pleistocene megafauna (The end of the Pleistocene was marked by the extinction of many genera of large mammals, including mammoths, mastodons, ground sloths, and giant beavers). The history of Africa is long, complex, and has often been under-appreciated by the global historical community.[5] Africa, particularly Eastern Africa, is widely accepted as the place of origin of humans and

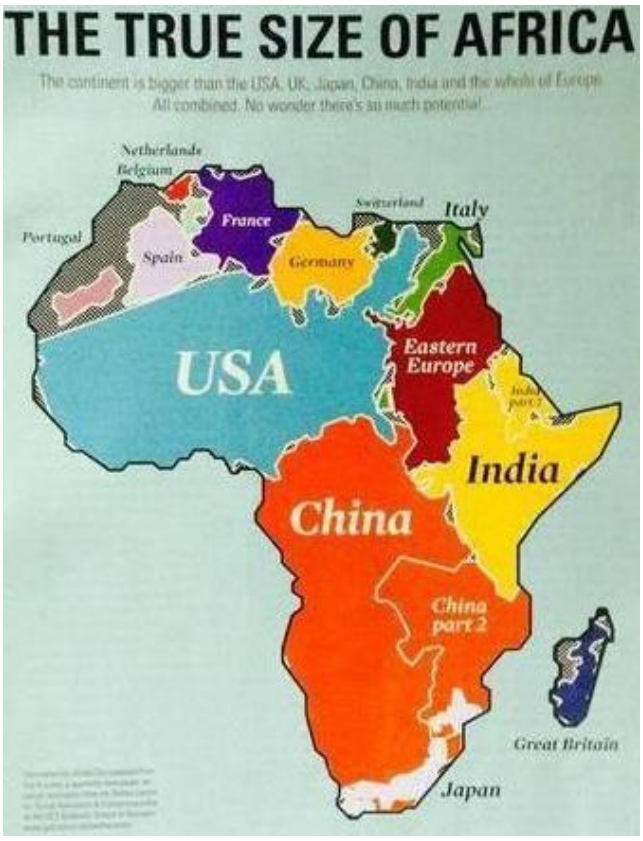
[4] Collet, Hadrien (2019). "Échos d'Arabie. Le Pèlerinage à La Mecque de Mansa Musa (724–725/1324–1325) d'après des Nouvelles Sources". History in Africa. 46: 105–135. doi:10.1017/hia.2019.12. eISSN 1558-2744. ISSN 0361-5413. S2CID 182652539.

[5] "One of Africa's best kept secrets – its history". BBC News. 1 July 2017. Retrieved 29 July 2021.

the Hominidae clade. Due to being the longest inhabited continent, Africa is also considered by anthropologists to be the most genetically diverse continent on the planet.

Early human civilizations, such as Ancient Egypt and Carthage which include the quarrying, surveying and construction techniques that supported the building of monumental pyramids, temples, and obelisks; a system of mathematics, a practical and effective system of medicine, irrigation systems and agricultural production techniques, the first known planked boats[6], Egyptian faience and glass technology, new forms of literature, and the earliest known peace treaty, made with the Hittites[7] witness the greatness leadership of Africa. Following a subsequent long and complex history of civilizations, migration and trade, Africa hosts a large diversity of ethnicities, cultures and languages.

Africa is the world's second-largest and second-most populous continent with about 1.4billion people (1,406,730,952 people to be exact based on the 2022 World Statistics estimates, accounting for 18.2% of the world's human population. Africa's population is the youngest amongst all the continents with median age is 19.7, when the worldwide median age is 31.[8]



At about 30.3 million km^2 (11.7 million square miles) including adjacent islands, it covers 6% of Earth's total surface area and 20% of its land area.[9] Africa spans the equator and the prime meridian making it the only Continent in the world to be situated in all four cardinal hemispheres. It is the only Continent to stretch from the northern temperate to southern temperate zones. African continent has a land area of 30.37 million sq km (11.7 million sq mi) — enough to fit in the U.S., China, India, Japan, Mexico, and European combined.

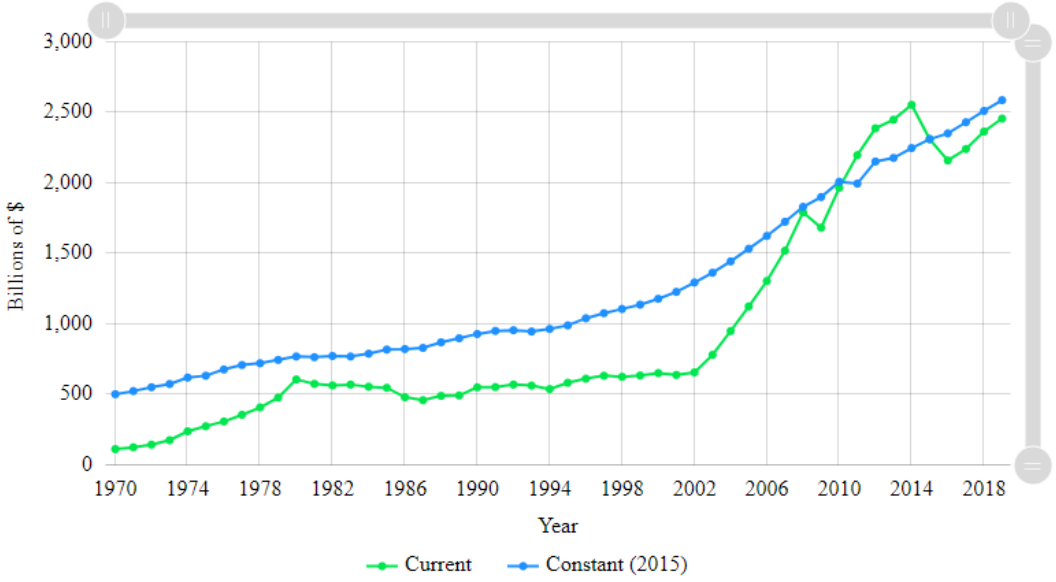
4.1.1 Africa Trade and Development: 1972 – 2072

The **economy of Africa** consists of the trade, industry, agriculture, and human resources of the continent. To trace trade in the continent, GDP can be the best tool due to the fact that all goods and services produced in the country (in this case the continent) are traded internally or as exports. GDP measures how much money a country (continent) makes from its products over the course of a year.

[6] Ward, Cheryl (May 2001). "World's Oldest Planked Boats". Archaeology. 54 (3).
[7] Clayton, Peter A. (1994). Chronicle of the Pharaohs. London: Thames and Hudson. ISBN 978-0-500-05074-3.
[8] https://www.worldometers.info/world-population/africa-population/ and https://www.statista.com/statistics/1224168/total-population-of-africa/
[9] Sayre, April Pulley (1999), Africa, Twenty-First Century Books. ISBN 0-7613-1367-2.

As of 2013 Africa was the world's fastest-growing continent at 5.6% a year, and GDP was expected to rise by an average of over 6% a year between 2013 and 2023. Growth has been present throughout the continent, with over one-third of African countries posting 6% or higher growth rates, and another 40% growing between 4% to 6% per year. Several international business observers have also named Africa as the future economic growth engine of the world.[10]

Figure 4.1: Africa GDP Trend between 1970 - 2018



Source: https://statisticstimes.com/economy/africa-gdp.php

According to Jerven (2017) an economy is classified as 'growing' if the nine-year moving averages of GDP per capita growth are 3% or higher. This is quite a strict criterion: according to the Maddison dataset, the average annual growth in GDP per capita in the world over the same period was just 2%. An economy is classified as 'failing' when the nine-year moving average of real GDP per capita growth is less than 0% – evidence of an overall and lasting deterioration in income per capita.[11]

In general, countries with high savings rates are those showing fastest growth. An IMF study in 1995 indicated that of the world's twenty fastest growing economies over the previous 10 years, fourteen had savings rates greater than 25 per cent of GDP, and none had a saving rate of less than 18 per cent. But fourteen of the twenty slowest growing countries had savings rates below 15 per cent. Insurers have a key role in enhancing savings rates and in channeling domestic savings into domestic investment; and, through long-term investments, matched to risks and generally located in the host economy in which they operate, insurers are key holders of equity and bond portfolios.

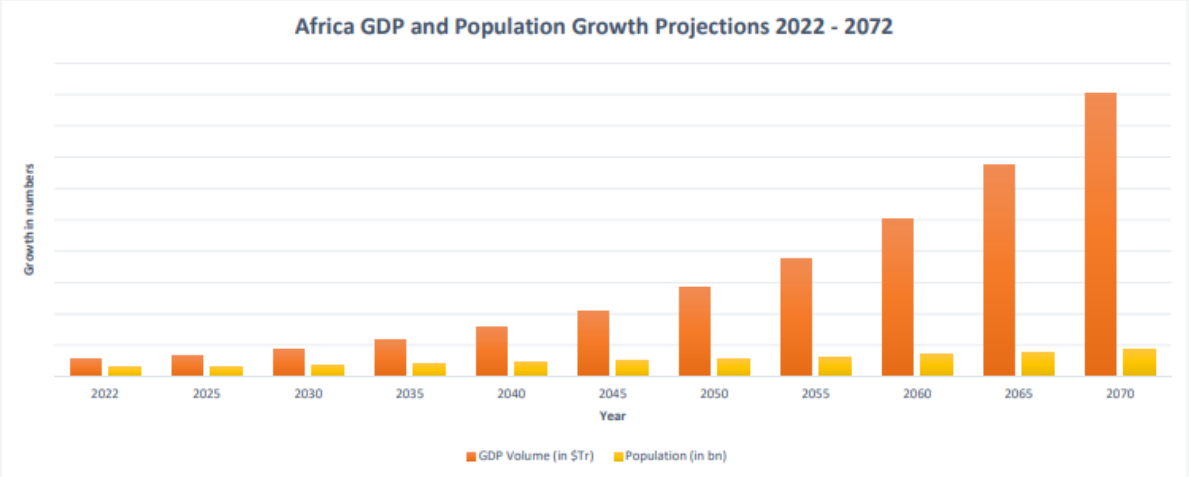
[10] "Rise of the African opportunity". Boston Analytics. 22 June 2016.
[11] Jerven, M. (2017) Africa growing? Past, present and future. European Union Institute for Security Studies (EUISS)

4.1.2 Trajectory of Africa GDP Growth 2022 - 2072

The study has analyzed the growth projection of Africa GDP and population in the next 50 years. The GDP will grow from the current $ 2.6 trillion (2021e) to about $ 50.8 trillion in the year 2072. Maintaining Africa GDP CAGR of 6% per annum and the population growth rate at a CAGR of 2.37% per annum between year 2022 to year 2072, table 4.1 and figure 4.2 below shows the GDP per capita volume in USD trillion and population in billions.

Table 4.1 Africa GDP and Population Growth Projections 2022 - 2072

Year	2022	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2072
GDP Volume (in $Tr)	2.8	3.3	4.4	5.9	7.9	10.5	14.1	18.9	25.2	33.8	45.2	50.8
Population (in bn)	1.4	1.5	1.7	1.9	2.2	2.5	2.8	3.1	3.5	3.9	4.4	4.6



Source: Authors computations, 2023

4.2 Complex and climatic risks found in the economic sectors in Africa

4.2.1 Concept of Risk

Risk Defined

There are definitions of risk for each of several applications. The widely inconsistent and ambiguous use of the word is one of several current criticisms of the methods to manage risk. The simple fact is that risk is always a probability issue. Possibility is a binary condition – either something is possible, or its not – 100% or 0%. Probabilities is not the same thing as foretelling the future.

Risk has been defined as the combination of the probability of an event and its consequences. [12]In all types of undertaking, there is the potential for events and consequences that constitute

[12] (ISO/IEC Guide 73)

opportunities for benefit (upside) or threats to success (downside). Risk Management is increasingly recognized as being concerned with both positive and negative aspects or risk.

Risks is defined as the variation in possible outcome of an event based on chance. That is, the greater the number of different outcomes that may occur, the greater the risk i.e. the greater the variation around an average expected loss, the greater the risk; here the focus is he degree of risk in a given situation. The degree of risk is a measure of the accuracy with which the outcome of an event based on change can be predicted. The variability concepts of risk emphasize the use statistical aspects[13].

Risk is generally defined as uncertainty or probability concerning the occurrence of a loss.

Mathematicians are interested in the behavior of phenomenon and define risk as 'the degree of dispersion of values in a distribution around the central position occurring in random, change patterns. The larger the degree of dispersion, he grater is the risk.

"The object of the theory of risk is to give a mathematical analysis of the random fluctuates in an insurance business, and discuss the various means of protection against their inconvenient effects".[14]

In insurance, risk can mean:

i. The hazard or change of loss
ii. The degree of probability of such loss
iii. The amount that the insurance company may lose.
iv. A person or thing with reference to the hazard involved in insuring him, her, or it.
v. The type of loss, as life, fire, marine disaster, or earthquake, against which an insurance policy is drawn.

4.2.2 Risk versus uncertainty

Risk: Combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or ill health that can be caused by the event or exposure(s).

In his seminal work risk, uncertainty, and profit, Frank Knight (1921) established the distinction between risk and uncertainty.

> *"uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. The term "risk," as loosely used in everyday speech and in economic discussion, really covers two things which, functionally at least, in their causal relations to the phenomena of economic organization, are categorically different. ... the essential fact is that "risk" means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character, and there are far-reaching and crucial differences in the bearings of the*

[13] See the Book by Markk S Dorfamn 'Introduction to Risk Management & Insurance 2005' Chapter one
[14] Harald Cremer, On the Mathematical Theory or Risk (1930)

phenomenon depending on which of the two is really present and operating. ... it will appear that a measureable uncertainty, or "risk" proper, as we shall use the term, is so far different from an immeasurable one that it is not in effect an uncertainty at all. We ....accordingly restrict the term "uncertainty" to cases of the non-quantitative type.

Thus, Knightian uncertainty is immeasurable, not possible to calculate, while in the Knightian sense risk is measurable, an approach taken by the insurance industry and risk experts.

4.2.3 Risk in economic analysis

Risk have a central role in economic activities. In capitalist market economies, taking economic risks is an essential part of role of the entrepreneur. Decisions on investments and activities of financial markets can only be understood against the background of the risks involved. Therefore, it is no surprise that modern economic theory, with its emphasis on mathematical models of economic activities, has developed several formal models of risk taking.

Portfolio analysis, which was developed in the 1950s by Harry Markowits, James Tobin and others, was an important step forward in the economic analysis of risk. These authors employed a simple statistical measure, namely the standard deviation (or alternatively the variance, that is the squire of the standard deviation) as a measure of riskiness. Hence, in a comparison between two investment alternatives, the one whose economic outcome is calculated to have the largest standard deviation is regarded as the most risky one. In a comparison between different such alternatives, each of them can be characterized by two numbers, namely its expectation value and its standard deviation or riskiness. Investors typically prefer investments with a high expectation values and as low riskiness as possible. However, investors differ in the relative weight that they assign to expectations respectively risk avoidance. Given these decision weights, an individual's optimal portfolio can be determined.

Since the late 1960s, alternative measures of risk have been developed. Perhaps the most influential of these was provided by Michael Rothschild and Joseph Stiglitz:

If we move probability mass from the Centre to the tails of a probability distribution, while keeping its mean unchanged, then we increase the risk associated with the distribution. A measure based on this principle (mean preserving spread) can be constructed that has more attractive mathematical properties than those of the older standard deviation measure.

4.3 Categories of Risk

4.3.1 Financial vs Non-Financial Risk

Financial Risk - concerned with those risks that involve a financial loss.

Non-Financial Risk- have no financial consequences e.g. friendship love, etc.

4.3.2 Static vs Dynamic Risks

Dynamic Risk - those resulting from changes in the economic, changes in the price levels and consumer taste.

Static risks - events leading to those losses that would occur even if there were no changes in the economy it involves either the destruction of an asset or change in its possession as a result of dishonesty or human failure.

4.3.3 Fundamental vs Particular Risks

Fundamental Risks - involve losses that are impersonal, these are group risks caused for the most part by economic, social and political phenomena. They affect large segment, or even all the population.

Particular Risks - involve losses that arise out of individual events and are felt by individual rather than by entire group e.g. burning of house, robbery of a bank.

4.3.4 Pure Risk vs Speculative Risk

Pure Risk - involve those situations that involve only the change of loss or no loss. Nothing good can came from an exposure to pure risks. A factory exposure to loss by fire is an example of pure risks. Factory either burns or it does not burn. There is no gain potential from this possibility.

Speculative risks - a situation where there is possibility of loss, but also a possibility of gain e.g. gambling. It also refers to those exposures to price change that may result in gain or loss. Most investment, including stock market investments are classified as speculative risks. Others include: Interest rate changes, price movement of foreign currencies and price movement of agricultural and other commodities.

4.3.5 Actual Risk – Frequency and Severity of Loss

Losses depend on two random variables. The first is the number of losses that will occur in a specified period. For example, a healthy policyholder with hospital insurance will have no losses in most years, but in some years he could have one or more accidents or illnesses requiring hospitalization. This random variable for thee number of losses is commonly referred to as the *frequency of loss* and its probability distribution is called the *frequency distribution.* The second random variable is the amount of the loss, given that a loss has occurred. For example, the hospital charges for an overnight hospital stay would be much lower than the charges for an extended hospitalization. The amount of loss is often referred to as the severity and the probability distribution for the amount of loss is called the *severity distribution.* By combining the frequency distribution with the severity distribution we can determine the overall loss distribution.

The result of loss frequency when multiplied by loss severity is known as **expected loss.**

Expected Loss = Loss Frequency X Loss Severity

Loss Frequency is the number of losses per number of exposure

Loss Severity is the average size of a loss if one occurs

Example of Expected Loss

Illustration 1:

Chance of getting a motor accident = 1/10

Cost of repairing the car = $ 5m

Expected Loss = .1 x $ 5m = 500,000

Illustration 2:

Chance of home burning = 1/1000

Value of home = $10,000,000

Expected Loss = .001 x $10,000,000 = $100,000

Frequency of risk: number of times of occurrence of the event in a given period

Severity: magnitude of the event when it occurs (extent of damage)

Both used to classify the risk and determine the best method of treatment.

4.3.6 Degree of risk

Degree of risk is the accuracy with which losses can be predicted, measure by probable variation of actual experience from expected experience. The lower the probable percentage of variation, the smaller is the risk. This percentage variation decreases as the number of exposures increases.

4.4 INSURABLE RISK

Not all risk can be insured. So as a risk to be insured in commercial insurance market it must possess the following characteristics:

1. Large number of relatively homogeneous characteristics

The vast majority of insurance policies are provided for individual members of very large classes. The existence of a large number of homogeneous exposure units allows insurers to benefit from the so-called "law of large number," which in effect states that as the number of exposure units increases, the actual results are increasingly likely to become close to expected results. There are exceptions to this criterion. Lloyds of London is famous for insuring the life or health of actors, actresses and sports figures.[15] Despite failing on this criterion many exposures like these are generally considered to be insurable.

[15] See, Insurance facts book, (2007)

2. Determinable and Definite Loss

The event that gives rise to the loss that is subject to insurance should, at least in principle, take place at a known time, in a known place, and from a known cause. The classic example is death of an insured on a life insurance policy. Fire, automobile accidents, and worker injuries may all easily meeting this criterion.

Other types of losses may only be definite in theory. Occupational disease, for instance, may involve prolonged exposure to injuries conditions where no specific time, place or cause is identifiable. Ideally, the time, place and cause of a loss should be clear enough that a reasonable person, with sufficient information, could objectively verify all three elements.

3. Accidental and Unintentional Loss

The event that constitutes the trigger of a claim should be fortuitous, or at least outside the control of the beneficiary of the insurance. The loss should be 'pure', in the sense that it from an event for which there is only the opportunity for cost. Events that contain speculative elements, such as ordinary business risks, are generally not considered insurable.

4. Feasible Premium-Loss

The size of the loss must be meaningful from the perspective of the insured. Insurance premium need to cover both the expected cost of losses, plus the cost of issuing and administering the policy, adjusting losses, and supplying the capital needed to reasonably assure that the insurer will be able to pay claims. For small losses these latter costs may be several times the size of the expected cost of losses. There is little point in paying such costs unless the protection offered has real value to a buyer.

If the likelihood of an insured event is so high, or the cost of the event so large, that the resulting premium is large relative to the amount of protection offered, it is not likely that anyone will buy insurance, even if on offer. Further, as the accounting standards the premium cannot be so large that there is not a reasonable change of a significant loss to the insurer. If there is no such chance of loss, the transaction may have the form of insurance, but not the substance.

5. Monetarily Calculable and Measurable Loss

There are two elements that must be at least estimable, if not formally calculable: the probability of loss, and the attendant cost. Probability of loss is generally an empirical exercise, while cost has more to do with the ability of a reasonable person in possession of a copy of the insurance policy and a proof of loss associated with a claim presented under that policy to make a reasonably definite and objective evaluation of the amount of the loss recoverable as a result of the claim.

6. Limited Risk of Catastrophically Large Losses

The essential risk is often aggregation. If the same event can cause losses to numerous policyholders of the same insurer, the ability of that insurer to issue policies becomes

constrained, not by factors surrounding the individual characteristics of a given policyholders, but by the factors surrounding the sum of all policyholders so exposed. Typically, insurers prefer to limit their exposure to a loss from a single event to some small portion of their capital base, on the order of 5%. Where the loss can be aggregated, or an individual policy could produce exceptionally large claims, the capital constraint will restrict an insurer's appetite for additional policyholders.

The classic example is earthquake insurance, where the ability of an underwriter to issue a new policy depends on the number and size of the policies that it has already underwritten. Wind insurance in hurricane zones, particularly along coast lines, is another example of this phenomenon. In extreme cases, the aggregation can affect the entire industry, since the combined capital of insurers and reinsurers can be small compared to the needs of potential policyholders in areas exposed to aggregation risk. In commercial fire insurance it is possible to find single properties whose total exposed value is well in excess of any individual insurer's capital constraints. Such properties are generally shared among several insurers, or are insured by a single insurer who syndicates the risk into the reinsurance market.

4.5 Complex and Climate risks

This thesis looks at risk as a system (complex risk) which is a set of elements (risk components) connected by relations that affect the purpose of the entities's activities and its financial result.

Risk in recent climate change assessments has been defined as the potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. Many risks to health and property in modern life emerge from the interaction between people and businesses. On the one hand, there are everyday risks such as when a worker has an accident in the workplace or a customer is injured in a store. On the other hand, there are large-scale catastrophes such as bodily injury from toxic chemical exposures or property damage from accidents during energy production. The large-scale events can involve hundreds of thousands or even millions of injured parties, and tens to hundreds of businesses.

Complex risks impact the networks of activities which underpin the global economy, disrupting the interrelationships that drive business and causing losses in unexpected ways and places. They have multiple consequences, in causing severe direct losses, but also operational challenges to business continuity, cascades of effects on counterparties and the macroeconomy in general. They can trigger financial crises and they impact the capital markets and investment portfolios. Increasing global economic integration, technological advances, and geopolitical friction are profoundly complicating the risk landscape, creating exposures and vulnerabilities that have the potential to generate more than mere "volatility" in corporate earnings.

4.5.1 Global and Emerging Risks

Global and emerging risks are complex, usually exogenous, threats and uncertainties that may have significant, unexpected impacts on company earnings and market positioning. As new phenomena or familiar challenges sharply aggravated by changing conditions, they often take shape at the intersection of several fundamental trends and can crystallize with sudden shifts in velocity. Trajectories of these risks are hard to predict due to extensive interdependencies with other issues and complex interactions with risk-absorbing systems. This engenders the possibility of rapid dissipation, nonlinear surprises, and spillover effects that cross geographic, sector, and other boundaries. For some such risks, there is no guarantee of a return to prior conditions and the result is the emergence of a new status quo. By and large, companies (individually or collectively), are not able control such risks; they can only mitigate their exposures. **Complex Risk -** Risk managers and analysts generally recognize these risks but they are not well understood causing confusion of definitions.

4.5.2 Anatomy Of Climate And Complex Risks

When examining terms that have been applied to complex risk for human and natural systems, there is a commonality: an interaction or aggregation of the determinants of risk—hazard, exposure, and vulnerability—and of multiple risks. This commonality is depicted in the figure below:

Figure 4.1: Commonality in complex risks

The world today is highly networked with multiple drivers of complex and climate change risks interact, as do the risks themselves. Connections among socio-economic, environmental, and technological systems transmit risk from one system or sector to another, creating new risks or exacerbating existing ones. For example, global warming of 2 degrees Centigrade above pre-industrial levels is projected to reduce global yields of staple crops by 5%– 20%.6 Greenhouse gas mitigation options can also increase food insecurity if bioenergy crops displace food crops, or can lead to biodiversity loss from land use change for cropping and afforestation. Concurrently, trade networks link distant food systems together and can thus compensate for reduced food security, but they can also create new risks of global impacts, such as multiple-breadbasket failure; more rapid spread of disease pests, and other invasive species; and new threats to local food security from changes in commodity prices caused by policy choices made elsewhere. These interactions include both those risks caused by climate change and those involving responses to climate change through adaptation and mitigation (hereafter collectively termed complex risks), where risk is understood to refer to the potential for negative or positive outcomes for human or ecological systems.

Complex projects, complex risks

In complex projects, risks affect projects in combinations and structures of risks. Often the risks that cause project runaway are not individual separate risks, but a combinations of risks in causal chains that, along with management actions and team reactions, build up "vicious circles" of disruption. The effort to identify positive feedback loops in risk structures, and to assess how to "break" them, is a significant step in risk analysis. Finally, a view of risk as a system rather than as individual entries on a risk register is necessary to properly understand the risk embedded in complex projects.

Risk analysis for complex projects presents difficulties. Looking simply at the risks does not reveal the causal chains responsible for management actions, the motivations of project actors, the socio-political project complexities and intra-connectedness feedback. Common practice based upon decomposition-type methods is often shown to point to the wrong risks.

4.5.3 Complex risk terminologies

Compound risk

Compound risks arise from the interaction of hazards, which can be characterized by single extreme events or multiple coincidences or sequential events that interact with exposed systems or sectors.

Emerging risk

A risk that arises from the interaction of phenomena in a complex system; for example the risk caused when geographic shifts in human population in response to climate change lead to increased vulnerability and exposure of population in the receiving region.

Emerging Risks cause potential extreme loss that is becoming apparent or more significant than previously understood, either because the threat itself is growing, or because society is increasing its vulnerability to that cause. *Examples include cyber catastrophe risk, climate change, laboratory-originated pandemics.*

Aggregate risk

The accumulation of independent determinants of risk.

Amplified risk

The substantial enhancement of background risk through combination or concentrations of determinants of risk in time or in space.

Interacting risk

The combinations of hazards and their reciprocal influences between different factors and coincidences among environmental drivers.

Interconnected risk

The complex interactions among human, environment and technological systems with physical interdependencies that are closely linked with interconnected social interactions.

Interdependent risk

Complex systems involve interactions and interdependencies that cannot be separated and lead to a range of unforeseeable risks.

Multi-risk

The whole risk from several hazards, taking into account possible hazards and vulnerability interactions entailing both multi-hazard and multi-vulnerability perspectives.

Systemic risk

Systemic risk results from connections between risks (networked risks), where localized initial failure could have disastrous effects and cause, at its most extreme, unbounded damage.

Correlated Risks / Cascading Risks / Consequential Risks

One type of peril triggers an event of another type, to cause an extreme event such as *earthquake causes a tsunami that triggers a nuclear meltdown.*

Clash Risks / Contingent Risks / Network Risks / Macro-Catastrophes

An event that causes losses across several lines of insurance business or that causes loss in unexpected locations or across multiple geographical markets because of the interconnectivity of business connections to the region affected example *Thailand floods caused contingent business interruption (BI) losses to US business supply chains.*

'Black Swans'[16] / 'Known Unknown'[17] Risks

A strategic surprise from extremely unlikely events outside the realm of regular expectations, and only able to be predicted in retrospect. The emphasis of this meaning is on the unknowability of the type of event, and our inability to anticipate its occurrence due to our own preconditioning example the c*ollapse of the Soviet Union.*

'Dragon King'[18] events

An event of a class of threat which occurs often at certain levels and one incidence goes to extreme severity for example *9/11 attack in USA as a far larger terrorist attack than had been previously experienced.*

[16] Taleb (2010) The Black Swan: The Impact of the Highly Improbable.

[17] Term popularized in a press statement by Donald Rumsfeld, United States Secretary of Defense, February 2002, addressing the absence of evidence linking the government of Iraq with the supply of weapons of mass destruction to terrorist groups.

[18] Sornette (2009) 'Dragon-Kings, Black Swans and the Prediction of Crises'.

Systemic Risks/Financial Contagion/ Exogenous and Endogenous Risks

Economically -impactful events that ripple through business and financial systems. The term 'systemic risk' is commonly used in financial risk management to mean events and practices capable of causing consequential effects throughout the financial system, so tends to have a specific meaning in financial regulatory practices such as h*ousing price bubble*

Non-Modelled Risks[19]

As defined by ABI 2014, for non-life insurers this loss might arise from a catastrophe event, but not explicitly covered in existing catastrophe models. Specifically it includes regions and perils not covered by existing catastrophe models, secondary perils and effects not covered by catastrophe models, classes and lines of business not covered by catastrophe models, and coverages not considered. Example is the T*hailand floods of 2011, fire -following earthquake, losses to offshore oil platforms, contingent business interruption.*

Unmodelled risks / Unmodellable risks / 'Pear-Shaped Phenomena'[20]

Insurance industry terms for risks that are less well understood than traditional perils, but that can cause insured loss, or represent insurance opportunities that are underexploited. These are low-probability, high- consequence events that have not been commonly quantified, that represent challenges in conventional modelling terms, and are sufficiently below the insurance radar that many in the industry may not have considered them. They are risks that are recognized to be foreseeable and amenable to risk analysis and could be future priorities for parties that carry, price, and transfer risk such as v*olcanic ashcloud fissure eruptions (Laki 1783); meteorite airbusts (Tunguska Siberia 1908).*

Main causes of increasing complex risk trend

Increased vulnerability to shocks

It could be argued that instead of new threats becoming more common, globalization of our economy is the real driver of this emergence of frequent disruptive events: businesses that only a decade or so ago were serving regional markets and familiar with the variables of one localized part of the world are now serving global markets, carrying out business activities in hundreds of cities worldwide, and reliant on travel and communications infrastructure to interlink all their business activity into a global system.

Interconnectivity and networks

These interlinkages of the global business system are vulnerable in a very different way to the physical infrastructure of regional businesses of past generations. The world is a volatile place,

[19] ABI (2014), non-modelled risks A guide to more complete catastrophe risk assessment for (re)insurers

[20] Blong (2013) 'Pear-Shaped Phenomena: Low Probability, High Consequence Events'.

and extremes of weather, geophysical processes, political and social patterns occur periodically in many locations – possibly no more frequently that they have done before.

However, currently the global corporations notice these extreme events in an entirely new way, as they impact some part of the linkage structure of their global business.

Systemic shocks

Global businesses are looking for ways to manage the balance sheet risk of these disruptive events, and to be better prepared for future new or 'emerging risks'. Many of these macro-catastrophe risks are systemic in nature – i.e. they have the ability to impact not just a single company but many companies, including the main business counterparts of the business and possibly many parts of the economic system at the same time.

4.6 Analysis of complex and climate risks found in Africa

This study analysis shows that the climate change research community has not yet achieved a consistent framework for assessment of complex climate change risks. The IPCC acknowledges risks can aggregate from multiple sectors, but has only two glossary definitions for types of complex risk, namely, compound risk and emerging risk. Moreover, the IPCC notion of compound risk focuses most on the interaction of climate hazards determining a risk and complex risk terms were most often applied to the hazard determinant of a risk. This aligns with a growing research field on climate hazard interactions such as heavy precipitation coinciding with a storm surge to increase likelihood of flooding, often termed compound weather or climate events.

Study use the term complex to communicate the diversity of interactions among sectors and systems that can amplify or reduce complex risks. Although risk assessment approaches that consider such interactions and networks are beginning to be used, many risk management frameworks often ignore interactions in part or in full. In doing so, they may significantly misestimate risk, such as when single sector models of food production misrepresent the direction, magnitude, and spatial pattern of risk compared with analyses that consider cross-sectoral interactions.

This study in addressing this difficult employs the Cambridge Risk Framework by Coburn et al, (2014) for identifying and analyzing complex risks - Taxonomy of Threats for Complex Risk Management in the below section.

Category	Sub-Category	Examples
Geophysical	Geological	Earthquakes, Tsunamis, Volcanic Eruptions, Landslides
	Meteorological	Tropical Cyclones, Thunderstorms and Lightning, Heatwaves and Cold Spells, Floods, Droughts
	Hydrological	River Floods, Coastal Floods, Lake Outburst Floods, Landslides and Slope Instability
	Climatological	Extreme temperatures, Droughts, Wildfires
	Biological	Epidemics, Pandemics, Insect Pests and Plant Diseases
Technological	Industrial	Explosions, Structural Failures, Chemical Fires, Oil Spills

	Transportation	Aviation Accidents, Train Derailments, Marine Accidents, Major Road Accidents
	Infrastructure	Power Outages, Telecommunications Failure, Water Shortages
	Cyber	Hacking, Data Leaks, Distributed Denial of Service Attacks
Societal	Economic	Financial Crises, Systemic Banking Crises, Oil Price Shocks, Sovereign Default
	Political	Interstate Conflicts, Civil Wars, Terrorism, Coup d'état
	Legal	Trusteeship Failures, Trade Disputes, and Other Legal Disputes
	Demographic	Genocide, Famine, Mass Population Displacements

4.6.1 Cambridge Risk MODEL For Taxonomy of Threats for Complex Risk Management

This study employs Cambridge taxonomy of macro-catastrophe threats framework to identify complex and climate risks in Africa. The framework has involved a process of reviewing chronological histories for over a thousand years to identify all the different causes of disruptive events, collating other disaster catalogues and categorization structures, and researching scientific conjecture and counter-factual hypotheses, combined with a peer-review process. The sections below provides the resulting Cambridge taxonomy of macro-catastrophe threats that have the potential to cause damage and disruption to social and economic systems Africa. The threat taxonomy is hierarchical and categorized by causal similarity.

Under each of these categories, the Cambridge taxonomy further identifies specific subcategories of threats, each with its own unique characteristics and potential impacts. For example, under natural catastrophes, subcategories could include volcanic eruptions, landslides, and asteroid impacts. The Cambridge Centre for Risk Studies has developed a complex framework for assessing these threats, which takes into account multiple factors, including the likelihood of an event occurring, the potential scale of its impacts, and the interconnectedness of global systems and economies. This framework is a comprehensive and sophisticated model that provides a framework for understanding the full range of potential catastrophic events that could affect the globe. The framework has 5 main categories of complex risks:

4.6.2 Finance and trade

Financial shocks are endogenous shocks in the financial system that arise when the financial system experiences failures of internal mechanisms, information asymmetry, or market inefficiency. The global financial crisis of 2008 had a significant impact on Africa's economies, primarily due to the decline in global demand for exports and the reduction of foreign investment. This led to a recession in many African countries, reducing their GDP growth rates and impairing the development of critical sectors such as agriculture, manufacturing, and services. The falling prices of commodities such as oil, cocoa, and copper have negatively affected many African countries that rely on exports. For instance, Nigeria's economy, which heavily depends on oil exports,

suffered an economic recession in 2016 following the sharp decline in oil prices on the global market.

Trade Disputes that harm international commerce and damage national economic productivity. These disputes can hinder regional or international economic integration and lead to reduced trade volumes, increased costs, and decreased profits. South Africa's trade dispute with Nigeria over chicken imports - In 2015, South Africa's chicken exporters were hit with a series of trade barriers, including increased tariffs and an import ban by Nigeria. The ban was justified by Nigeria as a measure to protect its local poultry industry from South African imports. However, South Africa's industry groups saw it as a violation of trade agreements between the two countries. The case was brought to the World Trade Organization (WTO) for arbitration, and the import ban was eventually lifted in 2019, with the agreement allowing South African poultry exports to enter Nigeria.

Another example is Ethiopia's trade dispute with Djibouti over the Doraleh Container Terminal (DCT) - The DCT is a major port in Djibouti, used by many countries in the region, including Ethiopia, to import and export goods. In 2018, Djibouti terminated its 30-year concession agreement with Dubai-based port operator DP World, which had invested heavily in developing the DCT. Ethiopia, which has a 19% stake in the terminal, saw this as a violation of its commercial interests and threatened legal action against Djibouti. The dispute has yet to be fully resolved and continues to affect trade flows

4.6.3 Geopolitics and society

Geopolitical conflict in Africa can be traced back to colonialism, which created artificial boundaries and fostered ethnic and religious tensions that continue to impact the continent today, issues related to resource allocation, power struggles and regional rivalries. Democratic Republic of Congo (DRC) one of the richest-in resources country in Africa has experienced decades of conflict, fueled in part by its vast mineral resources, which have attracted regional and international actors seeking to profit from them. The conflict involves a complex web of armed groups, some of which are supported by neighboring countries, as well as government forces. The conflict has claimed millions of lives and caused widespread displacement.

Political violence: Multiple coups and civil wars in African countries such as Mali, Central African Republic, Libya, and Somalia have had devastating effects on their economies. These events destabilized financial markets, disrupted trade, and discouraged foreign investment. Nigeria: The conflict in Nigeria is multifaceted, involving tensions between various ethnic and religious groups, as well as competition for resources and power. The Boko Haram insurgency, which began in 2009, has claimed thousands of lives and displaced millions of people in northeastern Nigeria. In addition, clashes between farmers and herders have resulted in significant violence in other parts of the country.

4.6.4 Natural Catastrophe & Climate

Climatic catastrophes: The Horn of Africa, which includes Somalia, Ethiopia, and Kenya, has experienced recurrent droughts due to climate change and poor water management practices. The droughts have led to crop failures, loss of livestock, and displacement of communities, particularly pastoralists who rely on livestock for their livelihoods. The droughts have also contributed to food insecurity and malnutrition in the region, particularly among children and vulnerable populations.

Natural catastrophes: Natural risks: This category includes natural disasters such as earthquakes, hurricanes, tsunamis, and volcanic eruptions. These events have the potential to cause significant damage to infrastructure and can result in the loss of many lives. Cyclone Idai in Mozambique, Zimbabwe, and Malawi - In March 2019, Cyclone Idai hit the southeastern African countries of Mozambique, Zimbabwe, and Malawi, causing widespread flooding, massive destruction of infrastructure, and the displacement of millions of people. According to the United Nations, over 1,300 people died, and millions were left in need of humanitarian aid.

Environmental catastrophes: Environmental risks are threats to the planet's ecosystem, including climate change, deforestation, and biodiversity loss. These threats can lead to the collapse of vital ecosystems, which in turn can harm human societies' ability to thrive. Oil spills in the Niger Delta: The Niger Delta region in Nigeria has experienced several oil spills due to poor maintenance of oil infrastructure, sabotage, and oil theft. The spills have contaminated water sources, destroyed farmlands and fishing grounds, and caused health problems for communities living in the area. The spills have also led to social unrest, with communities demanding compensation and better environmental management practices from the government and oil companies.

4.6.5 Technology and Space

Technological risks: This category includes emerging technologies such as artificial intelligence, nanotechnology, and synthetic biology. These technologies have the potential to cause significant harm if they are not developed and managed responsibly. Electronic waste dumping in Ghana - Ghana has become a dumping ground for electronic waste, leading to environmental pollution and health hazards. The Agbogbloshie dump site in Accra, which has become infamous for electronic waste dumping, has led to the release of toxic chemicals into the environment, affecting the health of the inhabitants. The dumping of electronic waste in Ghana is illegal, but inadequate enforcement and weak regulatory systems have enabled its continuation.

Externalities: are threats that arise from causes outside the earth’s atmosphere, from space objects or solar ionization processes, and these are clearly independent of other catastrophic triggers. Several African countries have launched satellites into orbit in recent years, including Nigeria, South Africa, and Egypt. However, the increasing number of objects in space has raised concerns about the risk of collisions with space debris, which can damage or destroy satellites. In 2019, a dead Russian military satellite collided with an old Chinese satellite, creating a debris field that threatened to endanger

other satellites in orbit. In 2019, a solar storm caused widespread telecommunication disruptions in South Africa, affecting the country's satellite-based communication systems. In 2018, debris from China's Long March 5B rocket launch fell in a village in Côte d'Ivoire, causing damage to several homes.

4.6.6 Health and humanity

Disease Outbreaks: Biological risks include pandemics, bioterrorism, and genetically modified organisms that could cause widespread harm to human health and the environment. The Ebola outbreak in West Africa from 2014 to 2016 disrupted economic activities in the affected countries, causing widespread unemployment and loss of income. This was due to the imposition of travel restrictions, which reduced economic interactions between affected countries and their trading partners. The outbreak also led to a decline in tourism, which affected the hospitality industry in the region.

Humanitarian Crises' are catastrophes that are triggered by changes in populations, such as through mass migrations, or demographic shifts, or depletion of natural resources. Africa has experienced significant migration flows in recent years, driven by factors such as conflict and climate change. Conflict in South Sudan has caused over 2 million people to flee the country, while droughts in the Sahel region have led to mass migration within the region. Africa is experiencing rapid population growth, which can lead to significant challenges such as food insecurity, unemployment, and inadequate infrastructure. For example, by 2050, it is expected that Africa's population will reach 2.5 billion, which will require significant investments in infrastructure and social services to cater to the growing population.

4.6.7 Other risks

The 'Other' category of macro-catastrophe threats is recognition that although the categorization has been as exhaustive as possible, there remains the potential for new causes of disruption to become recognized. The advent of artificial intelligence has the potential to revolutionize several industries in Africa, such as healthcare and agriculture. However, AI also poses new risks related to ethics, privacy, and social implications. The impact of AI on employment and job displacement is also an emerging risk that cannot be adequately assessed at the moment.

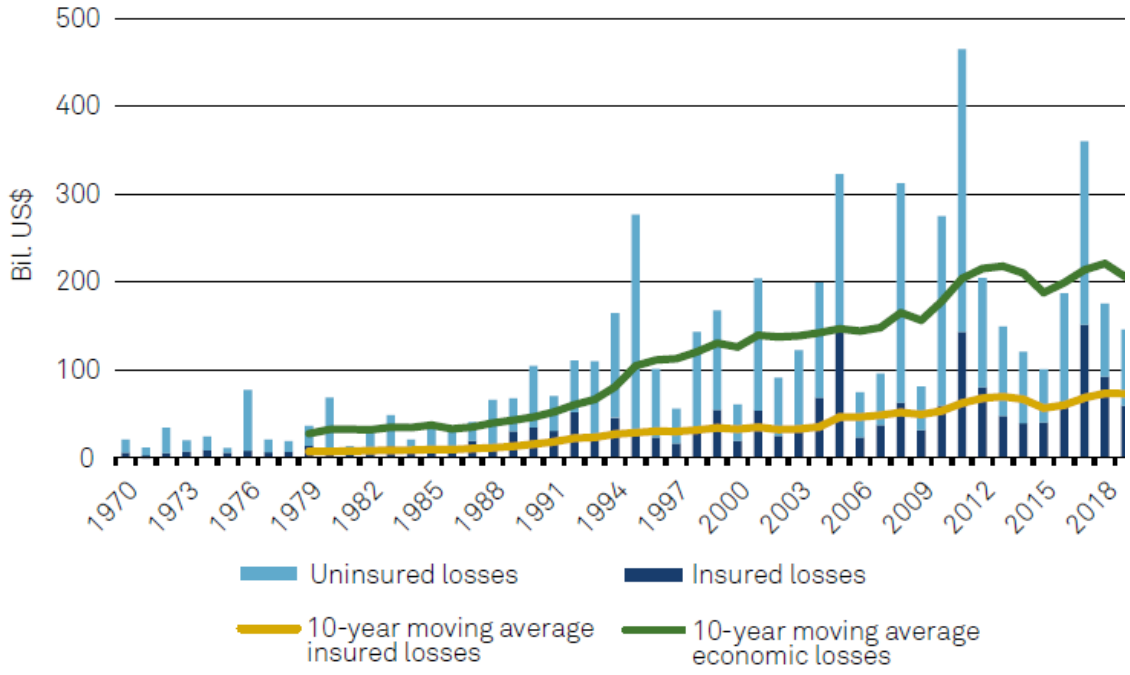
CHAPTER FIVE

5 UNDERWRITING CAPACITY GAP FOR PRIORITY COMPLEX AND CLIMATIC RISKS IN AFRICA

5.1 Protection gap

In the context of the insurance industry, the risk protection gap is the difference between the insurance covers that are economically beneficial to have and the cover that is actually in place should a loss event occur. Insurance penetration to GDP at a global level has fallen from 7.5 % in 2007 to 6.6 % in 2019. While the penetration has grown in some developing economies, it has not been enough to arrest the slide at a global level. In fact, global wealth has been growing faster than insurance premiums. The pandemic has highlighted the need for governments to improve their economies' resilience to big financial shocks, like those associated with natural catastrophes and epidemic diseases. In June 2020, the International Monetary Fund indicated global economic losses from COVID-19 of about $12 trillion over 2020–2021 while Munich Re estimates insured property/casualty losses at $30 billion–$107 billion for 2020.

Figure 5.1: Uninsured losses are growing faster than insured losses
Insured versus uninsured losses, 1970-2019



Source: Swiss Re Institute, 2020

The need for insurance has continuously outpaced capacity of the insurance industry to provide protection. This demonstrates a continuously growing opportunity. Globally, an estimated USD 4 trillion has been lost over the past 40 years to extreme natural disaster events, of which USD 2.9 trillion were caused by climate-related events, such as windstorm, flood, drought, hail, and brushfire, and USD 1.1 trillion by other natural catastrophes such as earthquake and tsunami. Some USD 1.1 trillion were recovered through insurance and about 2.9 trillion remained uninsured (Swiss Re, 2020). This aggregate loss data illustrates the large protection gap for extreme, and particularly climate-related, risks. Narrowing the gap requires a more detailed understanding of the components of the gap and the root causes, in order to design relevant and actionable measures.

5.2 Insurance in Africa

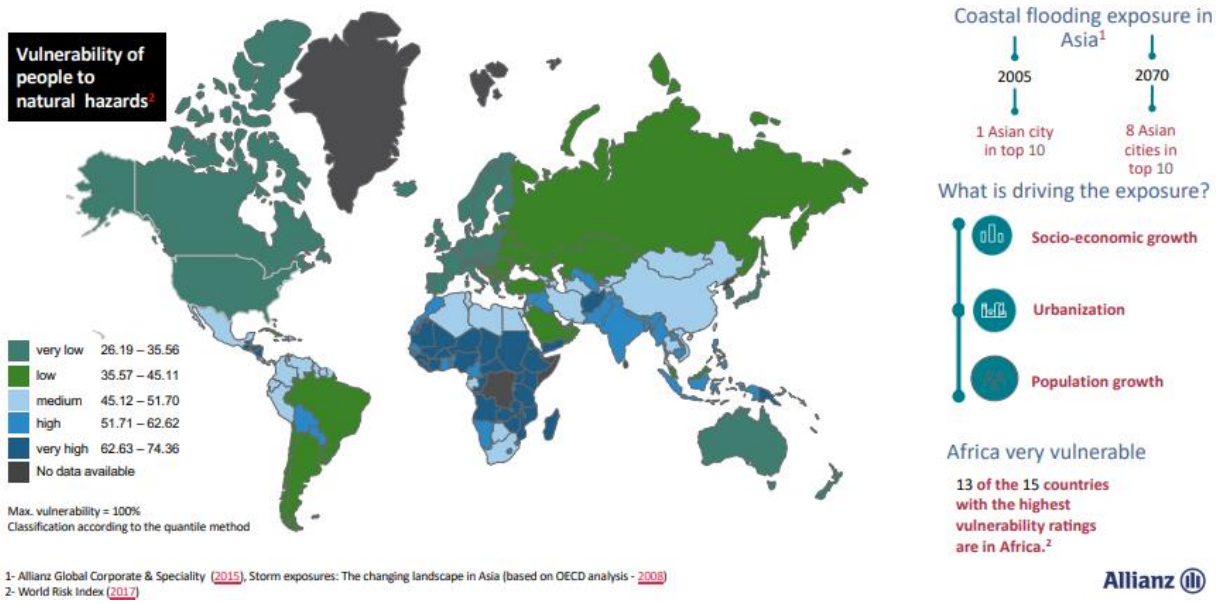
The African insurance industry currently holds a valuation of $68 billion as measured by gross written premiums. In 2017, Africa premium grew by 12% in $ terms to $ 66.6billion making Africa real premium growth second fastest in the world next to Asia (Africa Insurance Barometer, 2019). The total insurance penetration rate in Africa was just 2.98% in 2018, indicating the immense potential for the market to expand amid growing financial entrepreneurship and cross-sectoral projects across the continent. In 2018, the steepest growth of premiums occurred in the East Africa region at 4.9%, followed by North Africa, while the largest insurance market in South Africa experienced weak growth.

Landscape of Microinsurance in Africa report in the same year of 2018 reported that in the year in 2017 total of 15million lives covered which is about 2% of the estimated 700million people in the low-income bracket in the Continent out of the population of 1.3 billion. A total of $ 420million in GPW representing less than 1% of overall GPW in Africa was from Microinsurance. Similar study in 2014 reported 61.2million lives covered and $ 756m in GPW from Microinsurance, meaning less premium from the inclusive market segment while overall GWP continued to grow.

About 70% of global economic losses for valuable assets are uninsured (Swiss Re, 2021). The rate is even higher in Africa, where insurance penetration is low – except for South Africa and Namibia. In 2018 the global average penetration in non-life insurance stood at 2.8% of non-life premiums as a share of GDP, or at 1.5% for the emerging markets. Africa – except for South Africa – ranked far below that rate with Morocco at 2.1%; Kenya at 1.4%, Algeria at 0.6% and Nigeria at a low of 0.2%.

A large proportion of developing-country populations, especially the lower-income groups, are currently uninsured, leaving them squarely in this risk protection gap and therefore financially vulnerable. Furthermore, as uninsured loss events materialise, the resources available for buying appropriate insurance cover diminish. So the risk protection gap widens. Compounding this challenge are the growing environmental changes, such as climate change, that exacerbate the potential loss exposure of the uninsured. Standard insurance business models and products cannot close the risk protection gap, or even prevent it widening.

Figure 5.2: Global Map of vulnerability to natural hazards



5.2.1 Causes for the expanding protection gap

The 'protection gap' is defined as the uninsured portion of losses resulting from an event, namely the difference between total economic and insured losses. The term 'underinsurance', on the other hand, may be defined as the difference between the amount of insurance that is economically beneficial – which may include some rationally chosen self-insurance – and the amount purchased.

One key reason for underinsurance relates to limitations in the supply of insurance for certain risks. Insurable risks are measurable, have independent loss occurrences, manageable average and maximum losses, premium rates that are acceptable to both insurer and insured, and adequate industry capacity.2 Insurability can be challenged by situations of ambiguity, in which insurers don't know the probability distribution of a risk (Kunreuther et al., 1995 or Courbage and Liedke, 2003). Some catastrophes change the insurer's perception of the underlying risk, leading to capacity shortages. However, the industry typically overcomes such periods through the adaptation of data and modeling, leading to a subsequent recovery in capacity. Examples are the market disruptions caused by Hurricane Andrew (1992) and Hurricane Katrina (2005), which both were followed by significant improvements in risk modeling and waves of new capital entering the market to increase capacity. Low barriers for capital to enter the natural catastrophe reinsurance market facilitated the swift replenishing of capital after each market disruption. In most years, supply side capacity has not been a constraint to catastrophe risk coverage.

The diversification of a market portfolio can be incomplete for risks with fat tails and dependencies, resulting in more capital requirements and higher premiums (Kousky and Cooke, 2012). Extreme cases of a non-diversification trap could lead to market failure, according to modeled results (Ibragimov and Walden, 2007 and Ibragimov et al., 2009). The diversification

of extreme event scenarios is increasingly facilitated by the evolution of capital market instruments like cat bonds which spread risks to a much broader base of investors.5 Scenarios that may have challenged diversification in the global reinsurance market are better diversified in the global capital markets.

Affordability is perhaps another one of the biggest reasons for underinsurance, particularly for lower-income households and small and medium-sized enterprises. For instance, Eling et al. (2014) and Cole et al. (2013) find a significant price elasticity of demand for microinsurance. On the supply side, insurance contracts cannot be scaled down efficiently for lower-income customers due to transaction costs (Beck et al. 2008). Sustainability of insurance markets requires that insurance premiums are commensurate with the underlying risk. Risk-adjusted premiums can also provide risk takers with price signals about their hazard exposures and thereby encourage risk reduction and mitigation measures. Risk-based premiums also reflect the cost of capital that insurers must hold as buffer against the risk of catastrophic losses (Kousky and Kunreuther 2014). Risk-adjusted premiums challenge low-income individuals residing in hazard-prone areas. Born and Klein (2016) find trade-offs between regulation that is intended to promote affordability and the competitiveness of the market.

5.2.2 Trends in protection gap

There is a substantial natural catastrophe protection gap worldwide. Swiss Re's sigma data show economic losses from natural disaster events averaged USD 171 billion each year in the last decade (2007-2016), with 72% of that uninsured (Sigma, 2019). In 2022, according to Sigma, only 45%, or USD 125 billion, of global economic losses of USD 275 billion were insured. This means that millions of households and businesses face a large protection gap. With climate change, environmental devastation, and ever more people concentrated in high-risk areas, impacts from natural catastrophes will continue to grow.

Earthquakes, floods and windstorms are the costliest perils, particularly in areas of high population and property value concentrations. The relative importance of the three major natural world perils – storms, floods and earthquakes – in the natural catastrophe protection gap has been stable over time. Individual events generate considerable variation in uninsured losses but from 1990 through 2016, the average uninsured portions have been around 53% for windstorms and 85% for floods and 92% for earthquakes. The share of uninsured property losses as a result of natural catastrophes varies by region. Typically, the gap is smaller in the mature (60%) than in emerging markets, where an average 95% of economic losses are uninsured.

In relation to economic activity measured by GDP, uninsured losses are growing and there is a shift of exposures moving to emerging economies, which are less resilient in coping with the economic disruptions caused by large catastrophes. Globally, uninsured losses from natural catastrophes have increased from 0.09% of GDP in 1990 to about 0.17% of GDP in 2016.

5.3 Underwriting capacity of the insurance market in Africa

Insurance penetration rate at 2.8% for the African countries, and this presents a big untapped market opportunity for companies interested in providing affordable insurance products suitable for the mass market.

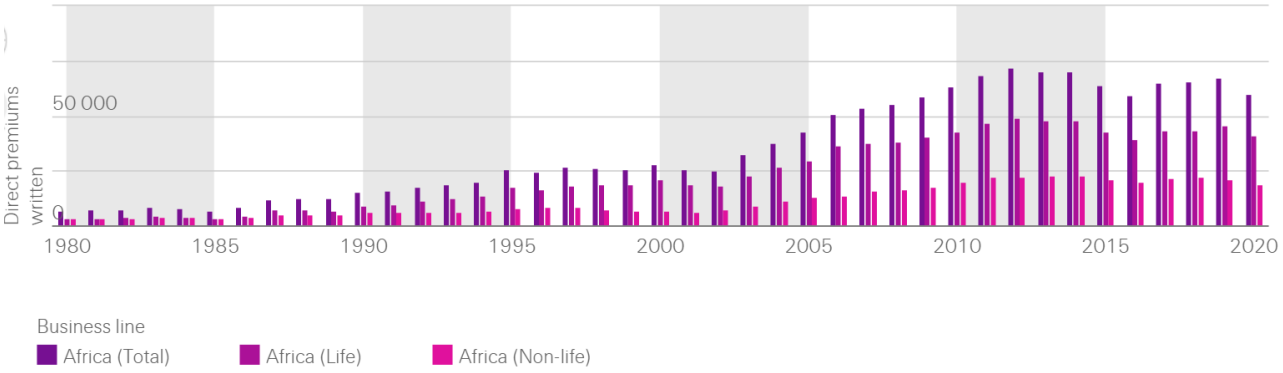
Table 5.1: Insurance industry in Africa: trends in life and non-life premiums (2016-2020)
In millions USD

	2020	2019	2018	2017	2016	Growth rates
Life premiums	41097	45911	43429	44 899	39 465	13.77%
Non-life premiums	19093	21371	22195	21 792	19 943	9.27%
Total	**60190**	**67282**	**65625**	**66 691**	**59 408**	**12.26%**

Source: Sigma Report

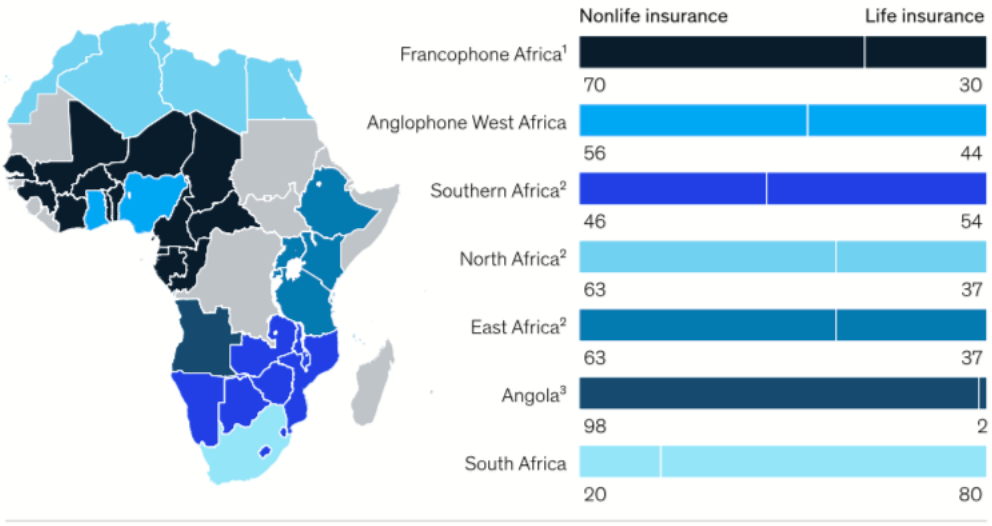
The growth trend above is depicted in figure 5.3 below which shows despite challenging times the insurance industry in the Continent has been on the growth trajectory.

Figure 5.3: Growth trajectory of insurance in Africa between 1980 - 2020



Source: Sigma, 2022

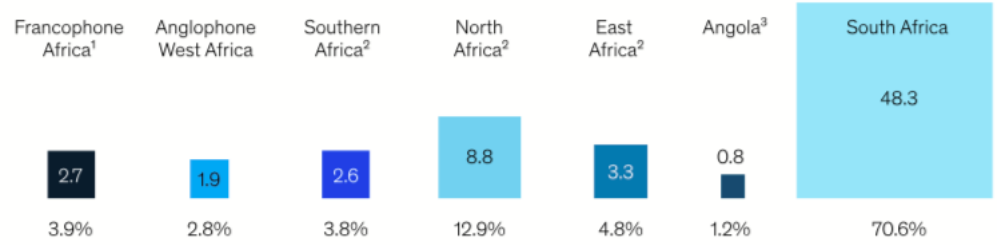
Figure 5.4: GWP type in Africa by region in 2018 percentages



Souce: McKinsey, 2022

A number of recent developments and insurance product innovations present new opportunities for investment in Africa that have potential to benefit first-movers, whether global and domestic insurers. The concept of micro-insurance is only starting to emerge. These small-scale, low-cost, and low-risk products are ideal for accessing Africa's rising middle class (Signe and Johnson, 2020).

Figure 5.5: GWP in Africa by regions as share of total in 28 $ billion



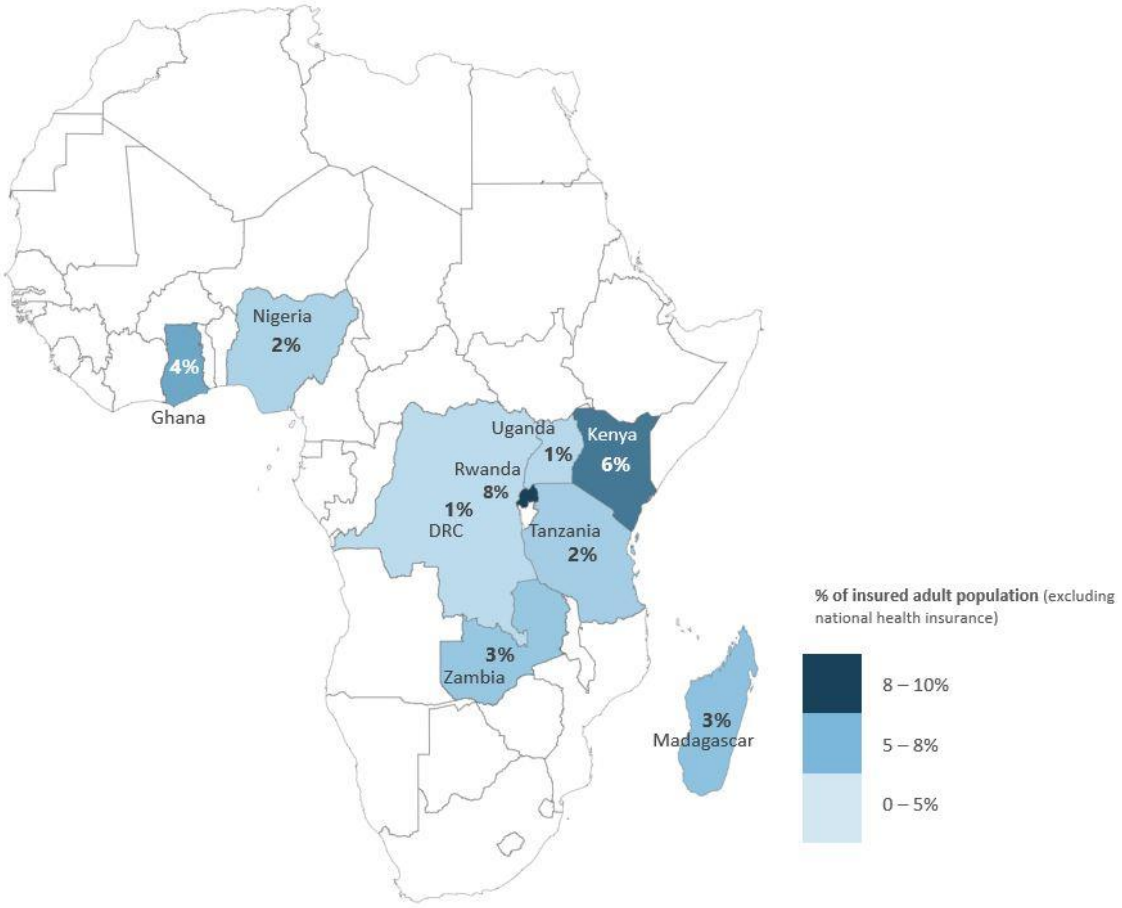
Source: McKinsey, 2022

Africa insurance market is significantly skewed with South Africa contributing more than 70% of GWP in the Continent. North Africa comes second with 12.9% of GWP has a penetration of 1.3% while Southern Africa with Namibia, Zimbabwe, Zambia, Malawi and Mozambique with a 2.2% penetration has only 3.8% of Continent's GWP. East Africa, the second fastest growing region at 4.6% contributes only 4.8% of GWP with a penetration of 1.2% of GDP.

5.4 The Protection Gap in Africa

A significant portion of the population in Africa is underinsured, leaving them exposed to risks and unable to manage and recover from them. Less than 10% of the adult population in nine sub-Saharan African (SSA) countries have private insurance, as shown by Figure 1, despite 54% (122 million individuals) of the total population across these countries having experienced an insurable risk in the last year (Cenfri, 2020).

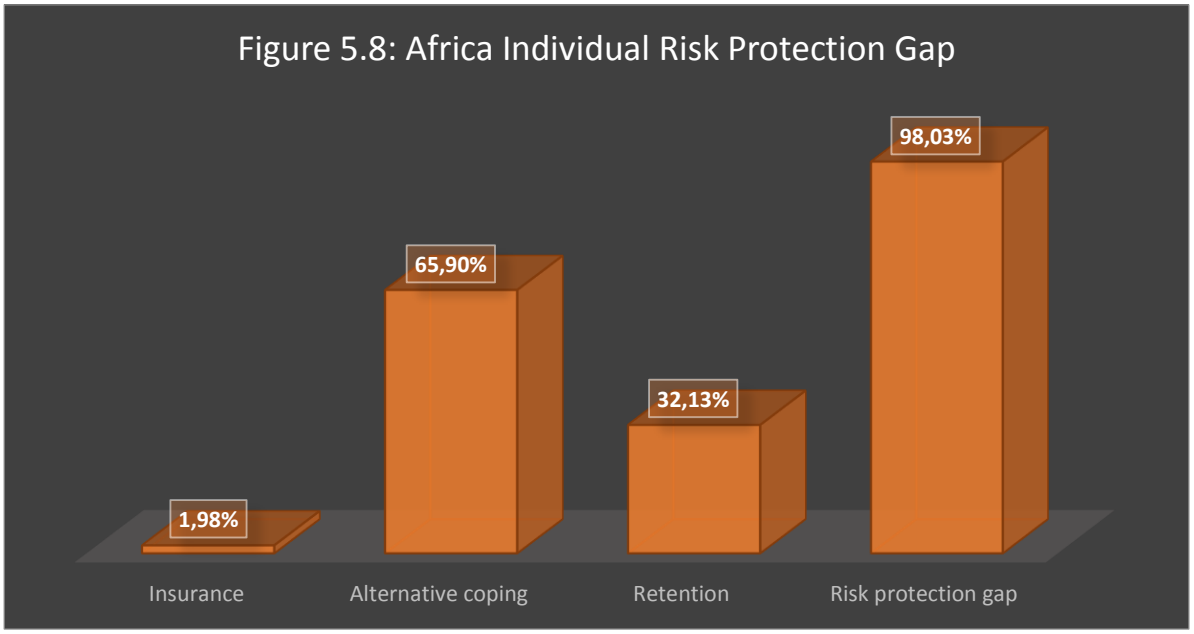
Figure 5.6: Percentage of formally insured individuals across selected SSA countries (excluding national health insurance)



Source: Cenfri, 2021

The disparity between the uptake and need for insurance indicates that there is a large risk protection gap in Africa. Using FinScope datasets (which are nationally representative consumer surveys implemented by local governments and stakeholders to gauge consumer realities, perceptions, needs and current usage of various types of formal and informal financial services), the study was able to develop a better understanding of individual risk protection gap in Africa.

Based on the demand-side data available through the FinScope datasets, the study defined the risk protection gap as the number of individuals who used coping mechanisms other than insurance to manage insurable risks, or who did nothing and therefore could not manage the risk event. Inferencing model used by Cenfri (2020) to establish individual protection gap, the study establish that 32.13% of the population did nothing to manage risks they faced, 1.98% used insurance and 65.898% used other coping mechanisms.



Source: Author's analysis

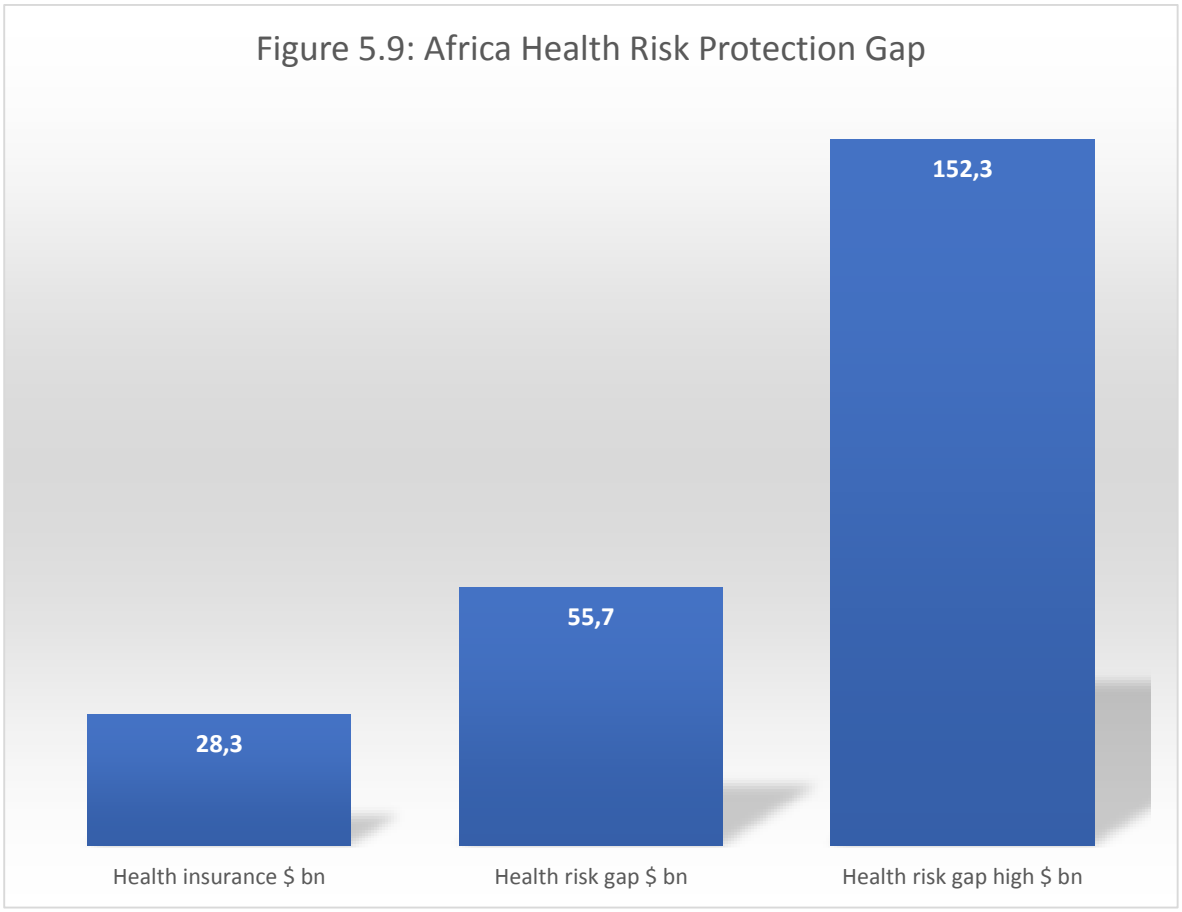
5.4.1 Health risk protection gap

African countries domestic health spending per capita in 2020 at an internationally accepted target US$60 per capita[21] for universal coverage of a package of essential health services to $129 per capita in some countries [22].

According to Grandview research (2022), the Africa health insurance market size was valued at USD 28.3 billion in 2022 and is expected to expand at a compound annual growth rate (CAGR) of 5.26% from 2023 to 2030 to USD 50.3 billion.

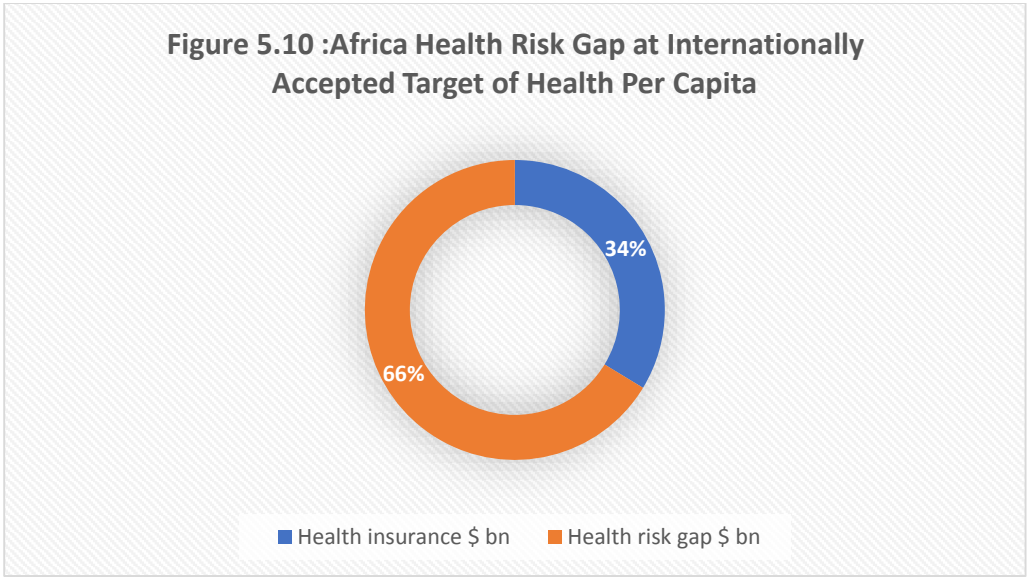
[21] USAID 2022, Report Analyzes Africa's Health Financing Outlook, https://www.hfgproject.org/report-analyzes-africas-health-financing-outlook/

[22] https://www.un.org/africarenewal/magazine/october-2020/public-financing-health-africa-when-15-elephant-not-15-chicken#:~:text=Currently%20African%20countries%20spend%20%248,countries%20that%20spend%20above%20%244%2C000.



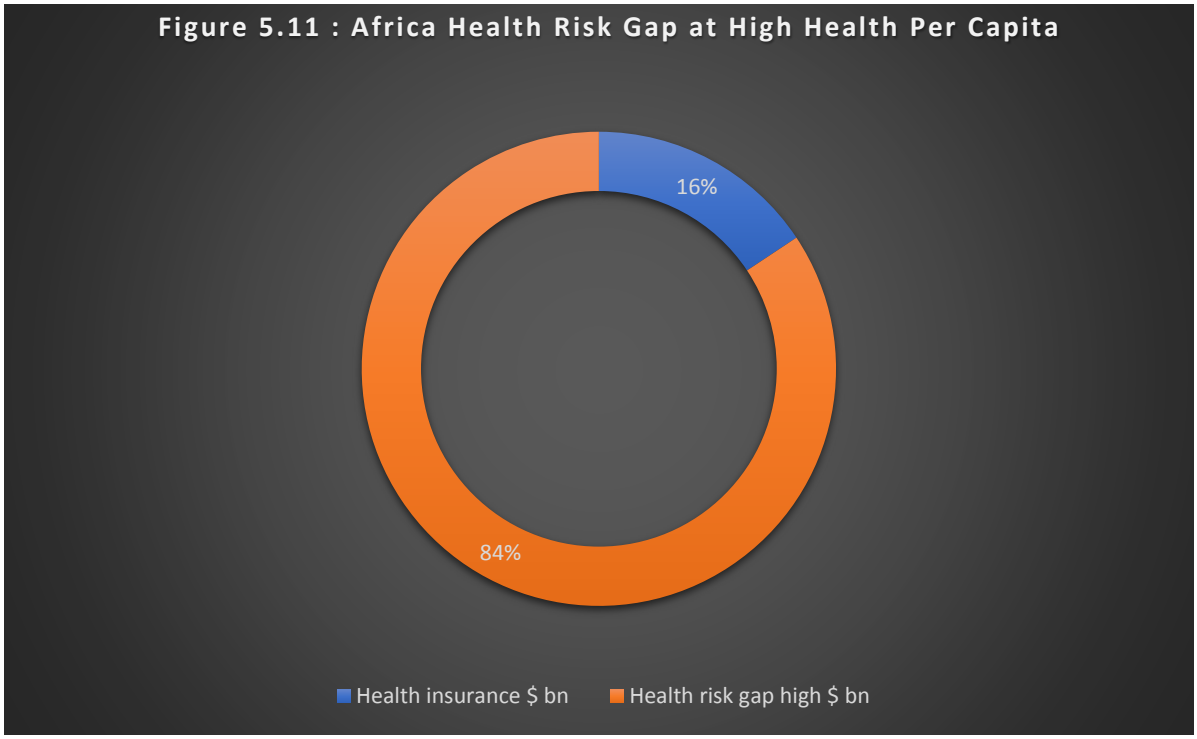
Source: Author's analysis

With health per capita at internationally accepted target the insurance industry will need to twice the existing capacity. As shown in the figure 5. below, Africa health risk protection gap stand at 66% in monetary terms when the health GWP of 2022 is compared to proposed health per capita of the USAID at $ 60.



Source: Author's analysis

At high health per capita cost as per the UN 2022 of $ 129 the Africa health protection gap expand to five (5) times as shown by figure 5. Below.

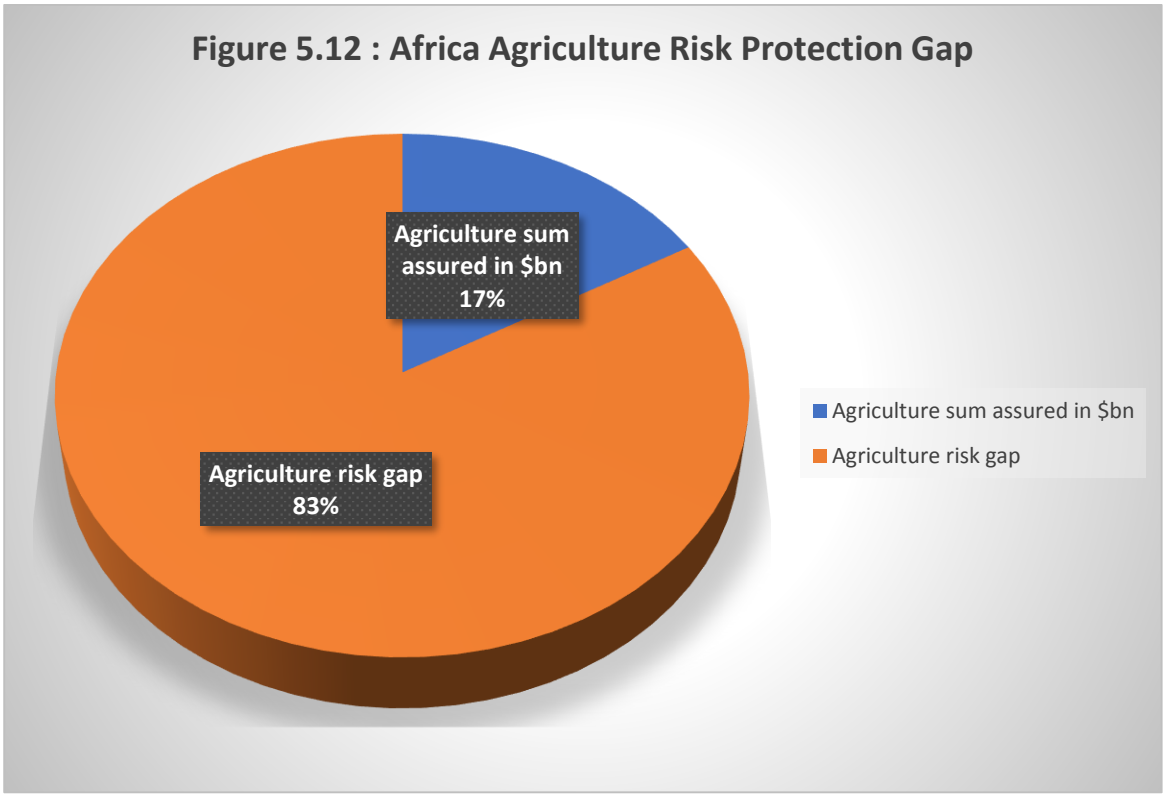


Source: Author's analysis

5.4.2 Agriculture risk protection gap

Agriculture has been argued to be the single most important economic activity in Africa. It provides employment for about two-thirds of the continent's working population and for each country contributes an average of 30 to 60 percent of gross domestic product and about 30 percent of the value of exports[23]. According to World Economic Forum (2023), Agriculture makes up 35% of Africa's GDP and employs about half of its people.[24] However, only 1% of Africa's GWP comes from agriculture insurance (Microinsurance Landscape Survery, 2018). According to AfDB (2022), Africa continent loses between 5% and 15% of gross domestic product to climate change. The study uses average of 7.5% of GDP lost due to climate change from the 30% GDP of the Continent. With GWP of $ 68 billion and GDP of $ 2.6trillion, Africa agriculture risk protection gap stands at $ 48.79bn as shown in figure 5. Below.

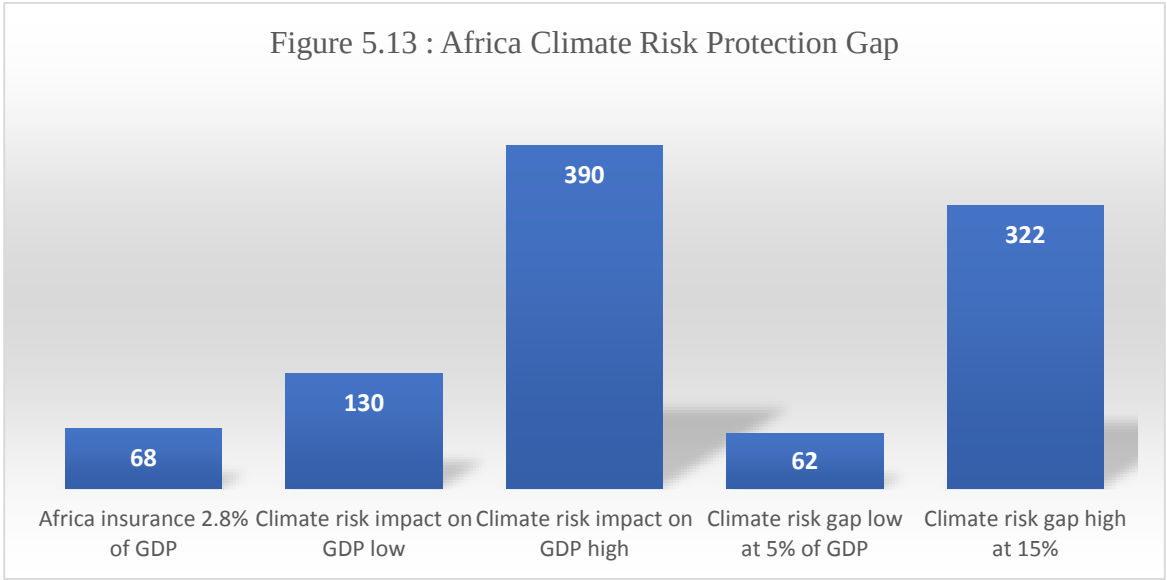
[23] https://www.britannica.com/place/Africa/Agriculture
[24] https://www.weforum.org/agenda/2023/03/how-africa-s-free-trade-area-will-turbocharge-the-continent-s-agriculture-industry/



Source: Author's analysis

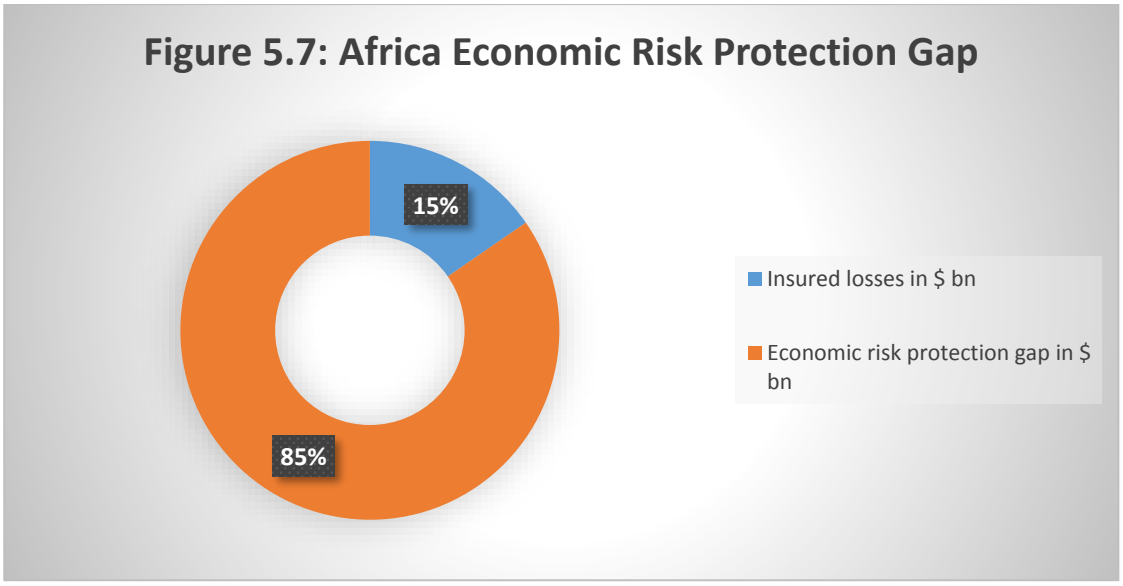
5.4.3 Africa Climate Risk Protection Gap

Based on Africa GDP estimates by the AfDP of 2022 whereas Africa GDP stood at $ 2.6 trillion and the estimated loss on GDP from climate change of between 5% - 15% the study establishes that Africa climate protection gap is between $ 62billion to $ 322bn as shown in table 5. Below.



Source: Author's analysis

According to a report by Swiss Re (2019), Africa's economic losses totaled USD1.3 billion and insured losses totaled USD0.2 billion, which equates to a risk protection gap of USD1.1 billion or 85%.



Source: Swiss Re and Author's Inferencing

CHAPTER SIX

6 ILS SOLUTIONS THAT CAN BE USED TO COVER THE UNDERWRITING CAPACITY GAP

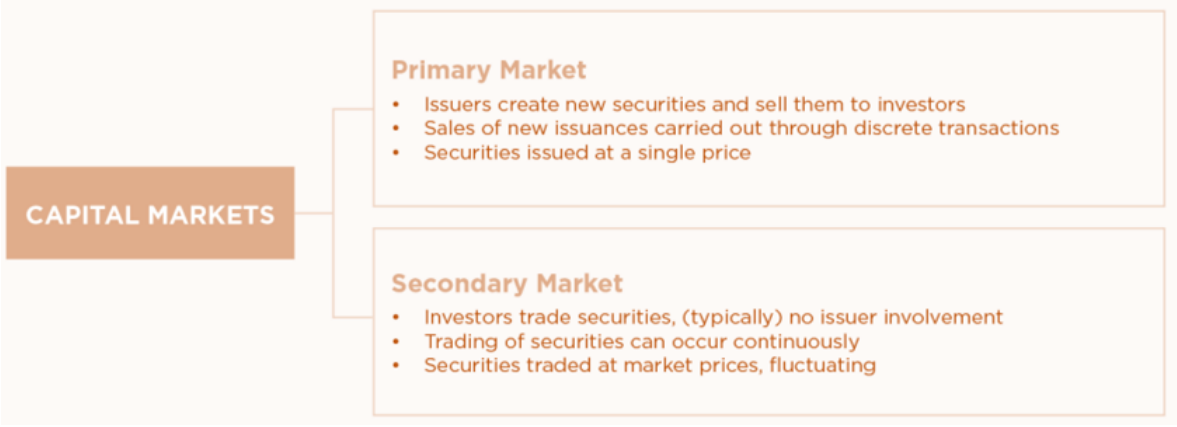
6.1 CAPACITY OF CAPITAL MARKETS GLOBALLY

Capital markets recognize and drive capital to the best ideas and enterprises. Coupled with the free flow of capital, innovation is an integral component to a country for supporting job creation, economic development, and prosperity. Markets facilitate the transfer of funds from those who seek a return on their assets to those who need capital and credit to expand. Clients benefiting from healthy capital markets include not just individual investors but also institutional investors, governments, and corporations. Capital, raised through equity and debt, can be used to grow businesses, finance investments in new plant, equipment and technology and fund infrastructure projects. This creates jobs and flows money into the economy. Additionally, individuals and businesses can invest in securities to generate wealth.

6.1.1 Capital Market

Capital Markets are Markets for long term funds. Companies and governments can raise funds for financing development projects by selling shares and other securities like bonds to members of the public. The key function of capital markets is to mobilize resources from savers and channel them to investments and thus fuel economic development.

Figure 6.1 Capital Market Functions



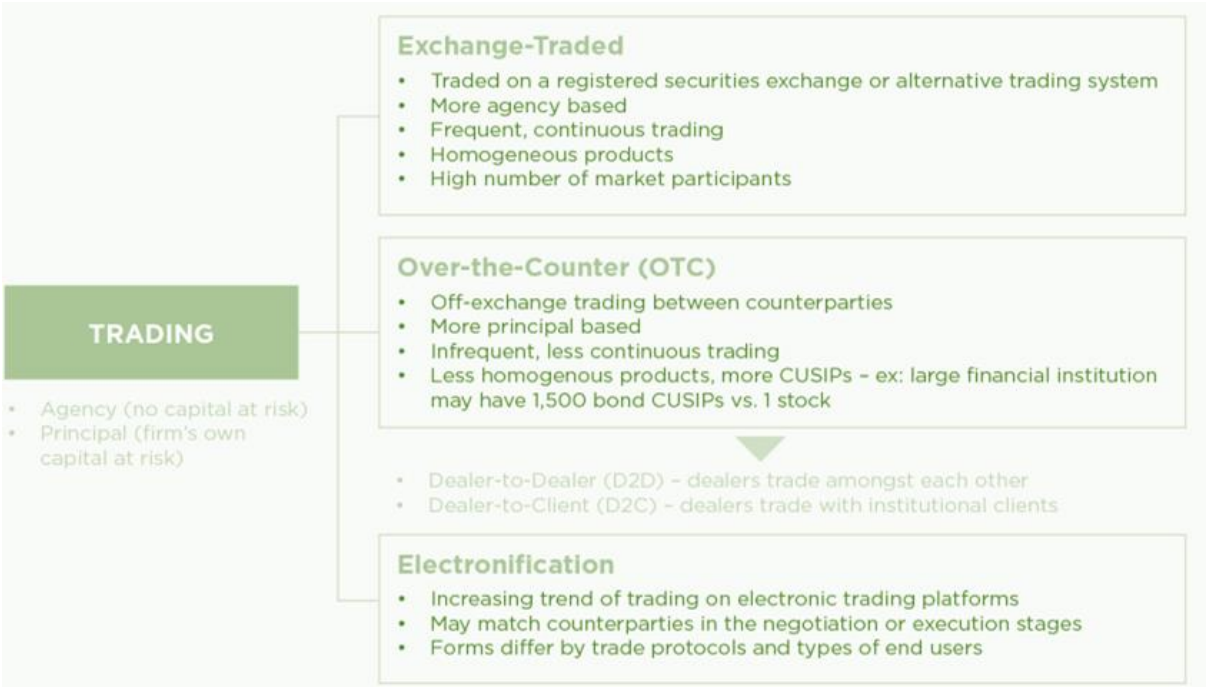
6.1.2 Market Structure

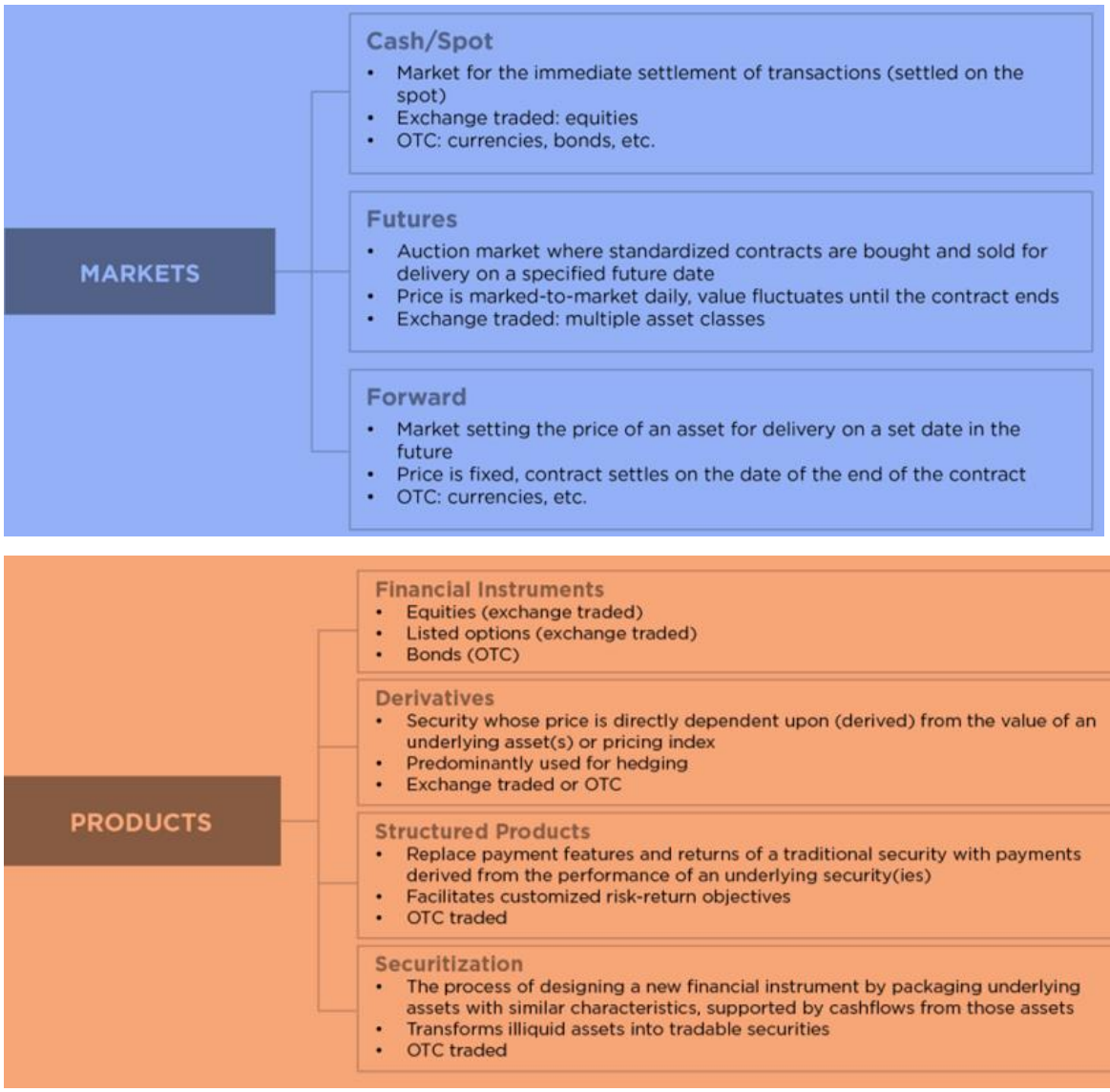
Primary and secondary markets are symbiotic in nature. Efficiently functioning primary markets maintain the depth and liquidity in secondary markets. Healthy secondary markets give issuers confidence their needs will be met at a good price level in primary markets, and their cost of capital will be lower at issuance when there is a liquid secondary market.

6.1.3 Primary Markets

6.1.4 *Secondary Markets*

Robust and efficient secondary markets are imperative for value multiplication. In addition to promoting capital formation, investors utilize secondary markets (trading) to generate returns and manage risk. Market making enables the efficient flow of financial markets. Market makers stand ready to buy and sell securities at all times, thereby providing the necessary liquidity for markets to function efficiently.





6.1.5 Types of Derivatives

• Futures: Agreement to purchase or sell an asset at an agreed upon price at the end of the set contract date (contract may be satisfied by delivery or offset)

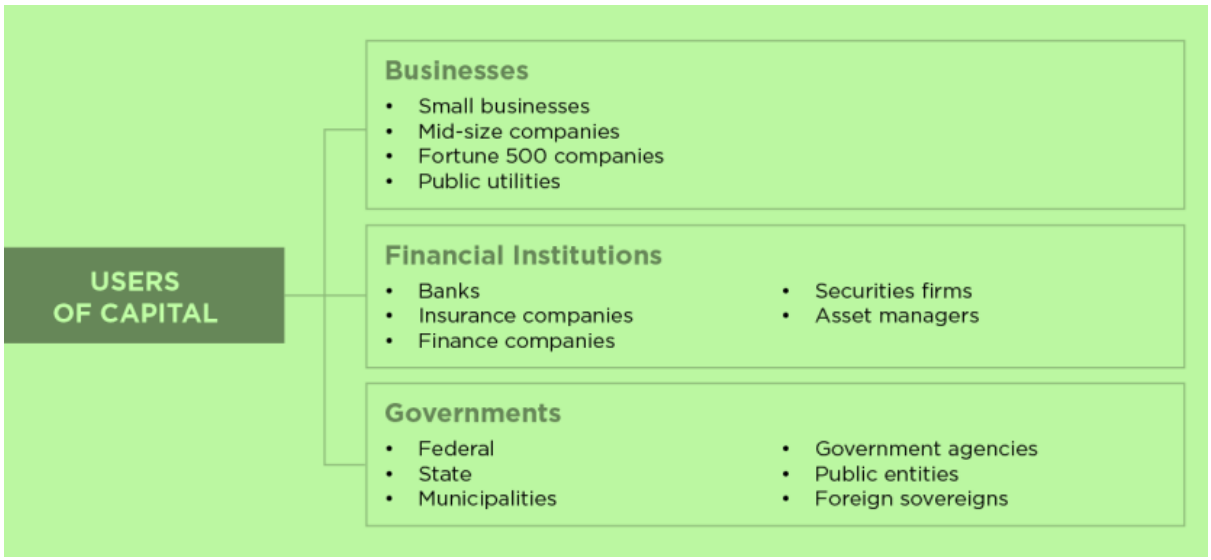
• *Options: Contract granting the right (not the obligation) to buy or sell an asset at a set strike price (price the contract may be exercised, or acted on) by an expiration date (date the option no longer has value/exists)

• Forwards: Agreement to deliver an asset at a specified future date and set price (agreed upon in advance or agreed upon at time of delivery)

• Swaps: Exchange of one asset or liability for a similar asset or liability for the purpose of lengthening or shortening maturities, or otherwise shifting risks (ex: different currencies, exchanging income flows, etc.)

6.1.6 Users of Capital

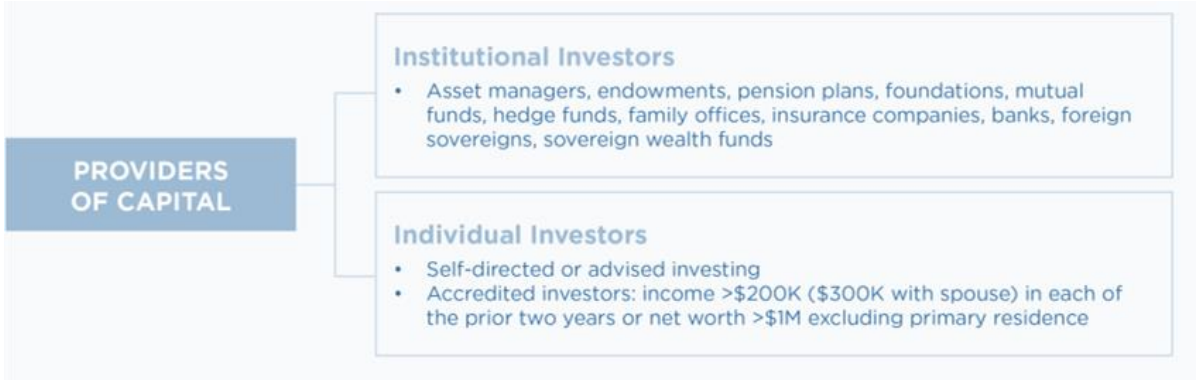
Why do issuers need capital? Finance operations; invest in organic growth and expansion plans; fund mergers and acquisitions; pay down existing debt; underwrite public projects.



How do issuers acquire capital? Generate cash flow from operations; obtain bank loans, lines of credit; divest assets; issue debt, commercial paper or equity.

6.1.7 Why do investors invest?

• Generate investment returns: Invest cash to generate income; exit an investment to realize a gain/loss; continually rebalancing investment portfolios



Risk management tools: Hedge portfolio risk; trade securities to change overall risk profile; change assumptions on future state of markets or securities.

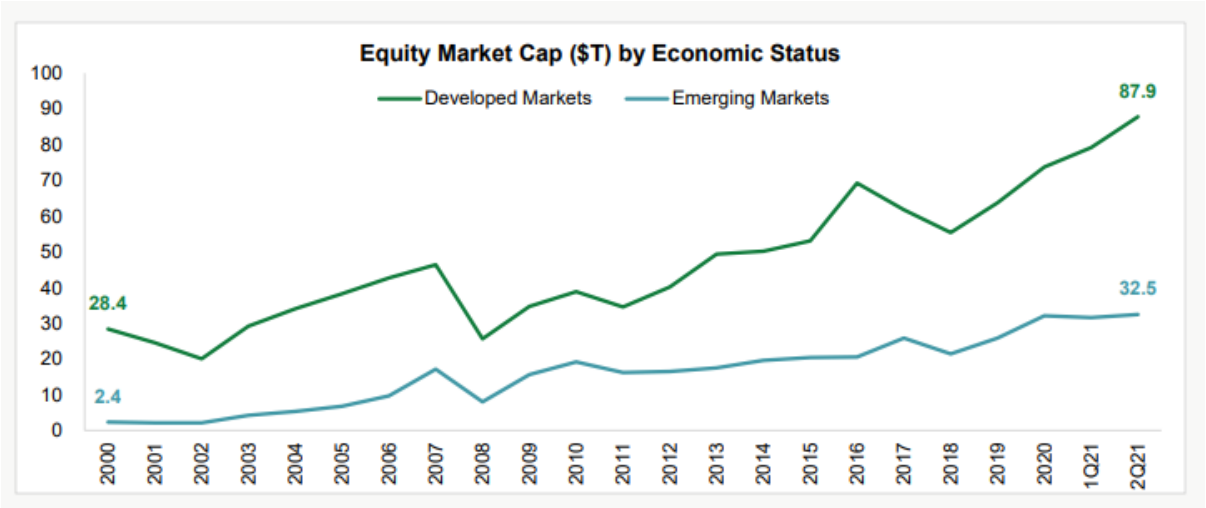
6.2 Global Capital Market

Global market cap grew to $120.4 trillion in 2021, from $30.7 trillion in 2000 (+291.5%, +6.4% CAGR), with AsiaPac representing the biggest gainer over the past few decades.

• Americas: $52.3T in 2021, from $16.4T in 2000 (+218.6%, +5.4% CAGR); from 53.4% total global market cap to 43.4%

• EMEA: $28.7T in 2021, from $9.4T in 2000 (+205.7%, +5.2% CAGR); from 30.5% total global market cap to 23.8%

• AsiaPac: $39.4T in 2021, from $4.9T in 2000 (+696.0%, +9.9% CAGR); from 16.1% total global market cap to 32.7%



6.2.1 Global Market Performance Overview

The report on index performance (trends in representative index prices) across the globe highlight the following trends:

• Developed vs. Emerging: Emerging markets outperformed over the entire time series (2000-2021), emerging CAGR +6.1% vs. developed +3.8%; trend reversed post COVID, developed CAGR +11.2% vs. +8.6% emerging (2019-2021)

• Best Performing Region: The Americas is the best performing region for both the whole time series and post COVID,+4.8% and +12.9% CAGRs respectively

• Worst Performing Region : Europe is the worst performing region for both the whole time series and post COVID, -1.0% and +5.5% CAGRs respectively

• Best Performing Country: For the entire time series, Brazil is the best performing region at a +9.7% CAGR; post

COVID, the U.S. is the top performer at a +12.8% CAGR (surprisingly, China was not on top: +6.5% and +11.1% CAGRs respectively)

• Worst Performing Country : The U.K is the worst performing country for both the whole time series and post COVID, +0.4% and -1.2% CAGRs respectively.

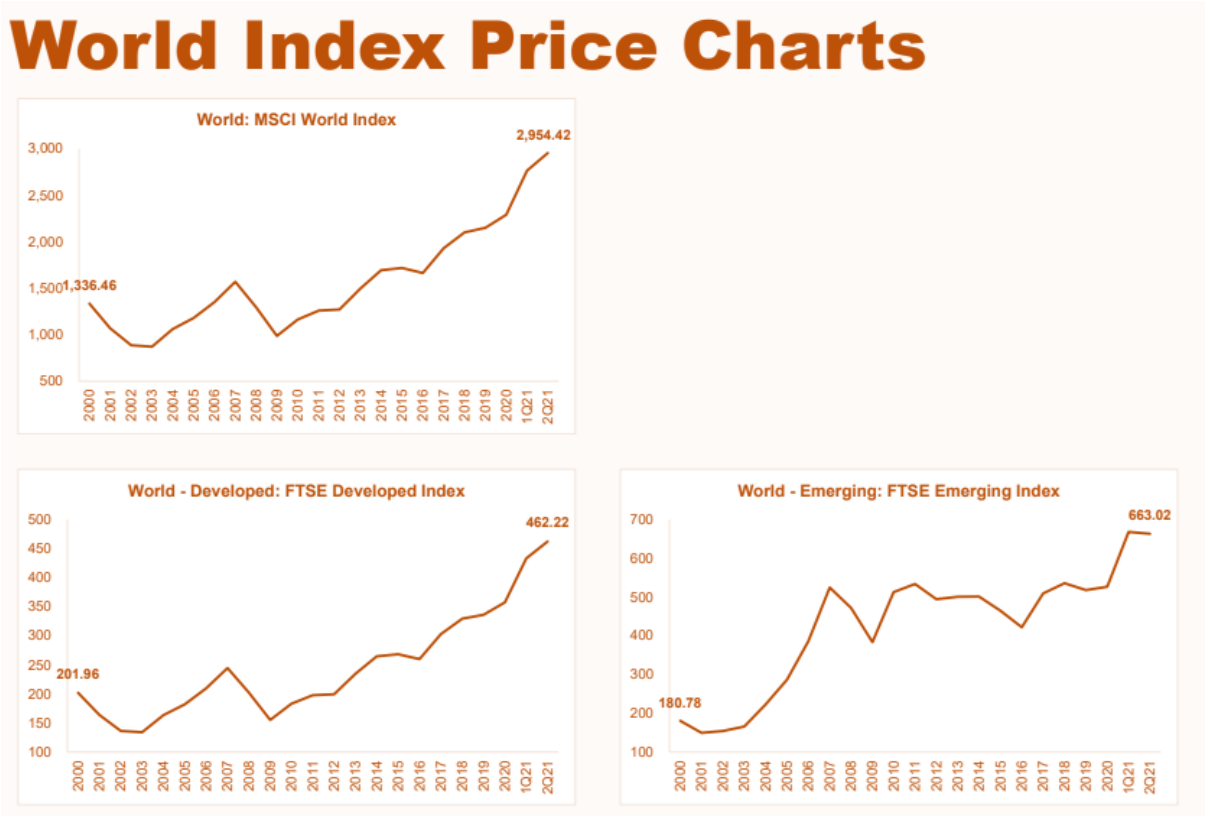
6.2.2 World Comparison

Since the time series looks back to 2000, emerging markets outpaced developed (+6.1% CAGR vs. +3.8%) as many emerging countries like China experienced substantial growth rates. However, this trend reverses when looking at post COVID price appreciation for the representative indexes, developed +11.2% CAGR vs. emerging +8.6%).

• World: +121.1% from 2000 to 2021, +3.7% CAGR; +37.3% from 2019 to 2021 (vs. pre COVID), +11.16% CAGR

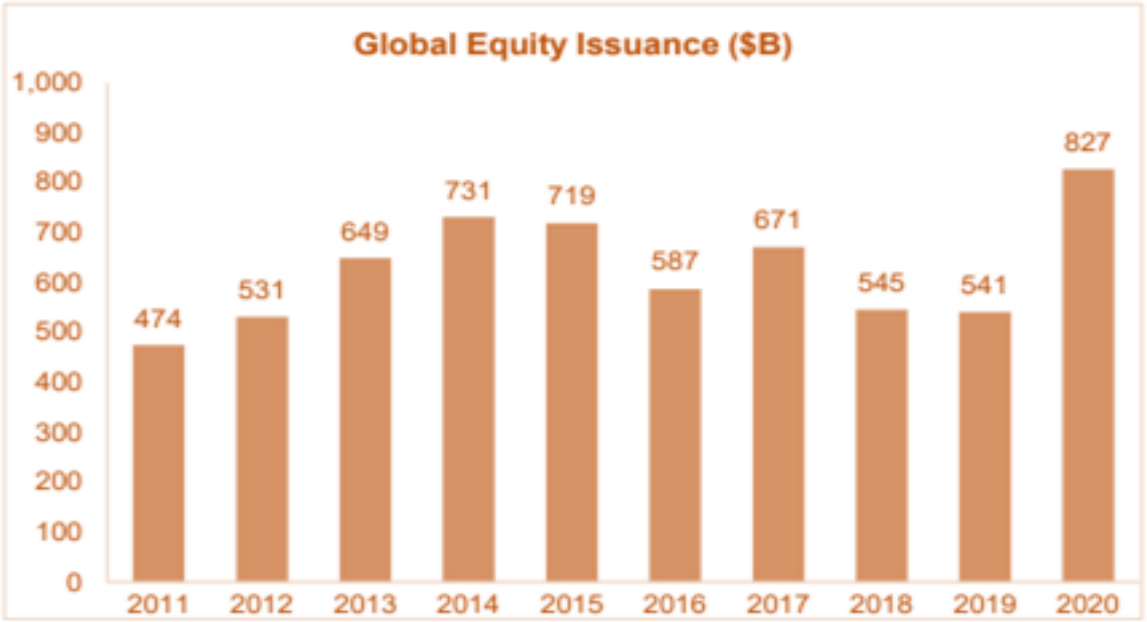
• Developed: +128.9% from 2000 to 2021, +3.8% CAGR; +37.6% from 2019 to 2021 (vs. pre COVID), +11.22% CAGR

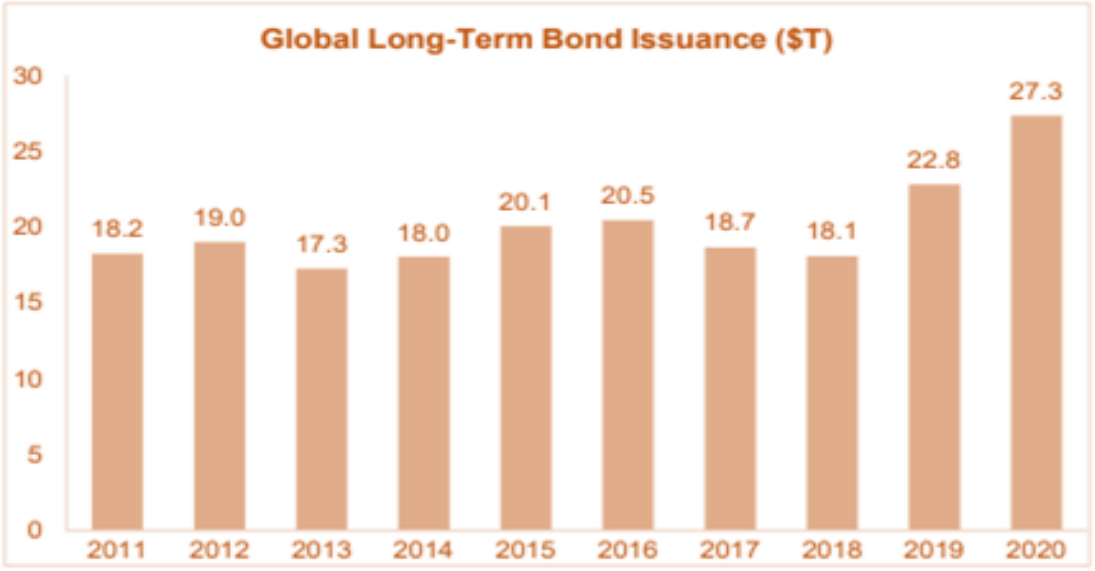
• Emerging: +266.8% from 2000 to 2021, +6.1% CAGR; +28.0% from 2019 to 2021 (vs. pre COVID), +8.6% CAGR



6.2.3 Global Capital market size

According to Capital Markets Fact Book (2021), Global bond markets outstanding value increased by 16.5% to $123.5 trillion in 2020, while global long-term bond issuance increased by 19.9% to $27.3 trillion. Global equity market capitalization increased by 18.2% year-over-year to $105.8 trillion in 2020, while global equity issuance decreased by 52.9% to $826.8 billion. U.S. gross activity (purchases and sales) in foreign securities increased to $46.1 trillion in 2020, up 24.7% from 2019. Foreign gross activity in U.S. securities increased by 19.6% to $98.3 trillion in 2020.





Sources: Bloomberg, Refinitiv, Dealogic Note: Long-term is defined as a security with maturity of 13 months or longer at issuance.[25]

6.2.4 International Security Offerings by All Issuers - Market Value

	$ Billions						
	Straight Debt	Convertible Debt	Total Debt	Common Stock	Preferred Stock	Total Equity	Total
2006	3,157.7	47.1	3,204.9	207.9	13.2	221.2	3,426.0
2007	2,980.2	90.0	3,070.2	386.3	21.7	407.9	3,478.1
2008	1,803.6	53.6	1,857.3	272.8	10.7	283.5	2,140.8
2009	2,566.4	55.6	2,621.9	395.8	13.7	409.5	3,031.4
2010	2,333.4	51.9	2,385.3	365.1	6.6	371.8	2,757.1
2011	2,262.9	36.4	2,299.3	235.7	10.5	246.3	2,545.6
2012	2,670.5	44.0	2,714.5	238.4	15.6	254.0	2,968.4
2013	2,709.0	54.4	2,763.4	308.4	8.3	316.7	3,080.1
2014	3,066.1	55.5	3,121.6	351.9	15.6	367.4	3,489.0
2015	2,538.3	38.4	2,576.7	394.7	14.3	409.1	2,985.8
2016	2,638.9	42.3	2,681.2	225.8	7.3	233.1	2,914.3
2017	3,171.4	35.6	3,206.9	345.6	24.1	369.6	3,576.6
2018	2,733.7	31.8	2,765.5	293.2	8.2	301.5	3,066.9
2019	3,022.1	70.4	3,092.5	286.5	6.2	292.7	3,385.2
2020	3,565.3	131.6	3,696.9	391.7	6.3	398.0	4,094.9
Average	2,748.0	55.9	2,803.9	313.3	12.2	325.5	3,129.4
Y/Y % Change	18.0%	87.0%	19.5%	36.7%	2.3%	36.0%	21.0%
5-Year CAGR	7.0%	27.9%	7.5%	-0.2%	-15.1%	-0.5%	6.5%
10-Year CAGR	4.3%	9.8%	4.5%	0.7%	-0.5%	0.7%	4.0%

Source: Refinitiv Note: Securities issued by an entity outside of its domestic market

6.2.5 The largest capital market in the world

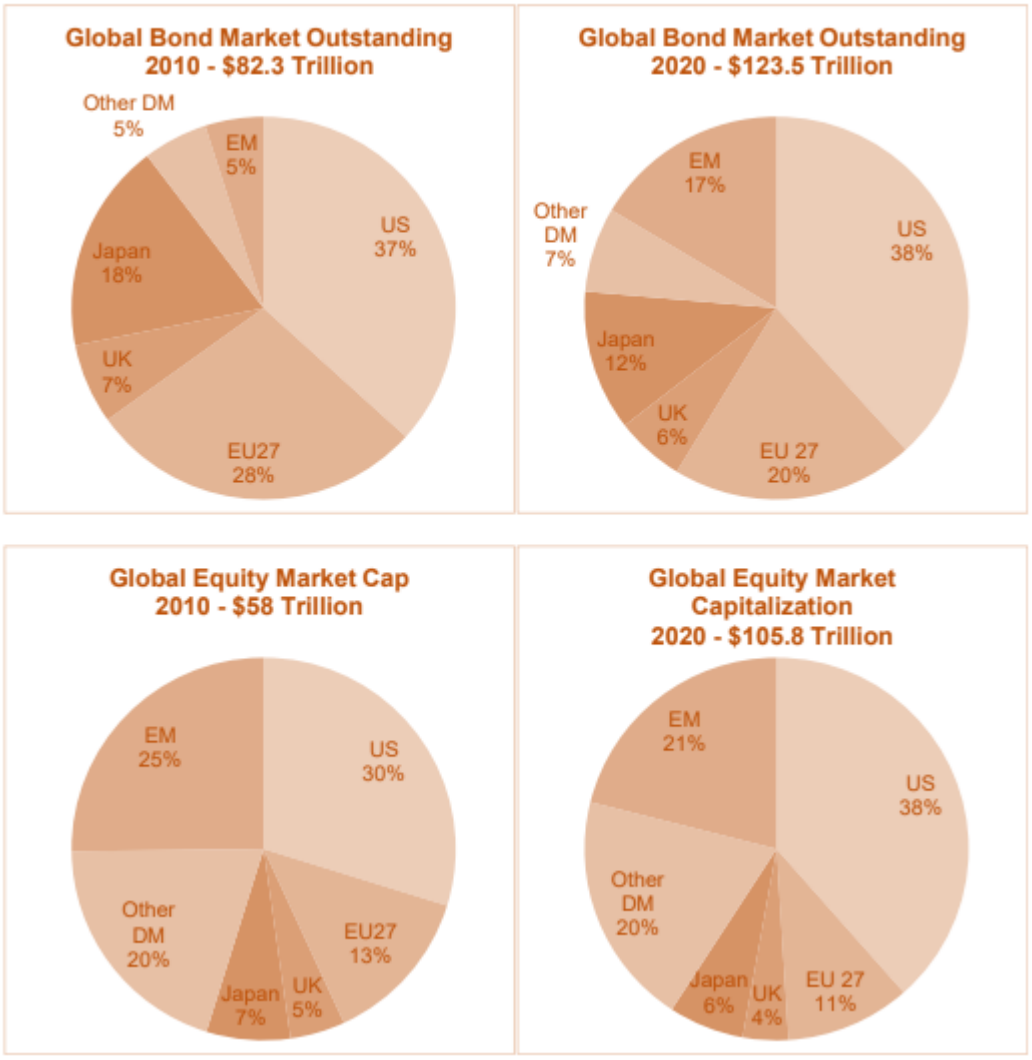
The U.S. capital markets are largest in the world and continue to be among the deepest, most liquid, and most efficient. Equities: U.S. equity markets represent 38.5% of the $105.8

[25] Global equity issuance includes non-convertible IPOs and follow -on equity deals, excludes preferred shares, rights issued, closed-end funds, business development companies, and special purpose acquisition companies.

trillion in global equity market cap, or $40.7 trillion; this is 3.7x the next largest market, the EU.

Fixed Income: U.S. fixed income markets comprise 38.3% of the $123.5 trillion securities outstanding across the globe, or $47.2 trillion; this is 1.9x the next largest market, the EU.

Global Bond Market Outstanding and Global Equity Market Capitalization - Charts



Sources: Bank of International Settlements (BIS), World Federation of Exchanges Note: Market capitalization of listed domestic companies

6.2.6 Global Capital market depth

An important measure of the global capital market's development is its depth, or the ratio of the global financial stock to the size of the underlying global economy, as measured by world gross domestic product (GDP). Over the last twenty years, the depth of the global capital market has tripled: the global financial stock is now roughly three times the size of world GDP, while in 1980 the two were the same size. 3. Financial deepening appears likely to continue for the foreseeable future. The global financial stock has grown faster than the underlying economy over the long term—since at least 1980 when McKinsey data series began (McKinsey & Company, 2005).

Financial deepening is usually beneficial, giving households and businesses more choices for investing their savings and raising capital, and enabling more efficient allocation of capital and risk. However, financial depth alone does not indicate the strength of an economy. For instance, the financial depth of the Netherlands is twice that of Italy, although both countries have similar GDP per capita. Germany and Thailand, on the other hand, have similar financial depth at very different income levels.

6.3 ART market overview

Doherty (2000b) traces the origins of ART techniques to the 1950's. He argues that this was linked to organisations beginning to fully embrace the concepts and process of risk management. Thus there arose the need for corporations to systematise their insurance buying. Managers began to consider systems for loss prevention and later, for the economic control of losses should they occur. There were incentives to do this since insurance prices tended not to reflect the claims experience of the corporation.

According to Schanz (1999), the term "art" was first used in the United States. He goes on to state that; At first, ART talked about ways that made it easier for businesses to insure their own risks, like captives and risk retention groups. In recent times, the concept has expanded to include things like finite insurance and reinsurance as well as risk transfer via capital markets.

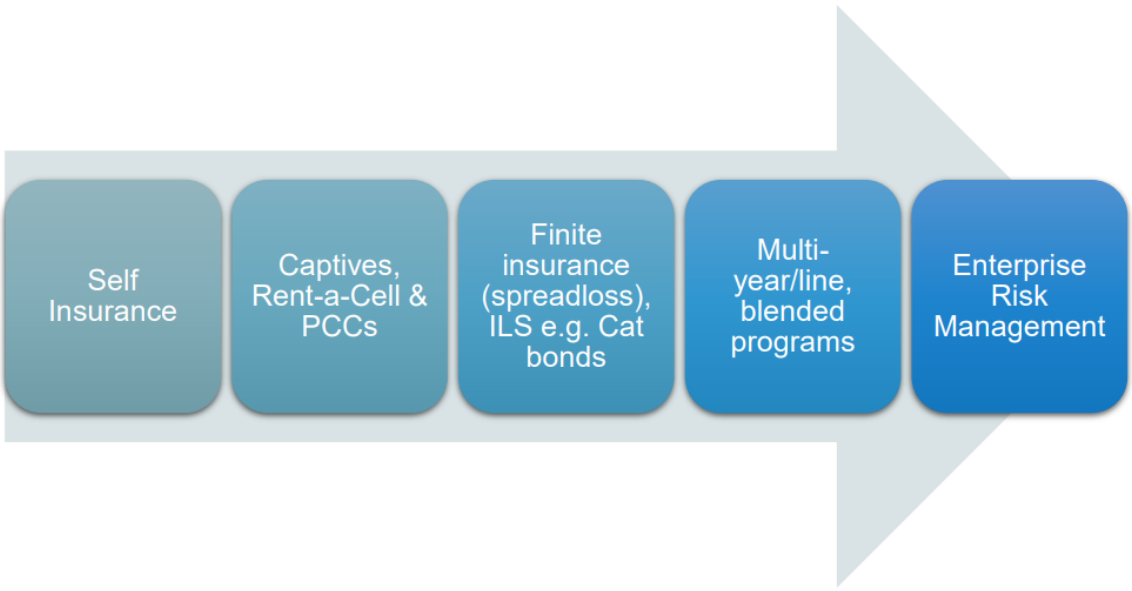
Alan P. (1999) provides interesting narration of ARTs arguing they evolved to be used by insurance companies to satisfy the insured and have also evolved to be used by reinsurance companies to satisfy the requirements of insurance companies. As such there are two forms of ART solutions, one peculiar to the cedant and the other peculiar to the insured, in other words, the two classes are - insurance alternative risk transfer and reinsurance alternative risk transfer.

The following is a list of the most important characteristics of ART solutions that have developed over time (Schanz, 1999):

- Designed to address specific issues
- Coverage over multiple lines and years.
- The spread of risk throughout a policyholder's portfolio and over time. Because of this, it is possible to assume risks that are typically not covered by insurance.
- Non-reinsurers assumption of the risk.

The embedded cyclicality of insurance markets appears to have a significant impact on the evolution of ART markets: Insurance companies encourage the growth of credit risk transfer markets in times of excess capital, whereas hardening markets force insurance companies to use risk transfer markets to increase their capital adequacy. Because markets, on the one hand, provide access to capital and, on the other, are a potential investment object when capitalisation is perceived to be in excess of supply, this context offers one perspective on the development of transfer risk markets from the perspective of capital management.

Evolution of ART



During the liability crisis of the 1980s, when businesses had trouble obtaining some types of commercial insurance coverage, new mechanisms for transferring risk developed. Doherty (2000b) propounds that the earliest forms of ART took the form of captives. Increasingly since the 1960's larger corporations have created and used their own in house operation, primarily as a means of co-ordinating insurance buying across the global enterprise. Forent (2004) propounds that the earliest forms of ART programmes developed in response to the hard insurance markets. Companies turned to large deductible, loss sensitive rating and retrospective rating insurance programmes to gain independence. This led to the development of wholly owned offshore captives for large corporations and rent-a-captive for small to medium size companies. He goes on to note that, in the hard insurance, high interest environment of the early 1990's finite programmes emerged as another finance tool.

Alternative risk transfer markets offer issuers several potential advantages from the perspective of protection buyers: 1) increased insurance pricing and capacity; 2) reduce counterparty risk; while 3) the primary constraint is the cost of setting up deals.

Capacity. Issuance of ILS offer an option in contrast to customary reinsurance techniques in times when costs have risen considerably and limit is seriously obliged. In addition, in contrast to reinsurance, which is typically negotiated annually (Euromoney, 2002), they offer coverage for multiple years at prices that are predetermined. As a result, they are able to protect insurance companies from significant price swings in reinsurance. As a result, risk transfer solutions are useful for settling earnings.

Counterparty risk. ART arrangements can be organized to limit credit risk. When choosing their reinsurers in traditional reinsurance transactions, purchasers consider counterparty risk. As a result, reinsurers with strong financials are frequently preferred,

as evidenced by the fact that, as of 1999, reinsurers with ratings below AA only wrote one-fifth of reinsurance contracts (S&P, 2000). However, due to the fact that even high-investment-grade businesses may fail, alternatives that are based on risk transfer strategies and are dollar-for-dollar backed by investment-grade bonds offer even greater credit quality than conventional reinsurance.

Cost. The development of capital market solutions faces significant disadvantages due to the high transaction costs on typically small deals. The one-time costs of securitizing a catastrophe bond are about USD 2 million, according to market analysts. As a result, risk markets were unable to provide a serious alternative when insurance markets were at their weakest. S&P (2000) states that when reinsurance rates rise by 30% or more, alternative risk transfer solutions become a viable alternative. Alternative risk transfer solutions provide investors with 1) favorable market yields, from the perspective of protection sellers; 2) chances for diversification, and 3) a focus on particular regions hurts investor interest.

Returns on comparable markets. When compared to corporate bonds and asset-backed securities with the same credit rating, investments in insurance-linked securities typically offer more attractive returns. In view of a delegate test of 17 disaster securities gave from 1997 to 2000 with above speculation grade rating, the typical spread over the gamble free rate was 420 premise focuses, though the spread of securities with BAA evaluations in a similar time span was under 300 premise focuses (Sigma, 2001). Investors are compensated for the following: the relative illiquidity of catastrophe bonds, the newness premium for non-standard securities, and the possibility of ratings being inaccurate as a result of model forecasts for anticipated future losses (EU, 2002).

Diversification. Aside from higher outright returns, elective gamble move arrangements offer a gamble profile that is less corresponded with acknowledge chances, as observational investigations show that the event of protection related occasions is uncorrelated with gets back from conventional venture protections like bonds and values (Sigma, 2001). Adding protection connected protections into a conventional venture portfolio would consequently decrease the general peril of the portfolio and further develop the portfolios risk changed return. Even though empirical analyses show that returns are fairly uncorrelated, there is always a chance that risks that have historically been uncorrelated can become interrelated, like when a California earthquake affects bourses around the world. Diversification effects are another factor that motivates reinsurance companies to invest: acquiring exposures to various catastrophic risks. With the assistance of catastrophic bonds, small and medium-sized reinsurers may be able to acquire positions that include those particular risks, although it may be challenging for them to acquire exposures in areas where they do not have a presence. What's more, some market members have recommended that there could likewise be implied some sort of chance dividing among reinsurance organizations for them to trade various kinds of disastrous openings (FSA, 2002).

Concentration. Up until this point, markets for risk move instruments have been obliged by an inclination to get investment grade evaluations to make the securities appealing to financial backers. The application of risk transfer solutions has essentially

been reduced to catastrophe exposures as a result of structuring deals within this constraint, with events occurring less than one in one hundred years (Lloyds, 2002). Additionally, the pattern of the underlying assets—natural disasters—is relatively easier for scientists to predict, facilitating the default discovery mechanism's creation of credible financial models and thus meeting the needs of rating agencies and potential investors in catastrophe bonds restricted to specific geographic regions. The scope of insurance-linked securities has been limited due to capital markets' reluctance to build up exposures outside of known regions. As a result, some investors have reached their exposure limit for earthquakes in California/Japan or hurricanes in Florida.

6.4 ART vs. ILS and Carriers vs. Products

Throughout the study, broad definition of ILS as financial instruments whose values are driven by insurance loss events is used. In a narrow sense, ILS need to be "securitized" meaning that (1) a special purpose vehicle (SPV) is created (2) which then issues securities either as pass- through securities (i.e., the investor receives a pro rata share of any cash- flow) or as multi- class collateralized obligations (i.e., different tranches are created). The securities can be rated and are sold publicly or placed privately (Singer, 2001). The study also differentiate between "alternative risk transfer" (ART) and "insurance- linked securities" (ILS). Apart from ILS, ART also includes unsecuritized instruments such as multi- year and multi- peril products, which more closely resemble traditional reinsurance contracts. The collateral in alternative risk transfer transactions can be deposited in a (modified) Regulation 114 trust (Aon Benfield Analytics, 2014). Although study focus is on ILS, it is inevitable not to include additional instruments from the field of ART such as collateralized reinsurance in order to fully describe the relevant trends and topics in the field. There is an increasing convergence between the different market segments.

According to Sigma (2015), a Swiss Re publication, there are two broad segments to the current ART market:

i. **Risk transfer through alternative carriers:** encompasses self-insurance, pools, captives and risk retention groups (RRGs).

ii. **Risk transfer through alternative products:** includes transactions such as integrated multiline products, insurance-linked securities (or CAT bonds as they are commonly referred to), credit securitization, committed capital, weather derivatives, and finite risk products.

6.5 Alternative carriers

The origin of the alternative risk transfer market was primarily directed at transactions that allowed entities to insure their own risks. These solutions emphasized the financing of risks rather than transfer of the risks to the commercial insurance market. In truth, most of the alternative carrier concepts incorporate a large portion of risk retention and involve little in the way of transfer; however, the ART name has been given to them and it has stuck.

Traditionally, businesses and other organizations have handled risk by transferring it to an insurance company through the purchase of an insurance policy or, alternatively, by retaining the risk and allocating funds to meet expected losses through an arrangement known as self-insurance.

6.5.1 Captives

Captives were the first to appear. A captive is a special type of insurance company set up by a parent company, trade association or group of companies to insure the risks of its owner or owners. Other options soon followed. These included:

- Risk retention groups, insurance companies organized by a group of businesses or institutions in the same line of business to provide liability insurance for the owners or organizers.
- Risk purchasing groups, organizations in which firms engaged in similar businesses or activities band together to purchase insurance coverage from a commercial insurer.
- Large deductible plans, in which businesses opt to retain a larger portion of their exposure through policies with large deductible amounts.

Table 6.1: Number of Captives, 2012-2021

Year	Number of captives
2012	6,125
2013	6,420
2014	6,739
2015	6,851
2016	6,700
2017	6,454
2018	6,359
2019	6,160
2020	5,879 (1)
2021	5,985

Source: Business Insurance Survey, Business Insurance, March 2022.

Table 6.2 Top 20 Global Captive Domiciles, 2020-2021

		Number of captives	
Rank	**Domicile**	**2020**	**2021**
1	Bermuda	680	670 (1)
2	Cayman Islands	652	661
3	Vermont	589	620
4	Utah	396	384
5	Delaware	288	313
6	North Carolina	250	257
7	Barbados	226 (2)	253
8	Hawaii	242	251
9	Luxembourg	199	192
10	Guernsey	188 (2)	192
11	South Carolina	175	183
12	Nevada	166	161
13	Tennessee	145 (2)	153
14	Arizona	131	149
15	Nevis	116	122
16	District of Columbia	106	112
17	Montana	115 (2)	102
18	Isle of Man	102 (2)	99
19	Singapore	80	84
20	Anguilla	94 (2)	77
	Total, top 20	**4,940**	**5,035**
	Total, all captives	**5,879**	**5,985**

Source: Business Insurance, March 2022.

The concept of captive insurers, insurance companies created to insure the risks of their owners, was introduced in the 1950s, when fire protection engineer Frederic Weiss formed subsidiaries to cover the risks of an industrial client in Ohio. Since that time many states and overseas jurisdictions have emerged as popular domiciles for captives. There are currently 5,985 captives worldwide, according to Business Insurance.

Captives and Risk Retention Groups (RRGs): By definition, captives and RRGs are insurance companies that are owned by their parent(s). The original captive "boom" was in the late 1960s; however, the recent hard market has broadened the appeal of the captive movement. For years, captives have been considered the exclusive domain of Fortune 500 companies but, today, middle market companies are also seeing the advantages of captive formations. As a result, captive domiciles across the country saw a record year for formations in 2003. Despite the continuation of the hard market, it will be difficult to continue this record pace.

Captives may be a "single-parent" captive—owned by one entity—or have several owners. They may insure the risks of organizations other than their major owners. Wholly owned captives are companies set up by large corporations to finance or administer their risk financing needs. If such a captive insures only the risks of its parent or subsidiaries it is called a "pure" captive. Companies may also form a joint arrangement of multiple companies (group captive). According to an April 2021 white paper published by the Triple-I, A Comprehensive Evaluation of the Member-Owned Group Captive Option, group captives have become an attractive risk management option for a growing number and type of companies.

Associations or groups of companies may band together to form a captive to provide insurance coverage. Professionals such as doctors, lawyers and accountants have formed many captives. Captives may, in turn, use a variety of reinsurance mechanisms to provide coverage. Many offshore captives use a fronting insurer to provide the basic insurance policy. Fronting typically means that underwriting, claims and administrative functions are handled in the United States by an experienced commercial insurance company, since a captive generally will not want to get involved directly in running the insurance operation. Also, fronting allows a company to show it has an insurance policy with a U.S.-licensed insurance company, which it may need to do for legal and business reasons.

The rent-a-captive concept was introduced in Bermuda in the 1980s and remains a popular alternative market mechanism. Rent-a-captives serve businesses that are unable to capitalize a captive but are willing to assume a portion of their own risk and share in the underwriting profits and investment income. Generally sponsored by insurers or reinsurers, which essentially "rent out" their capital for a fee, the mechanism allows users to obtain some of the advantages of a captive without having the expense of setting up a single-parent captive and meeting minimum capital and surplus requirements.

An offshoot of rent-a-captives, the segregated or protected cell captive, was introduced in Guernsey in 1997. A protected cell captive offers participants many of the benefits

of a group captive but with lower startup costs. The arrangement offers more security to policyholders by isolating assets and liabilities as if each participant were a separate company, called a cell, doing business with the core company. Actual numbers of segregated cells may be underreported because some captive domiciles don't report the number of cells within them.

Most jurisdictions have established a specific regulatory framework based on the structure and operation of captives.

The U.S. Treasury Department has taken the position that domestic captives chartered in the United States or its territories are to be considered "insurers" under the Terrorism Risk Insurance Act (TRIA) to provide a federal backstop for terrorism insurance. This means that all domestic captives, except those writing medical malpractice and other lines excluded by the act, are required to offer terrorism coverage to their insureds and are subject to the law's 3 percent surcharge provision.

Captives that are owned by publicly held companies also have to comply with all the regulatory compliance and governance requirements stipulated by the Sarbanes-Oxley Act, enacted in 2002 to increase the accountability of boards of publicly held companies to their shareholders.

6.5.2 Self-insurance

Self-Insurance--This segment of the carrier market is one of the oldest and still remains one of the largest. Currently, estimates indicate that self-insurance represents about 75% of the carrier market. Coverages that commonly fall into this segment are workers compensation, general liability, and auto liability and physical damage. Despite the fact that both workers compensation and auto liability are heavily regulated by the various states, growth of self-insurance in these two lines has continued. Since self-insurance is typically associated with cost efficiency and increased loss control, these alternatives are expected to continue to grow regardless of the market conditions.

Self-insurance can be undertaken by individual companies wishing to retain risk or by entities in similar industries or geographic locations that pool resources to insure each other's risks. A wide variety of industries participate in self-insurance pools.

The use of higher retentions/deductibles is increasing in most lines of insurance. In workers compensation many companies are opting to retain a larger portion of their exposure through policies with large deductible amounts of $100,000 or higher. Large deductible programs, which were first introduced in 1989, now account for a sizable portion of the market.

6.5.3 Pools

This ART technique is usually associated with groups of governmental entities that band together to cover specific risks. Most frequently, pools have been established to deal with workers compensation coverage. The year 2003 saw significant growth in the

pool concept and since workers compensation is one of the most troubled lines of coverage, interest in pools should continue during this current year and beyond.

6.5.4 Risk retention groups

Risk retention groups (RRGs) – insurance companies set up to cover a group of related insureds – were introduced under federal laws passed by Congress in the 1980s to help businesses, professionals and municipalities obtain liability insurance, which had become either unaffordable or unavailable. The Product Liability Risk Retention Act of 1981 enabled RRGs to insure product liability risks. The Liability Risk Retention Act (LRRA) of 1986 expanded permissible risks to include most commercial liability coverages, with the notable exception of workers compensation.

Under LRRA, RRGs must be domiciled in a particular state. Once licensed by its state of domicile, an RRG can insure members in any state. It need not obtain a license in a state other than the one where it was chartered. A report by the General Accountability Office (GAO) released in September 2005 noted the important role in expanding the availability and affordability of liability insurance for certain groups. It called on state regulators to enact uniform regulatory standards for RRGs and suggested that Congress consider enacting corporate governance standards.

A December 2011 GAO report examined the financial condition of risk retention groups and their regulatory environment. The report concluded that RRGs have generally remained profitable, with their share of the commercial liability insurance market rising from about 1.2 percent in 2005 to 3 percent in 2010. Through the federal Liability Risk Retention Act, Congress partially preempts state insurance laws to allow RRGs licensed in one state (the domiciliary state) to operate in all other states (nondomicilary states). The GAO found that while most RRGs are domiciled in one of a small number of states, they write the majority of their business in other states. The report recommended that Congress consider clarifying provisions of the LRRA regarding registration requirements, fees and coverage to cut down on disputes that have arisen between state regulators and nondomicilary RRGs.

Like captives, risk retention groups must offer terrorism coverage under federal terrorism legislation.

6.5.5 Risk purchasing groups

Risk purchasing groups (PGs) were introduced under the Liability Risk Retention Act (LRRA) of 1986. A purchasing group is comprised of insurance buyers who band together to purchase their liability insurance coverage from an insurance company. This contrasts with RRGs, which act as insurance companies, issuing their own policies and bearing risk. Another key difference between the two entities is that RRGs typically require members to capitalize the company whereas PGs require no capital. Both entities are regulated under state law and must adhere to certain stipulations under LRRA. Like risk retention groups, risk purchasing groups must be made up of persons or entities with like exposures and in a common business. Purchasing groups are now domiciled in over half the states.

6.5.6 Recent developments

- The Securities and Exchange Commission and some state regulators, including New York, have grown concerned that some insurance companies may be moving business to captive insurers to mask their financial health. Insurers insist their captives are appropriately funded and fulfill all regulatory requirements.
- There were 214 risk retention groups (RRGs) at the end of 2020, according to the *Risk Retention Reporter*. RRG premium increased from $2,536.5 million in 2010 to $3,574.7 in 2019.
- There were 1,024 purchasing groups (PGs) at the end of 2020.
- According to Artemis, catastrophe bond and other insurance linked-securities issuance rose to $16.4 billion in 2020, up from $11.1 billion in 2019. In 2020, capital outstanding stood at $46.4 billion, compared with $40.7 billion in 2019. The breakdown of issuance by type of transaction is $11.0 billion for property catastrophe bonds (67 percent of total issuance in 2020), $4.3 billion for mortgage ILS deals (26 percent) and $1.1 billion for other types of ILS including specialty, life, mortality and private deals (7 percent).

6.6 Alternative products

6.6.1 Catastrophe bonds

Catastrophe bonds - risk-based securities sold via the capital markets - developed in the wake of hurricanes Andrew and Iniki in 1992 and the Northridge earthquake in 1994. These mega catastrophes resulted in a global shortage of reinsurance (insurance for insurers) for such disasters.

Tapping into the capital markets allowed insurers to diversify their risk and expand the amount of insurance available in catastrophe-prone areas. Insurers and reinsurers typically issue cat bonds through a special purpose vehicle, a company set up specifically for this purpose. Cat bonds pay high interest rates and diversify an investor's portfolio because natural disasters occur randomly and are not associated with economic factors. Depending on how the cat bond is structured, if losses reach the threshold specified in the bond offering, the investor may lose all or part of the principal or interest. The exact definition of the trigger event is crucial for the payoffs of a cat bond. Depending on the trigger type of a cat bond, the sponsor either enters into a reinsurance contract according to IFRS 4 or in a derivative contract according to IFRS 9 / IAS 39. The following six trigger types have been used in past transactions:

- Indemnity
- Industry loss index
- Weighted industry index
- Modeled loss
- Pure parametric
- Parametric index

Zurich Financial's Kamp Re was the first major catastrophe bond to be triggered. The $190 million bond was triggered by 2005's Hurricane Katrina and resulted in a total loss of principal. The 2011 tsunami and superstorm Sandy in 2012 also caused losses on some bonds.

During the financial crisis of 2008, cat bonds were also exposed to counterparty risk – the risk that a party in a contract cannot fulfill its obligation. Lehman Brothers was a counterparty on four catastrophe bonds when it filed for bankruptcy; Lehman's role was to invest the bond proceeds and guarantee a rate of return on them. At bankruptcy, Lehman was unable to guarantee the value of the proceeds it held, driving down the price of those cat bonds to between 25 and 60 cents on the dollar. The problem also drove the entire cat market 10 percent lower, according to a 2010 Towers Watson report. Since then, the bonds have been more tightly structured to avoid a recurrence of the Lehman problem.

Table 6.3: Main features, merits and demerits of cat bonds

Features	
i. Transfer the risk of peak events, such as hurricanes or earthquakes, to investors in the capital markets **ii. Multi- year contracts** **iii. Liquid secondary market in most cases** **iv. Fully collateralized**	
Merits	**Demerits**
i. No basis risk if indemnity trigger	i. Basis risk in case of index trigger
ii. Multi- year coverage (lock in cost of coverage)	ii. Traditional reinsurance market continues to soften (making traditional reinsurance more competitive)
iii. Fully collateralized	iii. In general only for larger volumes (>USD 100m)
iv. Low correlation with financial markets	iv. When triggered no immediate renewal as with traditional reinsurance

The catastrophe bond market has continued to grow. The bonds are actively traded. The number and amount of the bonds can have a significant effect on prices in the reinsurance property market.

6.6.2 Private Catastrophe Bonds ("cat bond light")

Private cat bonds, also known as "cat bond light" or "regulation D", are a recent development using innovative legal documentation to create "private" instruments. Advantages include lower structuring costs, less time consumption and higher flexibility than cat bonds and, at the same time, higher liquidity and wider distribution than collateralized reinsurance (InsuranceLinked, 2014). According to the US Securities Act of 1933, securities need to be registered with the SEC. Several requirements have to be met, but there are two separate exceptions to this rule. These

two exceptions are known as “safe harbors”. The first one is Rule 144A for public bonds, under which conventional cat bonds (i.e., public bonds) fall, and the second one is Section 4(a)(2), under which “cat bonds light” (i.e., private bonds) fall (InsuranceLinked, 2014). Loss calculations in cat bonds light are, similar to traditional reinsurance, typically negotiated directly between sponsor and investor by signing confidentiality agreements in return for data access. Thus, some of the work done by risk modelers and legal service providers are excluded in such private deals and internalized by the investor.

6.6.3 Industry Loss Warranties (ILWs)

ILWs appeared in the 1980s, whereas cat bonds were first introduced at the beginning of the 1990s (Krutov, 2010). Majority of ILWs have a double- trigger mechanism. That is, an ILW is triggered if an index measuring total losses of the insurance industry exceeds a predefined level (industry index trigger) and if the actual loss of the insurer passes a threshold (indemnity trigger). The advantage for the investor is higher transparency while the sponsor can possibly recognize the ILW as a reinsurance instrument from a regulatory perspective (Cummins and Barrieu, 2014). However, the threshold for the index trigger is usually set a much higher level than that of the indemnity trigger. Thus, despite their indemnity trigger, ILWs are usually associated with a considerable degree of basis risk (Gatzert and Kellner, 2011). Second, ILWs cover between USD 1 million and USD 250 million in losses whereas cat bonds require USD 100 million (World Economic Forum, 2008). Third, ILWs rarely exceed one year of coverage and thus are not multi- year products such as cat bonds. Finally, ILWs are so- called unfunded transactions, i.e., unlike in a cat bond deal, the protection seller does not need to post the full risk capital as collateral at the outset. As a corollary, however, counterparty risk becomes an issue because the protection seller could default exactly in the situation when a compensation payment under the contract is due.

Table 6.3: Main features, merits and demerits of ILWs

Features	
i. Contractual agreements that call for the protection seller to compensate the protection buyer in case of a trigger event **ii. In general double- trigger mechanism (industry index and indemnity based)** **iii. Smaller volume (USD 1m to 250 m) than cat bonds** **iv. Yearly coverage**	
Merits	**Demerits**
i. Low sum insured starting at USD 1 million (whereas cat bonds need at least USD 100 million of cover)	i. Reliance on loss indices (higher basis risk than pure indemnity triggers)
ii. Fast execution	ii. Private transactions (no secondary market)
iii. No up- front commitment of full risk capital by protection seller (unfunded transaction)	iii. Counterparty risk unless limit is collateralized

6.6.4 Sidecars

A sidecar is a financial structure that allows sophisticated investors to take on the risk

and return of a book of insurance business. In contrast to CRe, sidecars raise capital before defining a specific insurance portfolio instead of covering an already existing book of business (Fermat Capital Management, 2014). They have typically been used during "hard markets" with high spreads whereas sidecar activity tended to be reduced during "soft markets" (World Economic Forum, 2008). A typical sidecar exists for a finite period to reinsure a specific book of property catastrophe business.

Sidecars usually rely on quota- share reinsurance instead of the excess- of- loss reinsurance mechanism inherent in cat bonds and ILWs (Wu and Soanes, 2007; Clear Path, 2014).Usually, the reinsurance company creates the sidecar by creating a separate subsidiary known as a special purpose vehicle. According to a Willis primer on the subject, the sidecar is funded by investors who want to reinsure a specific set of reinsurance contracts. The reinsurer cedes part of the contracts to the sidecar, meaning the sidecar receives premium and pays claims commensurate with the terms of the contract. The reinsurer handles the sidecar's administrative needs. Generally, the sidecar is fully collateralized, meaning the sidecar has sufficient assets to pay the maximum amount of claims it could sustain in a worst-case scenario.

Most sidecars are designed to last between one and three years, sufficient time to administer almost all claims after most catastrophes.

Sidecars can be either "equity- only" or "leveraged" and accordingly investors are offered debt or equity securities (Krutov, 2010).

Table 6.4: Main features, merits and demerits of Sidecars

Features	
i. Financial structures which cover a specific portfolio of insurance policies. In contrast to CRe, sidecars raise capital before defining a specific insurance portfolio instead of covering an already existing book of business **ii. Usually sponsored by reinsurance companies** **iii. Often Used during "hard" markets** **iv. Embedded quota- share reinsurance**	
Merits	**Demerits**
i. Multi- year coverage	i. High transaction cost
ii. No basis risk	ii. No liquidity
iii. Lower disclosure requirements in contrast to other ILS vehicles due to a stronger focus of investor's due diligence on management than on portfolio (World Economic Forum, 2008).	
iv. Reinstatement in subsequent season is standard (World Economic Forum, 2008).	

6.6.5 Collateralized reinsurance (CRe)

Collateralized reinsurance refers to a treaty in which a nontraditional reinsurer places in escrow account the entire amount of the coverage it is offering. If a treaty offers $30 million in protection, for example, the reinsurer escrows $30 million for the life of the contract. Provided the escrowed funds are invested safely, as in a Treasury note, there

is little doubt the reinsurer will have funds to pay any claim.

Though they invest conservatively, traditional reinsurers rarely escrow funds specifically for a contract. This seldom becomes a critical issue; reinsurers rarely fail to fulfill their obligations. Regulators and private third-party analysts like Standard & Poor's and A.M. Best monitor traditional reinsurers' financial health and claims-paying ability.

Hedge funds, in particular, have launched their own companies to write collateralized reinsurance, usually via Bermuda-based companies that get underwriting guidance from traditional reinsurers. Collateralized reinsurance began to grow around 2010, as investors began to believe they could achieve an attractive rate of return on insurance. In addition, insurance risks like catastrophes are not correlated to traditional market risks, a circumstance that helps investors construct a more robust portfolio.

Technically, CRe does not differ from traditional reinsurance except that collateral is provided up- front. CRe enables unrated entities such as hedge funds or dedicated cat bond funds to take on catastrophe risk exposure (Fermat Capital Management, 2014). In rare cases, ILWs have been categorized as a type of CRe (see, e.g., Aon 2013). In contrast to cat bonds, however, they are not tradable. Being customized according to the counterparties' needs, CRe provides a high degree of flexibility in terms of both structural characteristics and underlying insurance risks.

Table 6.5: Main features, merits and demerits of CRe

Features	
i. Privately structured contracts which insure a portfolio of specific insurance **ii. policies against losses caused by predefined peril(s)** **iii. One year contracts** **iv. Not traded** **v. Allow non- insurers can enter the insurance market**	
Merits	**Demerits**
i. High Flexibility	i. No liquidity
ii. Indemnity based (in general). Hence, no basis risk for the protection buyer	ii. Asymmetric information between protection buyer and seller (investor)
iii. Fully collateralized	iii. Up- front commitment of full risk capital by protection seller needed (funded transaction)

6.6.6 Finite Risks

The past several years have seen finite risk products become an accepted risk mechanism. While these products are designed specifically to the needs of the customers, they are typically multiyear contracts that assist the customer in reducing their cost of capital via earnings smoothing. Finite risk products are long-term solutions that, by their nature, reduce the year-to-year volatility normally associated with a commercial insurance policy. Products can be written either on a pre-funded (prospective) or post-funded (retrospective) basis.

Recently, a variety of applications have been successfully utilized to help purchasers resolve risk problems. Among the current crop of finite products are loss portfolio transfers, adverse development covers, time and distance covers and spread loss covers. To date, the most utilized finite product is the loss portfolio transfer, which is frequently used to eliminate long-term liabilities from a company during merger and acquisition activities. The smoothing effects of the finite risk products coupled with the current restricted capacity in today's marketplace will continue to favor the use of these products.

6.6.7 Committed Capital

These products, also referred to as contingent capital, are one method to take advantage of the convergence of the insurance and capital markets. Although not exclusive to the insurance industry but still worth mentioning in this context is contingent capital offered as bonds, also known as Contingent Convertible (CoCo) bonds. Technically, these instruments are structured with a put option in addition to a traditional bond. If a trigger event occurs, e.g., if the stock price of the (re)insurance company drops below a certain level, it may convert the bond principal into equity to strengthen its capital base (Cummins and Weiss, 2009). The conversion rate can be fixed, variable or variable with a floor. Alternatively, a trigger event could simply result in a write- down of the bond principal (Credit Suisse, 2014). CoCo- bonds are actively traded in the secondary market.The underlying concept of committed capital is that the customer can sell some form of debt via a contractual commitment at a predetermined price should a specific adverse event occur. These products are catching on quickly since many people see them as a bridge between full insurance and full self-insurance. The current hard insurance market should continue to stimulate interest in this approach.

Table 6.6: Main features, merits and demerits of CoCo

Features	
i. Securitization transaction similar to a down- and- out put option, which allows an insurer to issue capital (e.g., common stock, hybrid capital, or debt) at a predetermined strike price following the occurrence of a defined event **ii. - Securitization including contingent put option** **iii. - Debt capital is converted into equity (or debt) if trigger event occurs**	
Merits	**Demerits**
i. Hedges the equity capital of the sponsor	i. Potential contagion effects if trigger event erodes trust in the insurer/industry
ii. Secondary market provides liquidity	ii. Counterparty risk in case new equity capital is issued

6.6.8 Integrated Multi-line Products

The late '90s also saw the introduction of another new ART approach--the multiline--and, in many cases, multiyear integrated insurance product. These products were the first attempts to combine insurable risk with financial risks and were yet another sign of the converging capital and insurance markets. These products were heralded by some as the next big thing in risk management. However, due in large part to the events following 9/11, many insurers have moved back to their core businesses and deployed

their capital in more traditional methods. As a result, with the exception of Swiss Re and Zurich, few carriers are offering these products today.

6.6.9 Weather Derivatives

Known also as weather-related hedges, weather derivatives were a result of energy companies needed to find ways to mitigate the significant earnings volatility that was usually associated with changes in weather. Weather derivatives were introduced in 1997. Use of weather derivatives has quickly expanded beyond the energy industry and many experts see a wide variety of applications for these products in the future. Other market participants include agricultural businesses, construction companies, and retailers (World Economic Forum, 2008). For insurers, these derivative products might contain too much basis risk to be useful for hedging purposes. Additionally, although they were originally confined to use in the United States, they are now freely used in many parts of Europe and Asia. Significant growth over the next few years is expected.

6.6.10 Credit Securitization

Despite the rosy views of the U.S. economy, credit risks continue to be one of the most significant for many organizations. Credit securitization products were designed to hedge these risks. Typically, these products involve a portfolio of loans, bonds, or other credit assets. By bundling these assets together, they can be structured as a single portfolio with many layers, each with its own credit rating. The major advantage of these products is that bundling these risks diversifies the credit risk across single companies, industries and geographic locations, thereby becoming more attractive to the capital markets. The increase in default rates and credit rating reductions have damaged the reputation of this particular market, but interest in these products remains strong.

6.6.11 Longevity Bonds

A rather controversial product among the general public has been the longevity bond. In a nutshell, investors benefit if retirees and life annuity policyholders die sooner than expected. The general idea is that the bond principal depends on realized survival rates in a reference population: if those are higher than expected, then investors do not receive the full principal repayment. The survival rates are typically reported in form of a longevity index, which may give rise to basis risk. Several indices have been discontinued in the past and today the only available options are provided by the Life and Longevity Markets Association and Deutsche Börse Group for different cohorts (Deutsche Börse Group, 2014). Although the concept of longevity bonds is not new, successful issuances at the beginning of this decade resulted in some critique against the respective parties as they are buying insurance against the fact that the population "lives too long". Longevity bonds are thus sometimes referred to as "death derivatives" (Bloomberg, 2011). In 2010, Swiss Re succeeded in issuing a longevity bond. This success might be attributable to the introduction of a structure which closely resembles that of a typical cat bond and is thus quite familiar to the ILS investor base. An important disadvantage of longevity bonds (in contrast to swaps) from the investor perspective is their very long time to maturity during which the capital is tied up (Bank for International Settlements, 2013).

6.6.12 Extreme Mortality Bonds

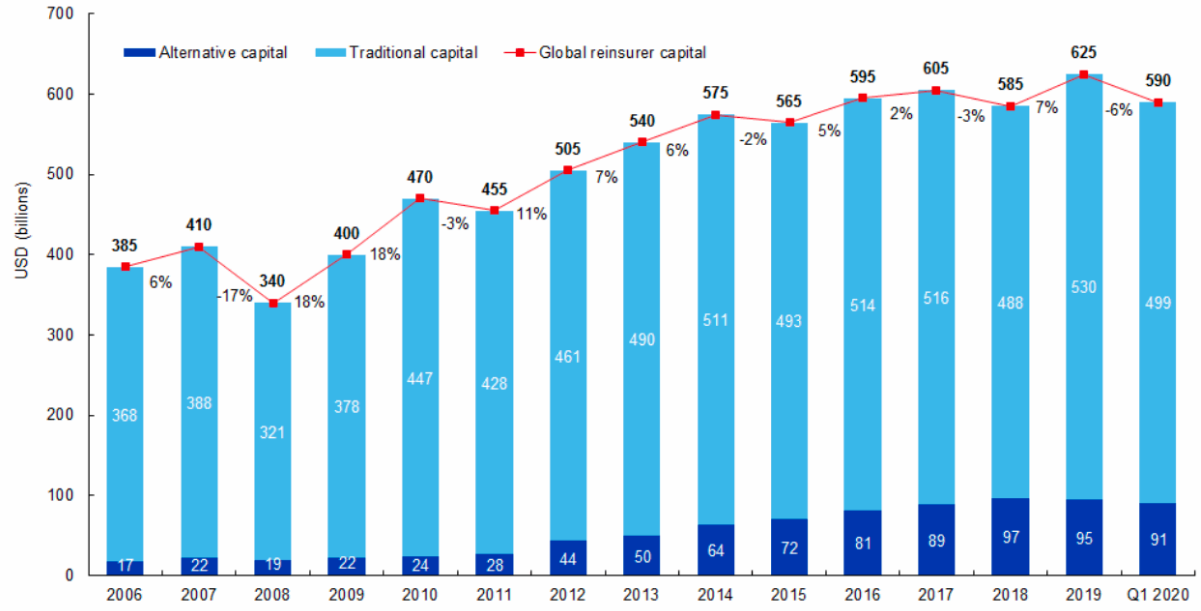
Mortality risk means the adverse financial impact of higher- than- expected mortality rates. This risk is securitized in extreme mortality bonds which are triggered by a mortality index. Investors in such instruments suffer losses when realized mortality in a defined population over a specific timeframe exceeds projected mortality. Jumps in mortality rates, i.e., sudden sharp increases of the number of deaths in a population are mainly driven by terrorist attacks, wars, or pandemics (Krutov, 2010). Life insurance products such as term life contracts pay in the event of a policyholder's death. Hence life insurers are prone to extreme mortality events. Many insurers exclude war- related claims. Thus, wars are a lesser concern for the securitization of mortality risk than pandemics or terrorism attacks (Millimian, 2013). Here, it becomes obvious that the legal framework for mortality risk must be clear- cut.

6.6.13 Embedded Value Securitization

Embedded value (EV) securitization, sometimes also known as value- in- force (VIF) securitization, refers to transactions where an insurance company monetizes future profits from an existing book of life insurance business (Wu and Soanes, 2007; Krutov, 2010). Although both terms are sometimes used synonymously, there is an important difference between the two. The VIF describes the present value of the expected future cash flows of the existing business. In contrast, the EV consists of the VIF and the insurer's adjusted net asset value (see Krutov, 2010). Thus, the EV represents the entire economic value of a life insurer excluding future new business. Thus, the insurer receives immediate access to future cash flows which would otherwise materialize over time. Especially in an M&A context, if a life insurer is being acquired, the buyer can consider EV securitization to fund the acquisition. Also, an insurer can securitize part of his EV for capital relief purposes or for an "acceleration" of its balance sheet, that is, to increase liquidity (Wu and Soanes, 2007). The risks for which an investor is compensated include the differences between projected and realized mortality / longevity, lapse rate, and investment returns. Often, EV securitizations are done with life insurance businesses in run- off (Wu and Soanes, 2007) and can thus be easily distinguished from future new business.

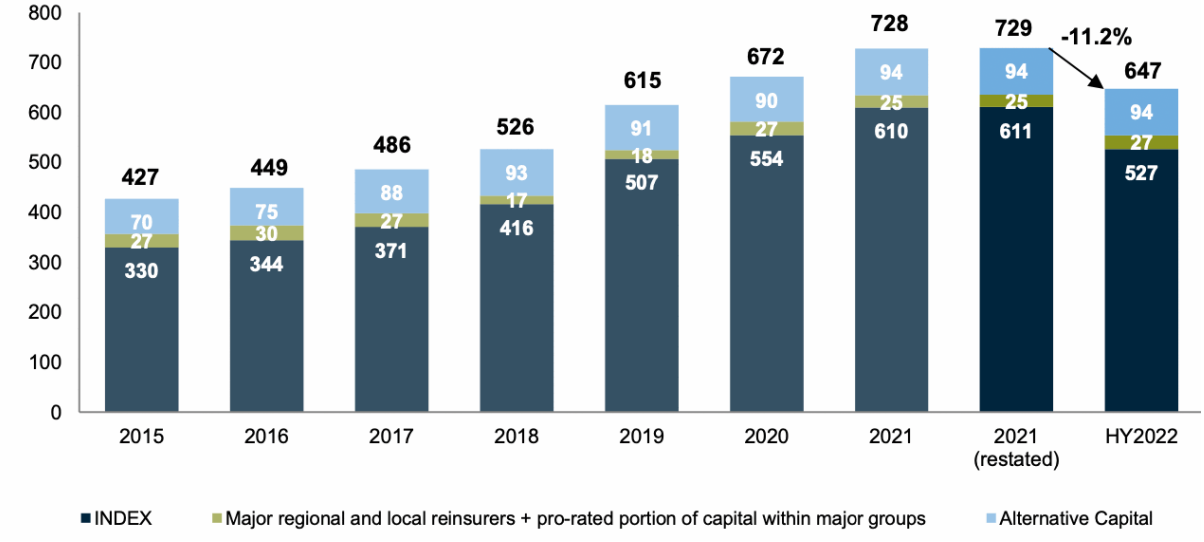
6.7 Size of the ILS market

Global capital market size in year 2021 was $ 256.6 trillion whereas $150.8 trillion was bond capitalization and 105.8 was equity. While reinsurance capital has grown from $ 386 billion in 2006 to $ 527billion in year 2022 a 73% growth; the alternative capital has grown from $ 17 billion in 2006 to $ 94 billion in 2022, a growth ratio of 180.85%.



Sources: Company financial statements / Aon Business Intelligence / Aon Securities Inc.

Total reinsurance dedicated capital (USD billions)



CHAPTER SEVEN

7 INNOVATION FRAMEWORK FOR ILS SOLUTIONS TO ENABLE STRATEGIC INSURING OF COMPLEX AND CLIMATIC RISKS IN AFRICA

7.1 What is Innovation?

Innovation can be described as a framework for change that leads to solutions with positive social, environmental and commercial impact. It refers to any combination of activities and technologies that breaks existing performance trade-offs in the attainment of an outcome in a manner that expands the realm of the possible. That drives growth. Breaking trade-offs through innovation allows a company to reach a point in "strategic space" that competitors cannot, allowing a company to provide a product at a price or performance level competitors cannot match.

Innovation is as well considered as an outcome, a set of activity or a process (Couger, 1990). Generally, the word "innovation" sometimes refers to the activities or the processes resulting in, or aiming for, innovation. In ISO standards on innovation management, Innovation is defined as an outcome (Hakvag, 2017).

Innovation in insurance sector

The conservative reputation the industry enjoys has served to camouflage a tremendous track record of innovation, from the first written insurance contract inscribed on Babylonian columns by King Hammurabi's men to the industry's current use of big data to lower costs and improve results.

The history of insurance product innovation is a history of human trade and development. The earliest policies largely covered losses by merchants going through foreign lands, enabling them to share the risk of trade. Maritime insurance dates back to the 13th century at least. Its expansion tracked the growth of seafaring trade, with many of those writing insurance in the 1680s gathering at Edward Lloyd's Coffee House. The societal impact of insurance innovation cannot be understated.

7.1.1 Can innovation be domesticated?

First and foremost, we should recognize that no system of work guarantees success, only the increased likelihood of success. This is made increasingly difficult when systems for managing the innovation process fail to consider the different implementations necessary for different types of organizations or teams that may be focused on different levels or 'classes' of innovation impact.

Standards and innovations are rarely in the same statement. Indeed, standardization of innovation management is perceived as an oxymoron the having a standard on innovation is an impossible wager. This common statement comes from concept confusion between creativity and innovation and also by terminology confusion, innovation is as well considered as an

outcome, a set of activity or a process (Couger, 1990). To clarify the terminology, the processes and more generally the whole system for innovation management, an international committee has been settled to provide guidance on innovation management.

An innovation management system encourages top management as well as leaders to establish appropriated and meaningful innovation ambition. This system also helps to optimize the use of resources. It indicates how to create awareness in sharing common vision and common set of tools and methods. With a facilitated assessment, (in including weak system elements, bottlenecks and unintended consequences) a benchmarking with external best practices may drive to more effective and mature management practices.

7.2 Conceptual Perspectives for Innovation in Service

Service innovation studies have tried to go beyond the manufacturing-based perspective (e.g., Gallouj; 2002; Gallouj & Weinstein 1997). They have sought to address the peculiarities of service activities in terms of innovation. In this view, the service-based approach (Gallouj, 1994) and integrative approach (Gallouj & Weinstein, 1997) are considered two prominent conceptualization frameworks that extend beyond the traditional perspective, which is represented by the assimilation approach. Table 1 summarizes the three conceptual approaches to innovation in services: assimilation, demarcation, and integration.

Table 7.1: Conceptual perspective for innovation in services

Theoretical Perspective	Assimilation	Demarcation	Integration
Type of innovation	· technological	· non-technological	· complex · architectural
Characteristics of innovation	· equates or reduces innovation in services to the adoption and use of technology · considers technological or visible modes of product and process innovation	· leads to new typologies for innovation in services: non-technological types of innovation such organizational innovation, ad-hoc innovation, and marketing innovation	· shows convergence between manufactured goods and services in regards of innovation · includes technological and non-technological innovation
Innovation framework	· attempts to assimilate services within the consolidated framework used for	· attempts to develop a specific framework for service innovation, while attempting to	· attempts to develop a common conceptual framework, able to account for an enlarged view of innovation that is

	manufacturing sectors and manufactured products	highlight all the specificities in service product and production processes	applicable to any tangible or intangible product · proposes a new taxonomy of innovation in services based on a new definition of product

7.2.1 Necessity of nurturing innovation

If we accept that necessity is the Mother of all invention, we can recognise capability as the Father, whereby simply having a need or a capability in isolation, is not sufficient for innovation success. To boldly go where none has gone before is a challenging mission. The question is, as Christensen and Raynor asked in The Innovator's Solution: "What can make the process of innovation more predictable?" Their answer: "Understanding the forces that act upon the individuals involved in building businesses." Inclusive insurance is traditionally an area that insurers are afraid to go because there is much unknown.

Innovation Ecosystem

Basic to successful innovation is a formal framework. Leadership involvement is essential, but so is involvement all down the ranks. This is aided by a clear definition of the vision and strategy for the innovation program, communicated throughout the organization. Innovation Ecosystem in an organization is build up by two layers, Leadership and Infrastructure.

There are a number of benefits of the Inclusive insurance Innovation Framework, which include the following:

1. Increased growth, revenues, profitability, and competitiveness;
2. Reduced costs and waste, and increased productivity and resource efficiency;
3. Increased satisfaction of users, customers, and citizens, as well as social benefits;
4. Sustained renewal of the portfolio of offerings;
5. Engaged and empowered people in the organization;
6. Increased ability to attract partners, collaborators, and funding;
7. Enhanced reputation and valuation of the organization;
8. Compliance with regulations and other relevant requirements.

7.2.2 Innovation Concepts and Framework

A study by McKinsey (2020) shows that 84% of global executives believe that innovation is extremely important but 94% are dissatisfied with their innovation performance, demonstrating a significant innovation gap. Another study by Innovation360 Group AB shows 84% of senior

leaders want to innovate but only 10% knows how. A research by the African Insurance Organization (AIO, 2020) indicates that executives in the insurance industry around the continent identifies technological advancement and new product development as among the top three opportunities in the insurance landscape of the Continent. But it all starts with the question what is Innovation?

7.2.3 Innovation Strategy and Culture

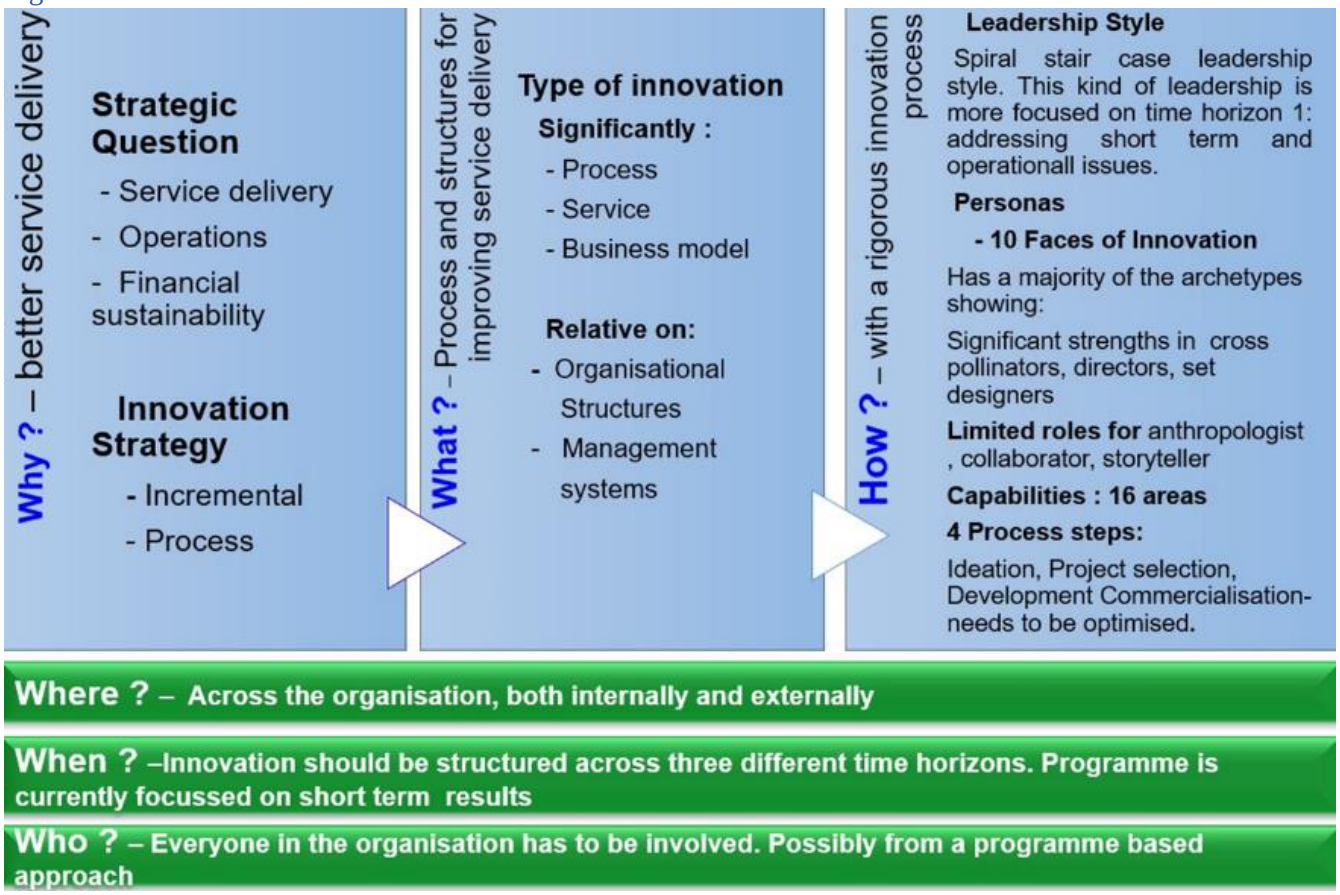
"The rationale for a strategy dedicated to innovation activities can be a focus on value realisation under conditions of uncertainty" (ISO 56002 Innovation Management System – Guidance, 2019). Companies with a highly aligned innovation strategy and a culture that supports innovation significantly outperform peers.

Innovation strategy can be built on responding to six (6) questions:

1. Why innovate?
2. What type of innovation?
3. How will you innovate?
4. Where is the innovation taking place?
5. When do you want to innovate?
6. Innovation for who?

Innovation 360 framework as presented by Oryx Ltd (2020) provides a simplified framework to respond to the above strategic questions:

Figure 7.1: Innovation framework



Source: Oryx Ltd, 2020

7.2.4 Successful innovation strategy

The hallmarks of a successful innovation strategy are:

1. Describeing why innovation activities are important.
2. communicated and understood.
3. flexible and adaptable.
4. Maintained as documented information.
5. Including:
    a. Context of the organization
    b. Innovation vision
    c. Roles, responsibilities and authorities
    d. Objectives, goals and plans to achieve them
    e. Organizational structures
    f. Support and processes including resources.

7.2.5 Innovation and its dimenstions

The OECD's Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation defines four types of innovation: product, process, marketing and organizational. In accordance with these guidelines, an "entity" is innovative when it is "new or significantly improved and realizes or redistributes value". This definition is in line with those found in ISO standards so that they can be useful tools for comparing and assessing innovation within and amongst organizations.

Innovation can be described as a framework for change that leads to solutions with positive social, environmental and commercial impact. It refers to any combination of activities and technologies that breaks existing performance trade-offs in the attainment of an outcome in a manner that expands the realm of the possible. That drives growth. Breaking trade-offs through innovation allows a company to reach a point in "strategic space" that competitors cannot, allowing a company to provide a product at a price or performance level competitors cannot match.

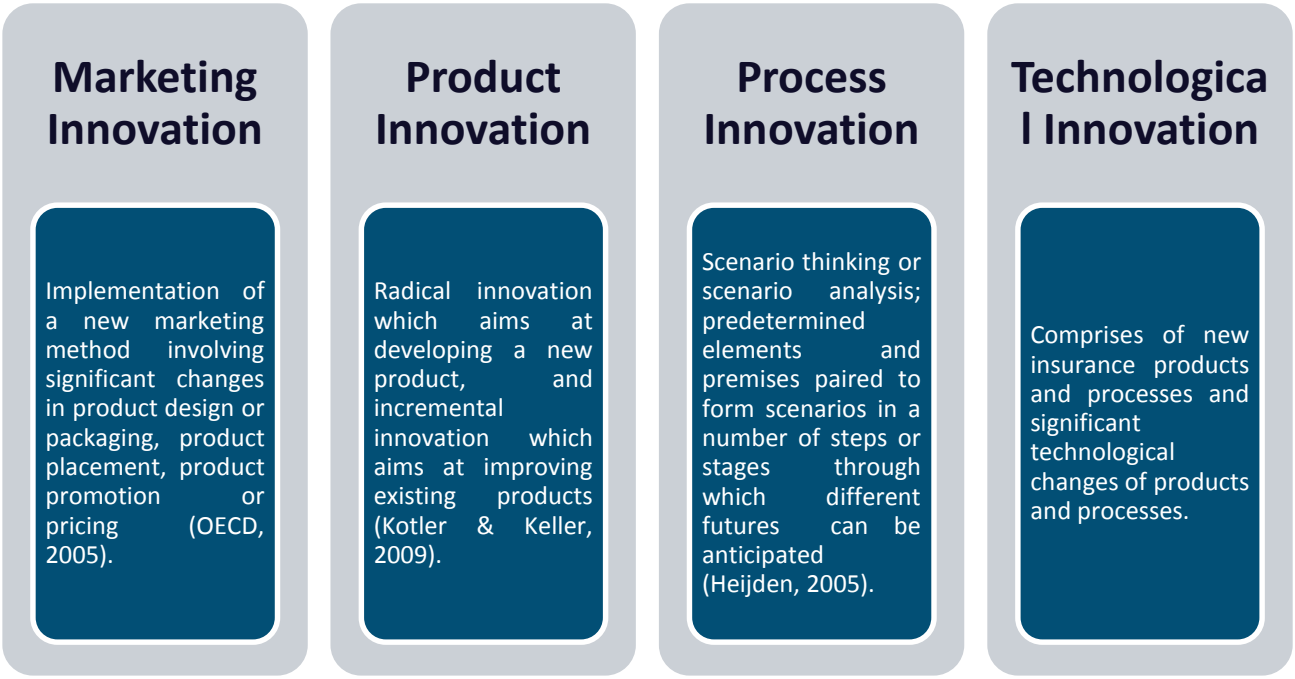
Innovation is as well considered as an outcome, a set of activity or a process (Couger, 1990). Generally, the word "innovation" sometimes refers to the activities or the processes resulting in, or aiming for, innovation. In ISO standards on innovation management, Innovation is defined as an outcome (Hakvag, 2017).

Embedding innovation within the organisation, provides a basis for profitable growth and self renewal, with business continuity programmes shaping disruptive market forces, customer needs and emerging technologies, to their advantage.

Striking a path for innovation need not mean starting from scratch. Instead, it is about leveraging wins and experiences, including the ideas of others, to create new propositions and approaches to delight customers and create value. It is about learning from both traditional competitors and new disruptors. It is about boldly borrowing best practices and new ideas from outside the insurance sector and its traditional allies.

Innovation is not only about technology, while technology is the recent times, it has spearheaded innovation particularly in the financial sector. Innovation could be marketing based where a new or improved marketing approach has been introduced adding significant value, product innovation or process innovation.

Figure 7.2: Innovation Paradigms



Source: Author's analysis

7.2.6 Systematizing Innovation

First and foremost we should recognize that no system of work guarantees success, only the increased likelihood of success. This is made increasingly difficult when systems for managing the innovation process fail to consider the different implementations necessary for different types of organizations or teams that may be focused on different levels or 'classes' of innovation impact.

Standards and innovations are rarely in the same statement. Indeed, standardization of innovation management is perceived as an oxymoron the having a standard on innovation is an impossible wager. This common statement comes from concept confusion between creativity and innovation and also by terminology confusion, innovation is as well considered as an outcome, a set of activity or a process (Couger, 1990). To clarify the terminology, the processes and more generally the whole system for innovation management, an international committee has been settled to provide guidance on innovation management.

An innovation management system encourages top management as well as leaders to establish appropriated and meaningful innovation ambition. This system also helps to optimize the use of resources. It indicates how to create awareness in sharing common vision and common set of tools and methods. With a facilitated assessment, (in including weak system elements, bottlenecks and unintended consequences) a benchmarking with external best practices may drive to more effective and mature management practices. In adopting ISO structure for system management, this standard on innovation management becomes compatible, and possible to

integrate, with other existing management systems of the organization such as business management system.

7.3 Innovation Management Systems

ISO Technical Committee TC279 has been developing new international guidance for innovation management systems (IMS) following the foundation of the TC279 charter for IMS in 2013, with more than 40 countries contributing towards the development of the standard.

The new ISO Innovation Management System (IMS) is a consensus-based approach that can be used to develop and guide the management of innovation, with standardized terminology, tools, methods and guidance to manage interactions between partners, intellectual property, strategic intelligence, and more recently Idea management.

With the right implementation the IMS standard has been positioned to support organizations seeking sustained innovation success by developing their ability to lead innovation activities, to embed design and innovation into their organization and provide a level of assurance that good practice is being followed. IMS is based on seven parts, with eight innovation management principles, to help achieve the following benefits.

Without doubt, developing and deploying innovation management systems within your organization requires a certain level of adaptation, where different types of organization with different levels of innovation will require different approaches and organizational structures. This presents a significant challenge to the adoption and the success of any standardized systematic approach to innovation.

7.3.1 Innovation Management Principles[26]

Realization of value

The purpose of innovation management is to realize value, through the process of identifying, understanding, and satisfying needs of interested parties. Realizing value, financial and non-financial, is vital to the sustainability of organizations.

Future-focused leaders

Leaders at all levels, driven by curiosity and courage, challenge the status quo by building an inspiring vision and purpose, continuously engaging people to achieve those aims.

Strategic direction

The direction for innovation activities is based on aligned and shared objectives and a relevant ambition level, supported by the necessary people and other resources.

Culture

[26] ISO/CD 56000 Extract

Shared values, beliefs, and behaviours, supporting openness to change, risk taking, and collaboration, enable the coexistence of creativity and effective execution.

Exploiting insights

A diverse range of internal and external sources are used to systematically build insightful knowledge, to exploit stated and unstated needs.

Managing uncertainty

Uncertainties and risks are evaluated, leveraged, and then managed, by learning from systematic experimentation, and iterative processes, within a portfolio of opportunities.

Adaptability

Changes in the context of the organization are addressed by timely adaptation of structures, processes, competences, and value realization models to maximize innovation capabilities.

Systems approach

Innovation management is based on a systems approach with interrelated and interacting elements, and regular performance evaluation and improvements of the system.

7.3.2 Faces of innovation

Harvard Business School's Kim B. Clark, professor of Business Administration and fellow innovation guru Clayton M. Christensen argue that there are three types of innovations:

a) "Empowering" innovations move products from costly items available to the few to mass-market items available to the many. These innovations expand the market. Consider the move from whole-life to term products as an example of such an empowering innovation.

b) "Sustaining" innovations are essentially product replacements, moving from one model to another that may be better, but has a basic similarity. This represents the majority of current innovation, Christensen says, but translates into a zero-sum economic game. Here, replacing one annuity with another slightly better but substantially similar one seems an appropriate example.

c) "Efficiency" innovations reduce production or distribution costs. The use of the Internet by many auto insurance writers may be a good example of this type of innovation.

7.3.3 The Four Levers for Innovation Success

There are four pillars for successful innovation:

Lever 1: Creative Collaboration

Creative collaboration is central to the realisation of value, developing high performing teams, customer intimacy, empathy and foresight, inside and outside of the organisation. This collaboration improves engagement with customers, development partners and the value chain, with creative collaboration as a multiplier for your creative output and innovation pipeline.

Lever 2: Innovation Mindset

The innovation mind-set is one of perseverance, with the mental agility to handle complexity, to realise value through uncertainty. Exercising the innovation mindset enables the simulation of interdependencies and systemic representations of future solutions, framed within the mind of the innovator, articulated among teams of innovators, leading to new ideas and solutions. When we exercise the mind in this way, alternating the frame of reference through which the challenge is viewed, we can then question those ideas, the problem to be solved, the requirements, needs, and the value to be realised from a design solution.

For example, roadblocks to a particular solution can often be overcome in a different way, whilst remaining true to the need you are trying to solve, how you intend to move your customer through the social impact model, ease access to a particular service, respond to changing values or move them up the value chain.

Lever 3: Systems of Work

As we have already discussed, systems of work provide a framework to embed innovation within the organisation, to guide innovation practice as a universal bench mark and framework for organisations to follow, evaluating their own performance, maximising the efficacy of innovation practice. It is important to consider all aspects of the innovation organisation, from talent development, organisational structures, guidance on partnerships and operational processes, in a way that supports continuous improvement and quality assurance.

Lever 4: Innovation Culture

Whilst Peter Drucker once famously said that culture eats strategy, we should also be reminded that you are what you eat.

You do not build or put a culture in place, however, it can be grown through the introduction of value systems, beliefs, processes and practice that set the right example for the culture you hope to achieve and then recognise those achievements, not only by rewarding the teams but also by setting the right levels of expectations and metrics for innovation success.

7.3.4 Traditional Innovation Dimensions

Marketing innovation entails Implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing (OECD, 2005).

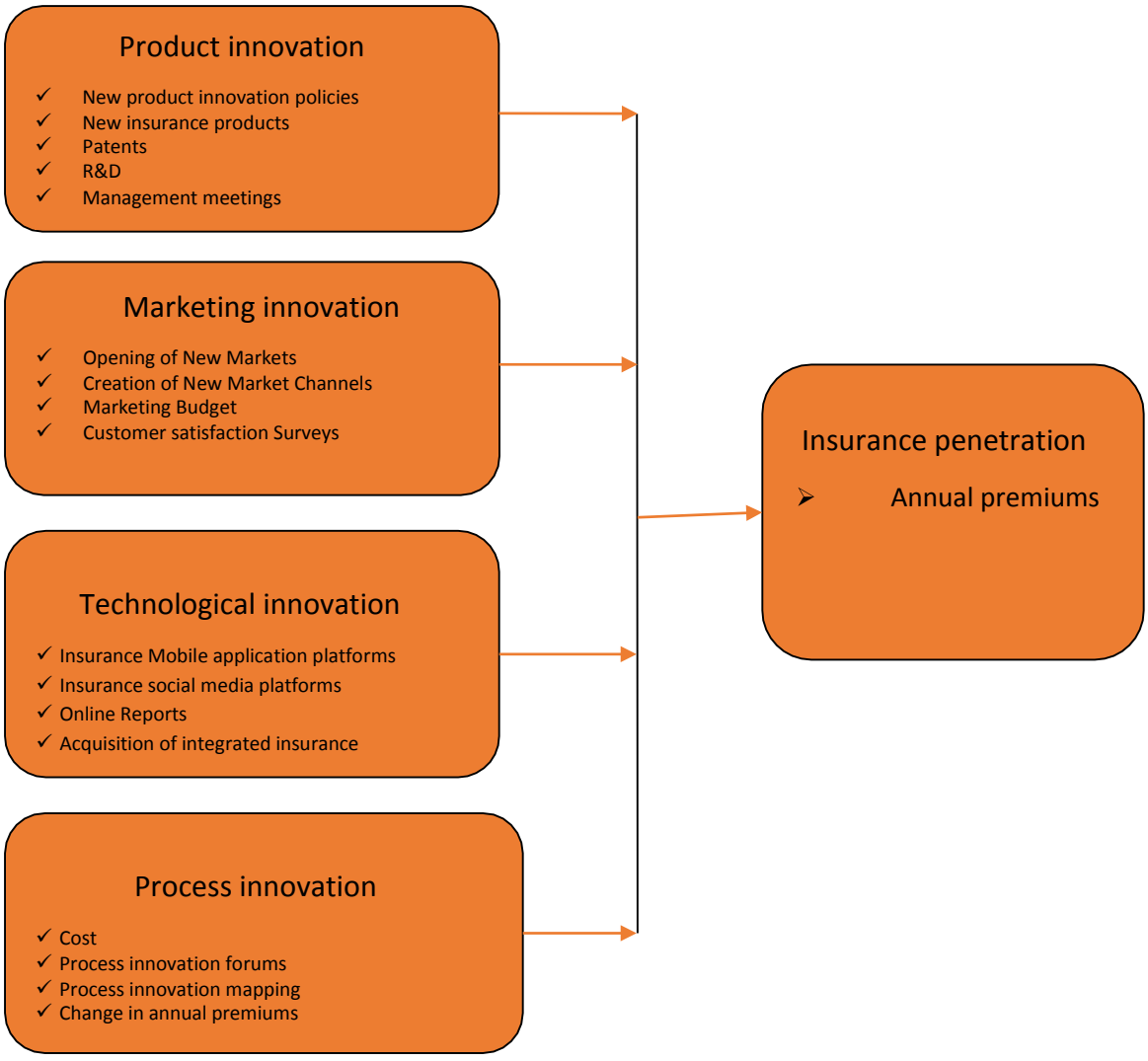
Product innovation is the radical innovation which aims at developing a new product, and incremental innovation which aims at improving existing products (Kotler & Keller, 2009).

Process innovation helps organizations to make sense of their current situation through the analysis of multiple equally plausible futures. It does not prescribe action, but enhances organizations' capabilities to mobilize resources and achieve greater innovativeness.

Technological innovation in general meets production and marketing goals as improvement in product quality, reduction in production cost, increase in market share and new market structures, creation of new markets, and increase in production flexibility.

The figure 7.3 below portrays the framework of innovation with traditional innovation dimensions and their various aspects and anticipated impact in an insurance company:

Figure 7.3 Traditional innovation framework for insurance company



7.3.5 Innovation Process

The process of innovation itself may be broken down into three segments: ideation, incubation, and commercialization.

Ideation involves generating and collecting ideas, sharing and enhancing ideas, and evaluating the business viability of ideas toward making an investment decision. When an idea is found worthy of consideration for even a small investment, a business case is developed to formally define the offering associated with the idea and to make a request for resources to incubate the idea.

Incubation involves building and testing the idea with the goal of gauging its market viability. Having tested the feasibility of the idea, the next step is to commercialize it—establishing the methodology, hiring and training key personnel, and developing sales and delivery capability to facilitate revenue growth.

The end result of innovation properly deployed is broken constraints, new possibilities, and progress for both insurer and insured.

7.4 INNOVATION IN THE INSURANCE INDUSTRY

7.4.1 What is Innovation in insurance sector?

The conservative reputation the industry enjoys has served to camouflage a tremendous track record of innovation, from the first written insurance contract inscribed on Babylonian columns by King Hammurabi's men to the industry's current use of big data to lower costs and improve results.

The societal impact of insurance innovation cannot be understated. For example, the Great Fire of London in 1666 led to the formation of the first English insurance company, The Fire Office, located behind the Royal Stock Exchange. In order to protect its investment, which insurer and the others established soon after- ward set up their own fire brigades to fight fires at places covered by their policies. Then, in a triumph of reason and enlightened self- interest, the insurers donated their firefighting equipment to the city in order to form and equip a municipal fire brigade that could fight fires anywhere in the city, not just in the buildings the companies insured.

While American founding father Ben Franklin had many noted accomplishments, what could have been more important than his founding of the nation's oldest operating property insurance company, The Philadelphia Contributionship for the Insuring of Houses from Loss by Fire, after the great fire of 1730? But even the lasting importance of the existence of insurance against fire for individual residences may be secondary to the safety innovations the company employed.

The history of insurance product innovation is a history of human trade, triumph and development. The earliest policies largely covered losses by merchants going through foreign lands, enabling them to share the risk of trade.

Maritime insurance dates back to the 13th century at least. Its expansion tracked the growth of seafaring trade, with many of those writing insurance in the 1680s gathering at Edward Lloyd's Coffee House.

Life insurance, accident, and health insurance, and now everything from business interruption insurance to cyber insurance, reflect innovations developed by insurers in order to allow merchants to take risks for growth and families to survive in the face of unexpected hardship.

The secondary result of those innovations has been life-improving innovation in other sectors, from the Underwriters Laboratory mark letting consumers know a product has met safety standards to air bags and seat belts whose development and adoption were driven in part by industry-funded sources like the Insurance Institute for Highway Safety.

Innovation in insurance has long been rightly married to a certain conservatism that ensures that companies do not get carried away by the latest fads, but preserve their capital for its intended purpose. That conservatism served most carriers well during the 2008 crisis, but may also hinder the flexibility needed to survive and thrive in a post-crisis environment, as the rate of change appears to be accelerating.

Empowering innovation, as defined by Christensen, may be by its very nature most disruptive to existing insurer business models. Trained as the industry is to focus on the best products and justifiable investments, it may be well positioned to implement both sustaining and efficiency innovations, but that may not be sufficient. Insurers are great at analyzing data— but, as Christensen's third principle in his seminal work, *The Innovator's Dilemma*, states: "Markets that don't exist can't be analyzed." Doing everything right for now may not be enough if you miss out on the next wave of innovation.

7.4.2 Why the innovation framework for ILS?

Most corporate executives recognize the value of innovation, but few would be brave enough to boast of clearly understanding the process of implementing innovation in a business model, and even fewer of successfully integrating continuous cycles of innovation in their own companies. That is not necessarily a mark of failure, but recognition of reality. For a successful business, commitment to innovation represents a gamble as to whether the innovation, if successful, will adversely affect the existing business, or represent a substantial increase or improvement in the business.

It is widely acknowledged that innovation strategies are central to the growth of output and productivity in many economies. Despite the fact that insurance has been practiced for over a thousand years world over, it is still a fact that insurance uptake is still very low, not only in Africa but the world over. In Africa for example, the problem is a very serious one given that 96% adults do not have any form of insurance and insurance companies have not come up with products or strategies to fully tap this market (Finscope, 2017). On the other hand, a look at the percentage of the available market buying various insurance policies may lead one to be concerned about the lack of movement toward expansion of that market penetration.

The effects of innovations on firm performance differ in a wide spectrum of sales, market share, and profitability to productivity and efficiency (OECD, 2015). Innovation plays a significant role in creating the differences of performance and competition among firms, regions and even countries.

Insurance is, in many ways, a prisoner of the past. The industry relies on data to assess and manage risks and to create new products. Insurers are very good at expanding the boundaries of the current business model. Like minicomputer makers, the industry is masterful at tweaking and optimizing its product. A quick look at some of the new products made available over the past few decades shows numerous examples of sustaining innovation. The industry does seem to know how to meet the needs of its consumers.

Insurance may not readily lend itself to as dramatic a disruptive innovation as was term life insurance at a time when whole life was all there was, for example, but the market may demand it. Whether one uses Raynor's terminology and calls it "disruptive innovation"— creating a new market—or uses Christensen's concept of "empowering innovation"—dramatically expanding the market—insurers may do well to work toward innovation that increases the size of the market they serve.

Professor David Gann, head of Innovation and Entrepreneurship at the Imperial College London Business School, observed: "In a rapidly changing world, innovation is no longer an option, it is a necessity. Companies that innovate have higher survival during downturns, are more profitable, and outpace competitors in periods of economic growth. Success depends upon aligning innovation with your firm's strategy and using the most modern approaches to innovation management." Many may agree with the sentiment, but translating the desire for innovation into reality may require adjustments to a company's business model.

There may be as many routes to innovation as there are innovations. Crowd sourcing or open innovation is one of the newest methods gaining attention. Management Standards on Innovation break down the existing cultural, structural or organizational obstacles among/between organizations.

7.4.3 Rationale for ILS Innovation Framework

Proposing a standard on innovation management is often perceived as a non-sense by many people. Indeed, standards may be perceived as restricting creativity. Still, organizations share a common need around innovation at large.

Innovation is a crucial business need as it relates to a company's ability to identify and pursue new areas of opportunity while understanding and responding to changing conditions in its environment. It also helps organizations to create value while managing uncertainty and to leverage the knowledge and creativity of the people who work there.

The ILS Innovation Framework offers a systematic approach to integrating innovation into all layers of an organization. This helps to seize and create opportunities for the development of everything from new products, systems and services to business models.

Change in an established and making business requires courage. Select how it is possible to change is even more complex. Kotter (1990) describes why Innovation management offers a framework of methodologies to make the change acceptable and legitimate for any organization. Working on innovation requires a specific set of tools and methods. This set is different from the ones used in new product/service develops. There are more uncertainties and more unknowns in innovation than in the development of a new product. Managing an innovation project requires developing the learning curve of the team. The methodology of Lean startup (Ries, 2011) is dealing with how setting a strategy and capturing insights to transform the assumptions in knowledge.

These standards provide best practices to support implementation of the innovation policies as well in Small to Medium Enterprises (SMEs) as n worldwide groups including public institutions, universities, research centers or non-profit organizations. In ISO TC 279 experts address: terminology, tools, and methods such as but not limited to open innovation, design innovation, strategic intelligence, creativity management, intra/entrepreneurships and also self-assessment of innovation management.

Organizations that are innovative also contribute to the United Nations' Sustainable Development Goal 9, which aims to "build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation." Innovation has many advantages such as an increased ability to manage uncertainty, greater profitability, improved reputation and client retention, reduced cost and a more empowered workforce.

7.4.4 Who can use the ILS Innovation Framework?

The Inclusive Insurance Innovation Framework is developed for:

i. All types of private, public and not-for-profit organizations, regardless of type, sector or size. The focus is however on established organizations rather than on temporary or start-up organizations;

ii. All types of innovations, e.g. product, service, process, method, model innovations, from incremental to radical innovations etc.;

iii. All types of ways to innovate, e.g. internal, collaborative, user, market- and technology-driven innovation etc.

7.4.5 Benefits of the ILS Innovation Framework

The users of ILS Innovation Framework will benefit from the following:

1. Increased growth, revenues, profitability, and competitiveness;
2. Reduced costs and waste, and increased productivity and resource efficiency;
3. Increased satisfaction of users, customers, and citizens, as well as social benefits;
4. Sustained renewal of the portfolio of offerings;
5. Engaged and empowered people in the organization;

6. Increased ability to attract partners, collaborators, and funding;
7. Enhanced reputation and valuation of the organization;
8. Compliance with regulations and other relevant requirements.

7.4.6 ILS Innovation Ecosystem

Basic to successful innovation is a formal framework. Leadership involvement is essential, but so is involvement all down the ranks. This is aided by a clear definition of the vision and strategy for the innovation program, communicated throughout the organization.

While it is important for key executives to be involved directly in establishing the vision for innovation, a broader team of leaders with executive sponsorship can be valuable in execution. An innovation board can govern the execution of innovation processes. That board may consist of leaders of major functions, service areas, geographies, and those directly leading innovation teams. Its objectives could include identifying policies and practices to be supported by the insurer's leadership, identifying and recommending investments to be made in innovation, and identifying high- potential areas and ideas on which innovation should focus.

Having such a board helps increase the probability of success by establishing innovation as a strategic imperative and allowing for the needed speed and flexibility in decision making regarding innovation. It also provides an opportunity to identify and share "best practices" throughout the company for recognizing and building strong fundamentals for innovation.

Innovation Ecosystem in an organization is build up by two layers, Leadership and Infrastructure.

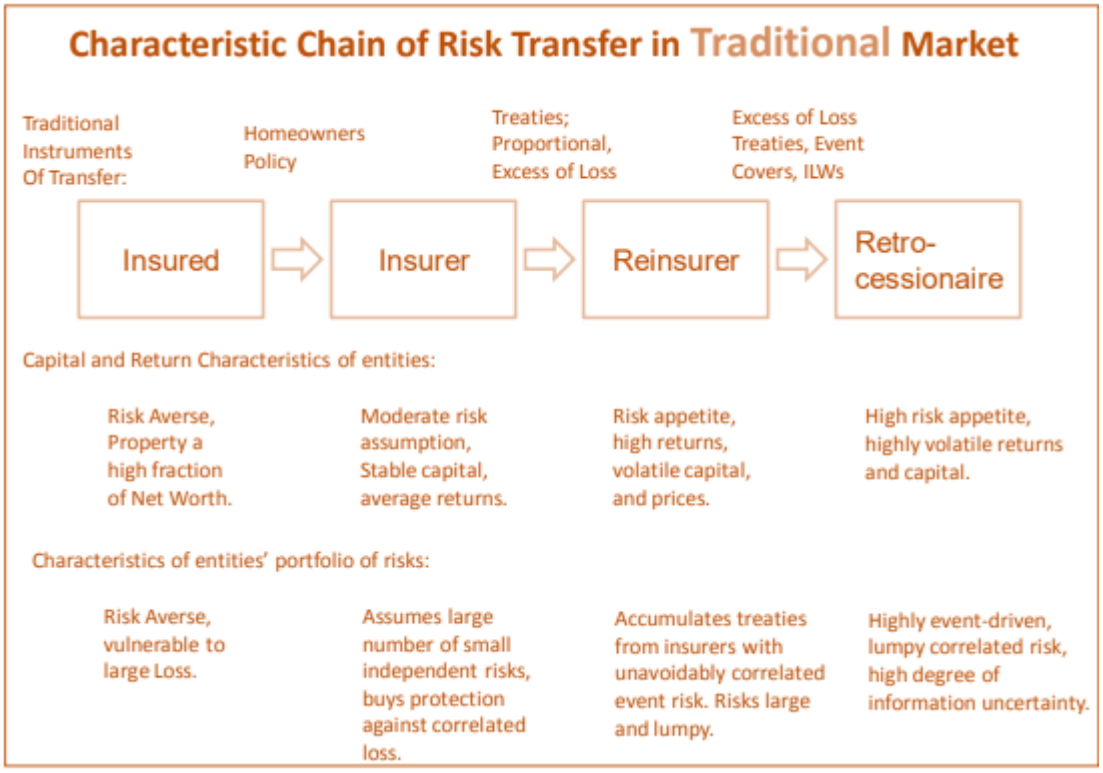
7.4.7 ILS as the innovation in the insurance industry

The Hyogo Framework for Action 2005-2015 identifies the need to promote the development of financial risk transfer mechanisms, including insurance, as a priority action for building the resilience of nations and communities to recover after disasters. While this recommendation is only one among many, the need for innovative disaster risk financing and insurance solutions is particularly relevant for the developing countries.

Innovation in disaster risk financing and insurance is occurring at all scopes: risk transfer for governments and sovereign entities, private non-life catastrophe insurance markets for homeowners, agricultural insurance for farmers and herders, and disaster microinsurance for low-income populations. Furthermore, innovation is happening on a variety of fronts in the field of disaster risk financing and insurance – product development, disaster risk assessment and sharing, and delivery channels to name a few – that interact to produce new solutions. These innovations, through public-private partnerships, can foster the development of risk market infrastructure in developing countries, which are essential to ensure the emergence of cost-effective disaster risk financing and insurance solutions from sovereign entities to households.

In 1992, the insurance world was shocked by the economic losses caused by Hurricane Andrew which caused some US$26 billion in current dollar loss, causing devastation across the Bahamas and the US states of Florida and Louisiana. Were it to repeat today it would cause some US$57 billion of insured loss. Hurricane Andrew ranks as the third biggest single event of the century when adjusted for exposure and inflation. Andrew caused a devastating wave of loss claims to roll through the chain of risk transfer, exhausting or depleting capital at each stage for all who had assumed part of the risk. For example, an insurer who provided a large number of homeowners policies for Florida residents, the reinsurer who provided this insurer reinsurance on these policies, and any retrocessionaires who had in turn taken a piece of the reinsurer's Florida exposure. Figure 7.1 below illustrates this risk transfer chain, which can be called the "traditional" risk transfer chain.

Figure 7.4: Characteristic Chain of Risk Transfer in Traditional Market



Source: Lane Financial LLC

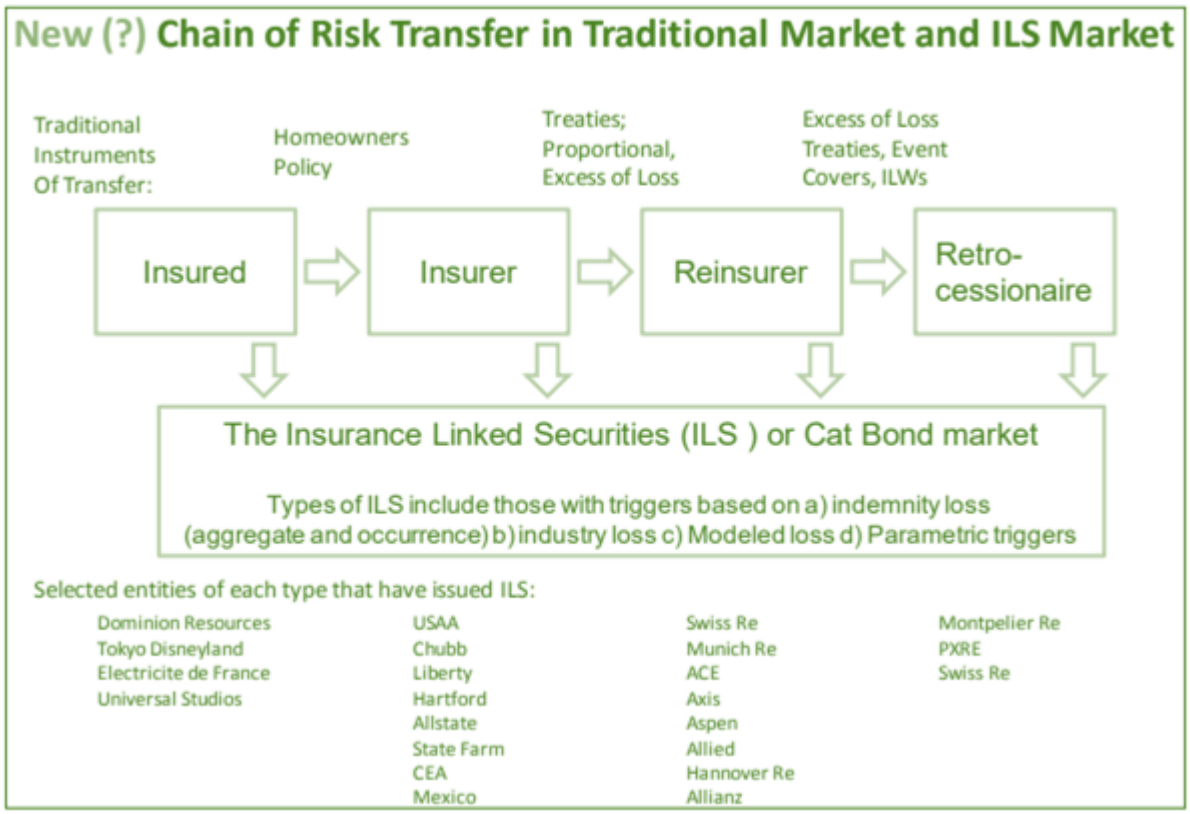
7.4.8 Re-engineering Risk Transfer Chain

The chain of risk transfer was re-engineered post-Andrew. Instead of simply transferring risk up through a chain of different insurance entities, but essentially keeping it within the insurance market, the major innovation was to transfer risk directly to the capital markets. The ILS box in Figure 7.2 below represents the capital market.

A noticeable feature of the revised chain is that the movement to the capital markets can take place by any of the types of players in the traditional chain. The fact that insureds such as

Electricité de France and Tokyo Disneyland have issued directly to the capital markets shows that a fully developed chain of risk transfer is not a prerequisite for transfer into the capital markets, although the chain undoubtedly facilitates such transactions.

Figure 7.5: Re-engineered Chain of Risk Transfer in the Contemporary Insurance Market



Source: Lane Financial LLC

ILS are essentially a form of collateralized risk transfer where the insured (such as USAA illustrated below) enters into an agreement equivalent to an insurance or reinsurance policy with a special purpose vehicle (SPV) which then transfers the risk onto investors through bond issuance. ILS are only the main instrument of transfer in the revised risk transfer chain. There are others currently in use and there have been several others that have been tried. Table 7.1 and 7.2 below provide details on the structure of ILS and descriptions of some other risk transfer instruments.

Table 7.1 : ILS property/general insurance products

	Cat bond	ILW	Collateralized reinsurance	Sidecars	Cat Swaps	Cat futures and options	Contingent Capital	Weather derivatives
Definition	Bond which transfers the risk of peak events, such as hurricanes or earthquakes, to a third party; coupon and principal payments are linked to the occurrence of catastrophes	Contractual agreement that calls for the seller to pay the buyer on specified type of losses, as measured by indices and / or incurred losses above a threshold	Privately structured contracts which insure a portfolio of specific insurance policies against losses caused by predefined peril(s)	Financial structures which cover a specific portfolio of insurance policies. Instead of covering an already existing book of business, sidecars raise capital before defining a specific insurance portfolio	Agreements between two parties to exchange contingent payments (usually not collateralized); two types: event- linked as well as pure risk swaps	Standardized exchange-traded contracts to pay or receive payments at a specified time, with the value of the payments being a function of a ″cat index″	Securitization transaction similar to a put option, which allows an insurer to issue capital (e.g., common stock, hybrid capital, or debt) at a predetermined strike price following the occurrence of a predefined event	Derivative financial instruments whose payout depends on the value of a weather-related index (or event). By definition weather derivatives are not insurance contracts.

Time horizon	Multi-year	One- year	One- year	Multi-year	Rarely multi-year	Less than one year	Often multi-year	Less than one year.
Standardization	Standardized elements but overall customized	Standardized	Highly customized	Moderate	High for event- linked, low for pure risk swaps	High	Low	Exchange-traded and some OTC products standardized ; other OTC products customized
Liquidity	Medium, liquid secondary market in many cases	Very low	None	None	Low for event- linked, none for pure risk swaps	Market is currently non-existent (in general exchange trading would allow high liquidity)	Low	Medium for some standard OTC contracts. High for exchange-traded products
Type of Trigger	Indemnity Industry Loss Index Parametric Modeled Loss	Indemnity and loss index	Indemnity	Indemnity	Index (event-linked swap) or indemnity (pure risk swap	Index-based	Typically indemnity	n general index (often based on heating or cooling degree days)

Single vs. Multi-Trigger	Typically single trigger	Double trigger	Typically single trigger	Can be single-trigger or multi-trigger	Typically single trigger	Single trigger	Typically single trigger	Single-trigger
Basis risk	Present if index-based or parametric trigger	May be significant (mainly index-based)	No	No	Present if index- based	May be significant, depending on the index	Low	May be significant (index-based)
Moral hazard	May be an issue in case of indemnity trigger. Can be mitigated through index-based or parametric trigger	Low	May be present	Low (indemnity based but in general quota-share reinsurance	May be an issue in case of indemnity trigger	Low	Possible (but unlikely due to relation with company value)	Low as trigger is index-based
Transparency	High if index-based or parametric trigger	High	Low	Low	High for event- linked swap (index-based	High	High	High

Counterparty risk	Low as capital is usually invested in high quality securities held by trustee	Yes, unless limit is collateralized	Low, full collateralization	No	Yes, unless additional collateralization agreement	Low, only if exchange defaults	Yes	Minimal if traded on exchange. Present if traded OTC and not collateralized

Table 7.2: Main characteristics Life / Health Instruments

	Longevity bonds	**Extreme mortality bonds**	**Embedded value (EV) securitization**	**XXX / AXXX reserve securitization**	**Survivor forwards and Mortality forwards**	**Longevity swaps**	**Life settlements**
Definition	Bonds which securitize longevity risk and address the fact that a cohort lives longer than expected	Bonds which securitize mortality risk and address the issue that a cohort dies prematurely	Transactions where insurance companies monetize future profits emerging from a block of business; often involves a seasoned closed block of life	Securitizations which life insurance companies and reinsurers use to fund redundant reserves via capital markets	Derivatives whose underlying is an uncertain t-year survival or mortality rate. Mortality forwards are the natural counterpart of	Derivatives that allow two counterparties to exchange future cash flows linked to a fixed swap rate as well as realized survival rates. They are essentially a portfolio of survivor forwards	Life insurance policies sold to investors in secondary or tertiary market. Investor continues to pay premiums on the contract and collects death benefit payment when the original

			insurance business in run- off		survivor forwards.	with staggered maturities	policyholder passes away
Time horizon	Long- term (in general 8 to 20 years. Beyond 20 years possible	Multi- year (but not as long- term as other life-related securitizations, until now the longest maturity covered 5 years)	Long- term (often >30 years)	Long- term (most transactions cover 10 to 20 years)	Long- term	Long- term	Long- term (depends on the remaining life expectancy of the insured)
Standardization	Low	Standardized elements but overall customized	No	Moderate	High	High	Low
Liquidity	Very low	Low	No liquidity (private deals)	No liquidity (private deals)	Very low	Low	Medium (Tertiary Market)
Type of Trigger	Index of survival rates (customization for individual sponsor possible)	Index of mortality rates (customization for individual sponsor possible)	No trigger	No trigger	Index of survival or mortality rates	Index of survival rates	N.a.

Single vs. Multi- Trigger	Single trigger (in general)	Single trigger (in general)	No trigger	No trigger	Single trigger	Single trigger	N.a.
Basis risk	Depends on the index composition	Depends on the index composition	No	No	Depends on the index composition	Depends on the index composition	N.a.
Moral hazard	Low	Low	No	No	No	No	N.a.
Transparency	High	High	Low	Low	High	High	May be a problem when investing via funds
Counterparty risk	Depends on the structure	Low as capital is usually invested in high- quality securities held by trustee	High	Low	Present (typically uncollateralized)	Present (typically uncollateralized)	Depends on the rating of the insurance company that issued the policy

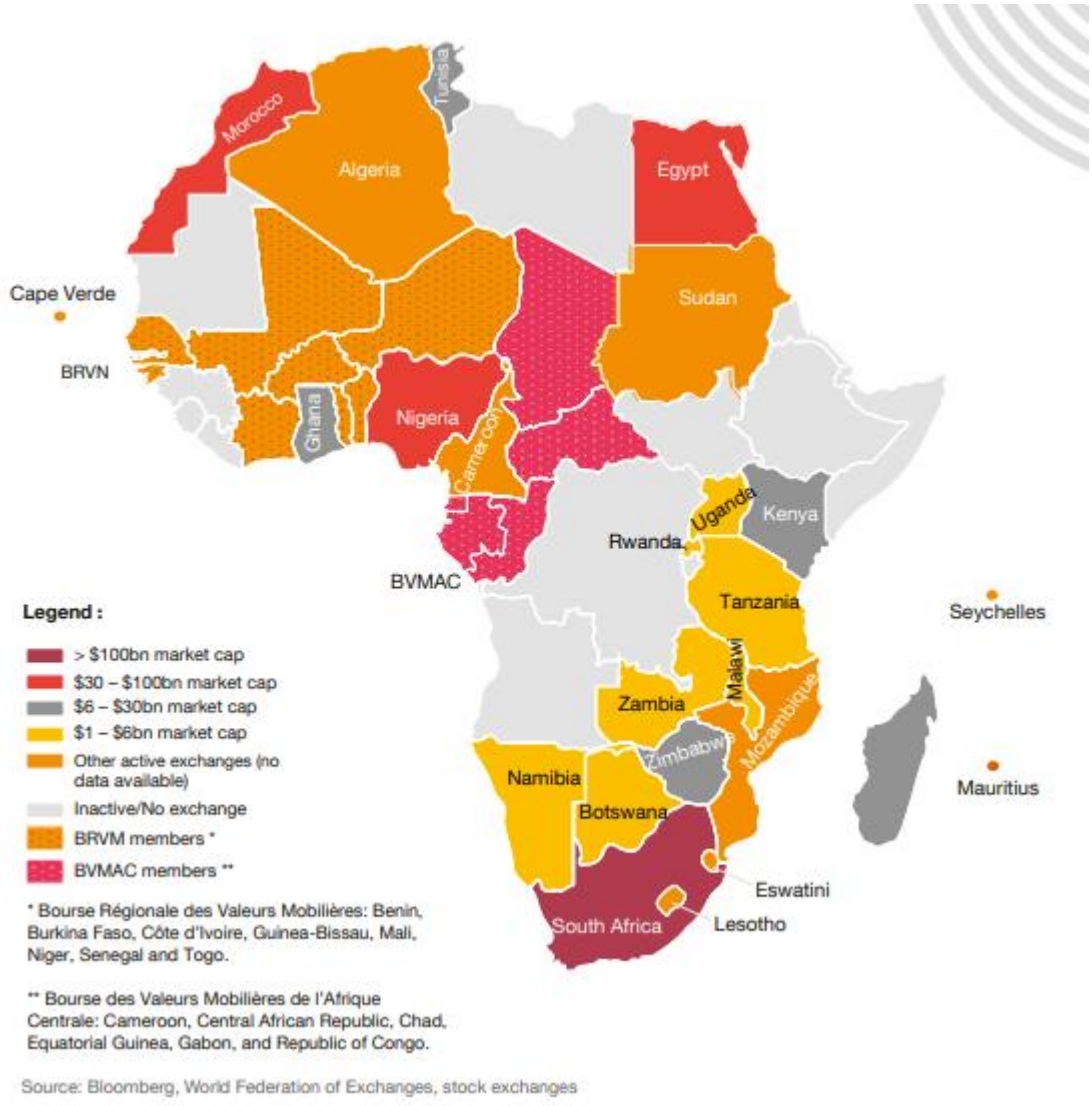
Source: Adapted from Cummins and Barrieu (2013), Willkie, Farr & Gallagher LLP (2014), Swiss Re (2009) and own information

7.5 Africa Capital Market

Capital markets play an important role in complementing bank financing in Africa. For example, more than US$560 billion was raised through bonds by governments and private firms in national currencies in Africa since 1997 . In addition, the number of stock exchanges on the continent has grown from five in 1989 to 32, with stock markets growing continuously in the number of shares listed and the traded volume. From 1992 to 2018, the capitalisation of African stock markets increased tenfold from $113 billion to more than $1,130 billion. Excluding South Africa (235 percent of the GDP), the highest stock market capitalisation in Africa was in Mauritius (69 percent of GDP) in 2018. The capitalisation of Mauritius stock exchange was well below the average market capitalisation in the East Asia and Pacific region (83 percent of GDP) and in high income countries (119 percent of GDP).

Global investors have demonstrated confidence in Africa capital markets, with several issuances being oversubscribed by more than three times. The interest rates attained also indicate investor confidence, with several sovereigns attaining an improved rate in comparison to their last issuances. Cameroon's 2021 Eurobonds, for example, had a coupon rate of 5.95%, which is a marked improvement on the 9.5% of its 2015 Eurobonds.

Despite a global surge in IPOs during 2021 on the world's stock exchanges, Africa has seen companies systematically pulling away from the equity markets. The reduction of IPOs and capital raising in 2021 indicates that Africa may be falling behind the international market's ability to leverage the private sector in order to create investment and wealth. The Sub-Saharan market, specifically South Africa, reported a reduction of approximately 73% in equity capital raised, when compared to 2020. This is a trend that has been seen over the past five years, in which the number of delistings outweigh the number of listings on the JSE. The same trend is being experienced throughout the rest of Sub-Saharan Africa. Investor relations experts speculate the reasons for the exodus to be low valuations and high cost related to corporate actions.

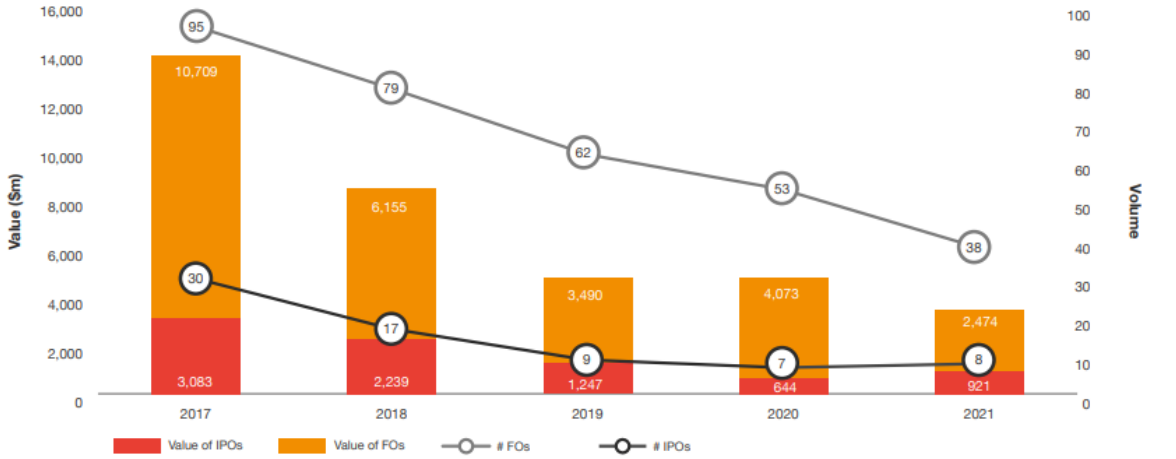


Source: Bloomberg, World Federation of Exchanges, stock exchanges

7.5.1 African equity markets

While global capital market activity continued to see an uptick with the highest IPO proceeds ever recorded in 2021, African ECM activity continued on a downward trend. The year 2021 saw the lowest ECM activity in the last five years with a decline in value and volume by 28% and 23%, respectively, compared to 2020. • Fast growing tech companies across major markets in Africa continue to source for growth capital outside the equities capital market, due to perceived onerous regulations among other reasons. • No IPO was recorded in South Africa as the largest bourse in the continent – the Johannesburg Stock Exchange (JSE) – continued to record a large number of delistings; 24 companies delisted from the JSE in 2021 against 20 that delisted in 2020.

Figure 2: ECM activity, 2017 – 2021



Source: Dealogic

Note: Some adjustments were made to the Dealogic dataset subsequent to the release of our 2020 publication. Data presented in our 2020 report has therefore been adjusted for two additional IPOs in 2020 – one on the Lusaka Stock Exchange and one on the Tunis Stock Exchange – with an impact of $50.4mn on 2020's total IPO value. Also, adjustment was made for three additional FOs in 2020 – all on the Nigerian Exchange – with an impact of $20.9mn on 2020's total FO value.

7.5.2 African debt markets

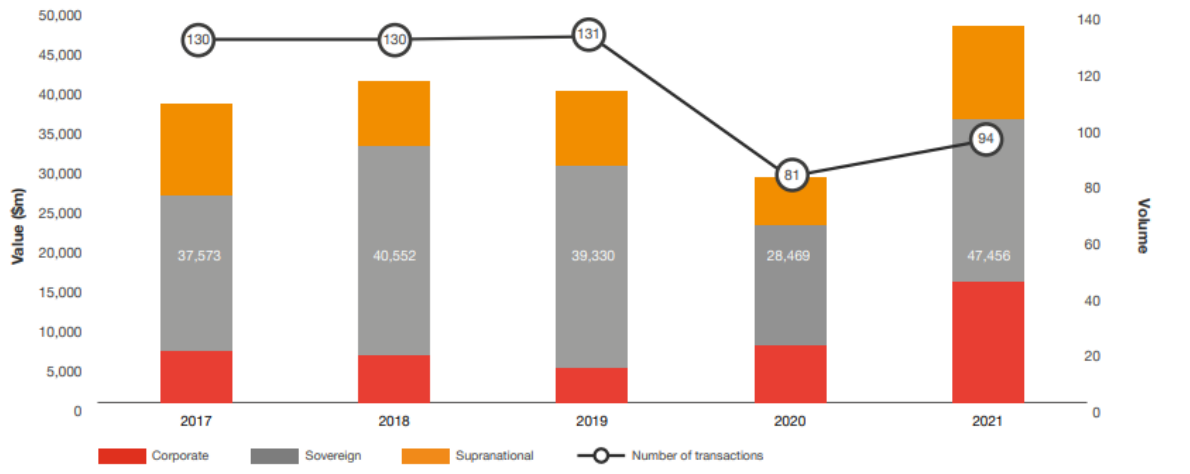
Analysis of the African debt markets focuses on both foreign currency-denominated (also referred to as non-local currency) high-yield and investment grade corporate debt issued internationally by African corporates, as well as sovereign and supranational issues which play an increasingly important role in the broader macroeconomic context in African countries.

• African issuers have raised $193.4bn of non-local currency debt from 566 issuances over the past five years.

• The increase in issuances in the current year can be largely attributed to the recovery from the COVID-19 pandemic economic devastation of 2020.

• The value of total issuances in 2021 exceeds pre-pandemic levels

Figure 8: Total non-local currency African debt issuances, 2017 – 2021



Source: Dealogic

7.5.3 African corporate non-local currency debt market

• Trends in corporate non-local currency bond issuances have been somewhat inconsistent over the past five years, due to the small number of active issuers

and the variable size of issuances over the period.

• The number of corporates who issued debt in 2021 is more than double the number pre-pandemic (2019: 11 issuances, 2021: 27 issuances).

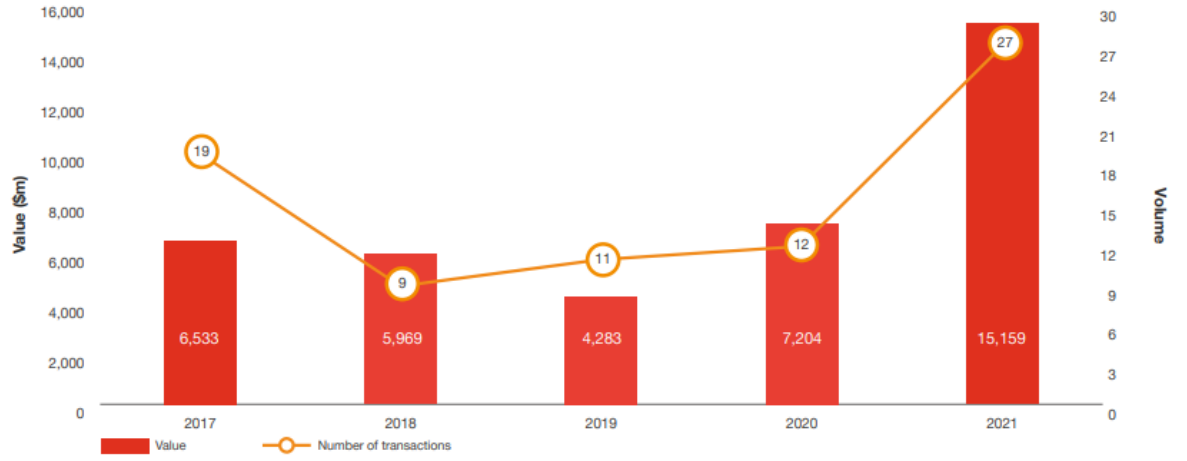
• Total proceeds in 2021 represented a ten year high of $15.2bn – almost double the highest annual value in the past ten years.

• Prosus NV remains the largest corporate issuer in 2021 with proceeds of $4bn (2020: $5.7bn).

• The average yield to maturity of corporate bonds has decreased over the past five years (2017: 6.59%, 2021: 4.91%).

• 25% of corporate bonds in 2021 were issued for the purposes of refinancing or repaying debt, compared to only 7% used for the same purpose in 2020

Figure 9: Non-local currency corporate bond issuances, 2017 – 2021



Source: Dealogic

7.5.4 African non-local currency debt by industry

The non-local currency debt by industry analysis over the past five years demonstrates Africa's growth in the technology and finance industries, driven by an increasing population and appetite for economic growth and investment. • In 2021, the finance and computers & electronics industries accounted for the largest issuances (28% and 27% of corporate bond issuances respectively). In the past five years computers & electronics was the largest industry by value of corporate issuances (25%), with finance and oil & gas accounting for 23% and 13%, respectively. • The change in composition in 2021 is largely due to Investec and Access Bank plc making issuances of $1.3bn and $1bn, respectively, and multiple African banks making issuances of less than $1bn. • Oil & gas remains the third largest industry, accounting for 14% of the total value of non-local currency corporate bond issuances in 2021

Figure 10: Total non-local currency corporate bond issuances by industry, 2021

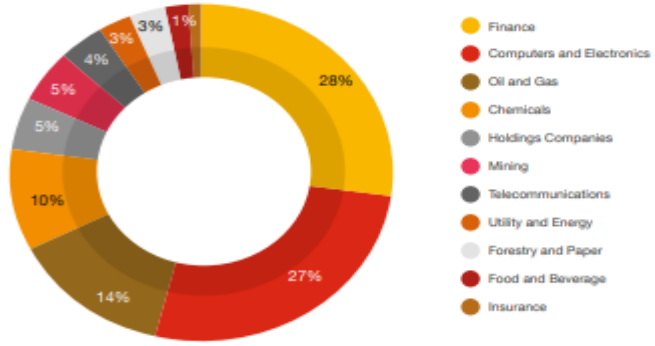
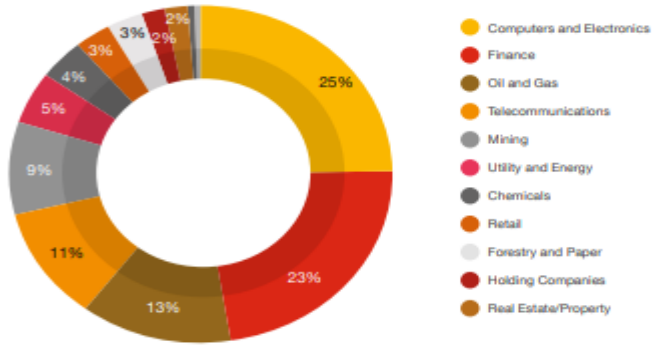


Figure 11: Total non-local currency corporate bond issuances by industry, 2017 – 2021



Source: Dealogic

7.5.5 Sovereign and supranational debt

• Egypt has consistently been the largest issuer of sovereign bonds over the past five years, accounting for 33% of all sovereign bonds issued in 2021.
• The total value of sovereign bonds issued has increased by 37% from 2020 to 2021.
• The size of sovereign bond issuances is notably smaller than those issued prepandemic (with an average issuance size of $1.2bn in 2019, and $0.9bn in 2021).
• The value of supranational bond issuances increased by 87% from 2020 to 2021. Supranational issuances experienced a decline in the previous five years, but have shown a strong recovery in 2021, and are now comparable in volume to issuances in 2016 and 2017.
• African Development Bank has been the largest player in supranational bond issuance, issuing $35.2bn in bonds over the past five years ($8.2bn of bonds issued in 2021). The next largest issuer is Africa Finance Corp with $3.8bn issued over the past five years ($745mn of bonds issued in 2021).
• The average yield to maturity for supranational bonds has declined in recent years, from 6.48% in 2018 to 2.60% in 2021.
• Only 32% of sovereign and supranational debt issued was of investment grade (Fitch rating of BBB or above).
• 36% of sovereign and supranational bonds were issued for the purpose of refinancing (2020: 19%).

Figure 12: Sovereign debt by nationality, 2021

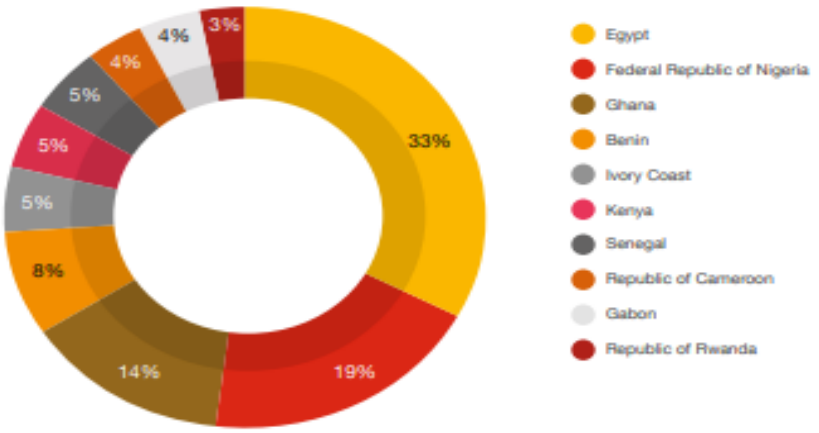


Figure 13: Sovereign debt issuances, 2017 – 2021

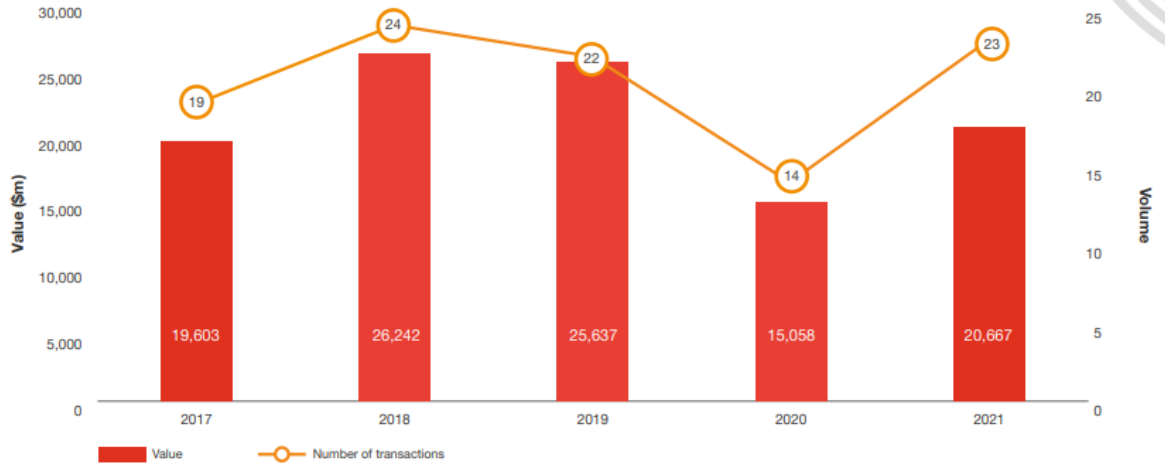
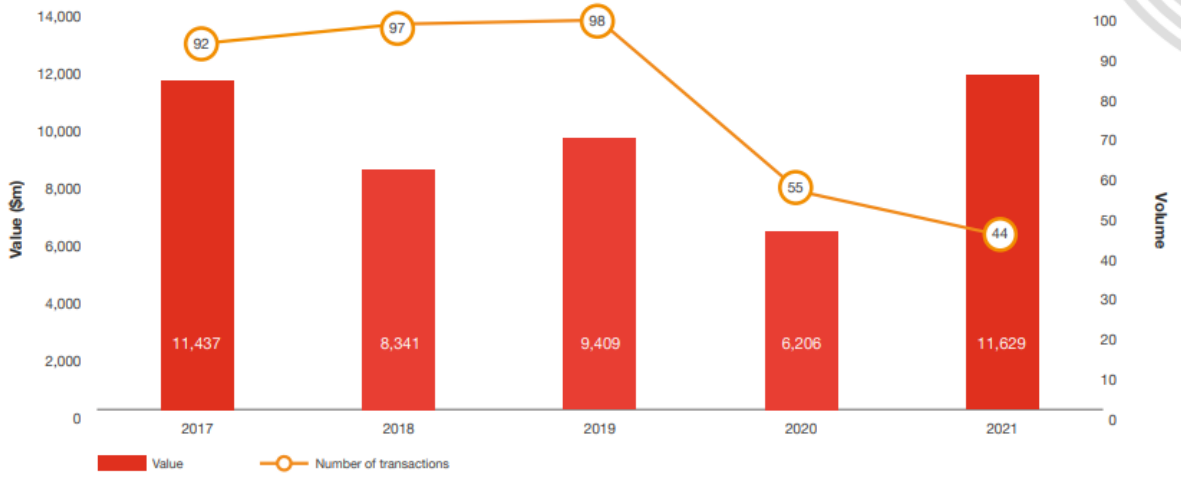


Figure 14: Supranational bond issuances, 2017 – 2021



Between 2007 and 2020, twenty-one African countries took the opportunity to access international debt markets, many for the first time. The instrument of choice has been eurobonds (foreign currency bonds issued in global financial centres). Along with this access to the markets came scaled-up lending from bilateral lenders, especially China, and continued access to loans from the multilateral organizations, like the IMF and World Bank. This access to international debt markets was hard-won. African countries pulled-in the capital by turning their economies around after a prolonged crisis in the 1980s and 1990s. Investors had been attracted by expanding economies, low debt levels after debt relief, much improved macroeconomic policies, and the opportunity to diversify their portfolios. Other factors also helped, such as historically low interest rates that triggered a global search for yield. Behind the scenes, African countries' finance ministries had been striving to get credit ratings and began equipping their debt management offices to manage the new types of borrowing.

The stock of African eurobonds reached $140 billion in 2021, having provided governments with a financial boost to their investment in infrastructure, technology, and skills. Longerdated bonds of thirty years or more have been issued, and countries are issuing in Euro as well as US dollars. The increased bonds have meant African countries have increased their weight in the main emerging market bond indices. The bulk of the issuance had been by Africa's larger emerging economies, including Egypt, South Africa, and Nigeria. But when compared to the size of their economies, issuance by the frontier economies of Ghana, Zambia, Senegal, Gabon, Ivory Coast and Angola was sizeable.

7.6 Innovating ILS for Africa

Africa insurance market is yet to see its first ILS product in line with study by Sibindi (2015). State or governmental entities that have used the ILS/ART market. These include most noticeably Mexico, the US states of North Carolina and Massachusetts and the California Earthquake Authority. The fact that these entities find the coverage obtained useful is encouraging for developing country aspirations.

In order for African countries to benefit from catastrophe risk transfer markets, they must circumvent the issue of under-developed private insurance markets leading to inadequate traditional chain of risk transfer which manifest into significant risk protection gap. One option is to emulate private market innovations by using ILS as the revised chain.

Although these types of transaction tend to be expensive, there is good news for African countries interested in risk transfer to the capital markets. Since 2010 the ART market showed strong growth in the issuance of insurance linked-securities for property catastrophe risk, and market practitioners report new inflows of capital on the investment side with demand expected to outstrip supply of risk. This could lead to favorable pricing conditions for potential sovereign catastrophe bond sponsors. African countries looking to capitalize on these good market conditions can learn from case studies of innovative practices from two of the biggest and most persistent ILS users, United Services Automobile Association (USAA) and Swiss Re.

African insurers are exposed to risks emanating from complex risks in three main areas:

– Physical risks: risks that arise from weather-related events, such as floods and storms, both directly and indirectly through subsequent events, such as disruption of global supply chains or resource scarcity

– Liability risks: risks that could arise from third party claims (for example, under professional indemnity contracts) where claims are successfully brought by third parties against the insured party for losses or damage suffered from complex risks and climate change, with some or all of the cost being passed onto the insured's insurance company

– Infrastructural or economic risks: financial risks which could arise from the sectors driving economic transformation of leading economies in the Continent including energy projects including hydroelectric dams, coal, solar farms; modern railways and rapid urban transportation; wide-body aircrafts and aviation.

- Environmental risks: Insurers have deep experience in mitigating risks associated with natural catastrophes. The climate change challenge requires a variety of responses from the industry and many insurers are already engaged in risk mitigation initiatives.

7.7 Structuring ILS Solutions for Africa

The process of structuring ILS products requires a thorough understanding of the underlying insurance risk, as well as the legal, financial, and regulatory considerations involved in creating and managing these securities.

Structuring process for ILS products typically involves several steps:

1. Identify the underlying insurance risk: The first step in structuring an ILS product is to identify the underlying insurance risk that will be transferred to investors. This could be a natural catastrophe risk, such as a hurricane or earthquake, or it could be a mortality risk, such as a life insurance policy.

2. Determine the risk transfer mechanism: Once the underlying risk has been identified, the next step is to determine the risk transfer mechanism. This could be done through a variety of instruments, such as catastrophe bonds, sidecars, or industry loss warranties.

3. Establish the terms of the ILS product: The terms of the ILS product will depend on the specific risk transfer mechanism chosen. For example, if a catastrophe bond is used, the terms will include the coupon rate, the trigger event that will result in a payout, and the maturity date.

4. Develop a pricing model: Once the terms of the ILS product have been established, a pricing model is developed to determine the price at which the security will be offered to investors. The pricing model takes into account the probability of a trigger event occurring and the expected losses that will result.

5. Creating the special purpose vehicle (SPV): An SPV is a separate legal entity that is created specifically for the purpose of issuing the ILS securities. The SPV is typically located in a tax-friendly jurisdiction and is used to isolate the insurance risk from the sponsor's balance sheet.
6. Issuing the securities: Once the SPV is created, the ILS securities can be issued to investors. These securities are typically sold in a private placement to institutional investors, such as pension funds or hedge funds.
7. Market the ILS product: After the pricing model has been developed, the ILS product is marketed to potential investors. This may include insurance companies, pension funds, hedge funds, and other institutional investors.
8. Monitor the ILS product: Once the ILS product has been issued and is being traded in the market, it is important to monitor it to ensure that it is performing as expected. This includes monitoring trigger events and ensuring that investors receive payouts when necessary.
9. Managing the collateral: Collateral is typically posted by the SPV to ensure that the investors will receive their payments in the event of a triggering event. The collateral can be in the form of cash, securities, or other assets.
10. Monitoring and reporting: Once the ILS securities are issued, the SPV must monitor the underlying insurance risk and provide regular reports to investors. This includes tracking the occurrence of triggering events, managing the collateral, and providing regular updates on the performance of the ILS securities.

CHAPTER EIGHT

8 CONDUCIVE REGULATORY REQUIREMENTS FOR ILS ECOSYSTEM TO PROSPER

8.1 Overview

The regulatory framework for ILS aims to protect investors and ensure the stability and integrity of the insurance and securities markets. It seeks to ensure that issuers of ILS are properly capitalized and able to meet their obligations to policyholders and investors, and that investors are informed about the risks associated with these securities.

The regulatory framework for ILS is designed to ensure that investors are protected and that the transactions are conducted in a transparent and fair manner. It is important for issuers and investors to be familiar with the regulatory requirements in their jurisdiction in order to ensure compliance and avoid potential legal or financial consequences.

In the United States, the Securities and Exchange Commission (SEC) has regulatory authority over ILS. The SEC requires issuers of ILS to register with the agency and provide detailed information about the securities they are offering. The SEC also requires that ILS be sold only to qualified institutional buyers (QIBs) and accredited investors. In addition, ILS must comply with the Securities Act of 1933 and the Securities Exchange Act of 1934, as well as the rules and regulations promulgated by the SEC.

In the European Union (EU), the regulatory framework for ILS is set by the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA). The EU's Solvency II Directive sets out the regulatory requirements for insurers and reinsurers that issue ILS, including the minimum capital requirements they must meet to ensure they are able to meet their obligations to policyholders. The directive also sets out requirements for the governance and risk management of ILS issuers.

Other jurisdictions also have regulatory frameworks for ILS. For example, the Insurance Regulatory and Development Authority of India (IRDAI) has issued guidelines for the issuance of catastrophe bonds and other forms of ILS in India. The guidelines require that issuers of ILS be licensed insurers or reinsurers and that the securities be rated by a credit rating agency.

8.2 Regulatory Frameworks for ILS

ILS regulatory frameworks are embodied in the Solvency II and Insurance Core Principle number 13 of the International Association of Insurance Supervisors (IAIS).

The introduction of Solvency II in the European Union can be expected to have a considerable impact on the ILS market. The latest draft of Solvency II generally recognizes ILS as financial instruments that provide insurance risk mitigation (Aon Benfield, 2010). However, to achieve a

(partial) reduction in regulatory capital under the new standards, insurers will need to demonstrate that basis risk in a transaction is brought to a minimum.

According to Quantitative Impact Study 5 (2010), SCR.13.8, p. 274 "...When an insurance risk mitigation technique includes basis risk (for example as might happen where payments are made according to external indicators rather than directly related to losses) the insurance risk mitigation instruments should only be allowed in the calculation of the Solvency Capital Requirements with the standard formula if the undertaking can demonstrate that the basis risk is either not material compared to the mitigation effect or if the risk is material that the basis risk can be appropriately reflected in the SCR".

Furthermore, the third pillar of Solvency II aims at market discipline through disclosure requirements. In this regard, insurers could decide to increasingly rely on securitization instead of traditional reinsurance, because the former is associated with a higher degree of transparency for outside stakeholders (Gorge, 2009). Another aspect of Solvency II (in combination with IFRS) is that the prudent reserve strategy which many insurers followed in the past will be replaced by risk- based provisioning. This new economic perspective might be associated with a higher degree of reserving risk that could be tackled by means of ILS (Gorge, 2009). In life-insurance securitization, we might see more embedded value securitizations as Solvency II does not allow insurers to recognize the present value of future profits (PVFP) in their capital calculations, thus encouraging them to securitize it (Linklaters, 2008). Although non- peak risks (such as motor insurance) are of lesser importance for insurers in the Solvency II framework, their securitization could be demand- driven (i.e., by investors) rather than supply- driven (i.e., by insurers Table 8.1 summarizes the Solvency II draft provisions.

Another consequence of Solvency II is the preferential treatment of risks transferred to SPVs within EU jurisdiction (such as Ireland or Luxembourg) rather than transferring it to an SPV outside EU jurisdiction. This is because EIOPA needs to evaluate the "regulatory equivalence" of the risk transfer if the SPV is located outside EU jurisdiction (Aon Benfield, 2010). Furthermore, regulators of the Solvency II regime will take a close look at the SPV's collateral which needs to be of suitable quality, duration and liquidity. However, this seems to be one of the major lessons of the financial crisis and is already put in place through U.S. treasury bills and money market funds (Aon Benfield, 2010).

Table 8.1: Summary of Solvency II draft provisions using a Special Purpose Vehicle (SPV)

Requirements	Details
Mandatory Conditions for Recognized Risk Transfer	- The risk transfer contract must meet the definition of a Special Purpose Vehicle (SPV) - The risk transfer contract between the sponsor and the SPV must have a clear aggregate limit - Claims of investors are subordinated to claims of the sponsor - The SPV must at all times have assets that are equal to or greater than the sum of the aggregate limit

	- Investment risk should be minimized
Effective Risk Transfer	- The amount of risk transfer will determine the extent to which the sponsor can obtain recognition for the technical and Solvency Capital Ratio (SCR) calculations - In determining the use of the loss trigger, basis risk should be kept to a minimum - If a material level of basis risk exists, the sponsor is likely to receive only partial recognition for internal risk analysis or, worse, no allowance at all
Offshore Special Purpose Vehicles	- If a sponsor and SPV are domiciled in different countries, there needs to be a dialogue between their respective regulators - A member state will not be permitted to give more favorable treatment to an offshore SPV than it gives one domiciled in that member state - Obligations of the SPV are to be fully funded

Source: Aon Benfield (2010)

8.3 Insurance Core Principle 13

ICP 13 recognizes ILS as other forms of risk transfer include alternative reinsurance arrangements, such as risk transfer to the capital markets. Insurance risk transfer to the capital markets can occur by making use of a wide variety of arrangements. Arrangements in the non-life sector are often broadly classified into four groups: 1) catastrophe bonds (cat bonds); 2) collateralised reinsurance; 3) industry loss warranties (ILWs); and 4) sidecars which are mutually exclusive (ICP 13.6.3).

In the life sector, some arrangements are similar to the non-life sector (for example, mortality bonds, which operate like cat bonds). Other life insurance arrangements have specific features that are not used in non-life insurance, such as the funding of certain portions of reserves (ICP 13.6.4).

Despite the many similarities with mainstream insurance, transactions transferring insurance risk to the capital markets have special features that the supervisor should bear in mind in order to assess the appropriateness and effectiveness of their use by cedinginsurers and reinsurers. The ICP 13 guidance has the following provisions for regulating ILS:

8.3.1 Initial assessment

Insurance risk transfer to the capital markets usually entails the creation of a dedicated entity or a legally ring-fenced arrangement, specifically constituted to carry out the transfer of risk. These are referred to by a variety of names, such as special purpose vehicles, special purpose reinsurance vehicles, or special purpose insurers; for the purpose of this ICP, they are collectively referred to as special purpose entities (SPEs) (13.6.6).

The main purpose of an SPE is to assume insurance risk, funding theexposure by raising funds in the capital markets, and to be dismantledonce its purpose has been fulfilled. Importantly, as SPEs conduct insurance business, the supervisor should consider licensing them asinsurers (see ICP 4 Licensing). Licensing of SPEs should be appropriately tailored to take into consideration the unique characteristics of SPEs. In this respect, close collaboration among those supervising ceding insurers and those supervising SPEs before authorisation of the SPE and on an on-going basis can be particularlyhelpful.(13.6.7)

8.3.2 Key features of SPV

Key elements of any SPE structure include (13.6.8):

i. the insurance risk that it assumes is "fully funded" (i.e., thatthe exposure taken by the SPE is funded across a range offoreseeable scenarios from the time the SPE goes on risk to the time it comes off risk);

ii. the claims of any investors in the SPE are subordinate to those of the ceding insurer; and

iii. the investors in the SPE have no recourse to the ceding insurer in the event of an economic loss.

8.3.3 Components of SPV

In order to be able to understand and assess whether an SPE structure meets the criteria above, the supervisor should take the following into account (13.6.9):

a. ownership structure of the SPE;

b. suitability of the Board and Senior Management of the SPE;

c. investment and liquidity strategy of the SPE;

d. the SPE's management of credit, market, underwriting andoperational risks;

e. ranking and priority of payments;

f. extent to which the cash flows in the SPE structure havebeen stress tested;

g. arrangements for holding the SPE's assets (e.g. trustaccounts) and the legal ownership of the assets;

h. extent to which the SPE's assets are diversified; and

i. use of derivatives, especially for purposes other than riskreduction and

efficient portfolio management.

8.3.4 Role of parties in SPV

Understanding the role of all the parties to the SPE arrangement is critical to understanding the underlying risks, particularly as these may be fundamentally different from those involved in a traditional reinsurance transaction. The supervisor should understand and assess, among other things, the (13.6.10):

i. extent to which key parties have been fully disclosed (e.g. sponsor, (re)insured, investors, advisors, counterparties) and are known to the supervisor;
ii. extent to which potential conflicts of interest between all parties to the SPE have been adequately disclosed and addressed (such as situations where sponsors also take a managing role);
iii. degree of basis risk that is assumed by the ceding insurer and to what extent this could have immediate ramifications for the ceding insurer's financial position in case of a loss;
iv. details of the SPE's management arrangements and key personnel;
v. third party assessments of the SPE structure (e.g. by creditrating agencies);
vi. expertise of the legal advisors involved;
vii. robustness of any financial or actuarial projections, if applicable (e.g. if triggers are indemnity based);
viii. disclosure of outsourcing agreements; and
ix. credit risk associated with key service providers, including financial guarantors used to protect the position of investors.

8.3.5 Risk management of SPV

As many SPEs are designed to operate with a minimum of day-to- day management, the supervisor should understand and assess theextent to which the systems of risk management and internal controlsare adequate and proportionate to the nature of the underlying risks and to the complexity and expected lifespan of the SPE structure (13.6.11).

8.3.6 Minimum risk management requirements for SPV

The systems of risk management and internal controls of the SPE, should ensure that, at a minimum (13.6.12):

i. investment restrictions are not breached;

ii. interest payments, dividends, expenses and taxes are properly accounted for;

iii. movements above established thresholds in assets and collateral accounts are reported;

iv. assets are legally existent and technically identifiable; and

v. liabilities can be determined on a timely and accurate basis and obligations satisfied in accordance with the underlying contracts.

The supervisor should understand and assess (13.6.13):

i. the systems of risk management and internal controls of theSPE, particularly the extent to which these are sufficient to ensure effective operation in compliance with the SPE's legal and supervisory obligations; and

ii. operational risks within the SPE structure and any mitigationarrangements.

8.3.7 Basis risk

The supervisor should understand and assess the extent to which SPE arrangements give rise to basis risk. This arises where the trigger for indemnity under the SPE arrangement is different from thebasis on which underlying protected liabilities can arise.

Where SPEs contain indemnity triggers (i.e., recovery from the SPE is based on the actual loss experience of the ceding insurer) basis risk is less likely to be an issue. However, many SPEs contain non- indemnity triggers, such as parametric triggers (driven by objectively measurable events) or modelled triggers (driven by the outcome of modelled, industry-wide losses). In such cases, there may be eventswhere the ceding insurer will remain exposed to its underlying policyholders without having recourse to the SPE.

Any basis risk should be considered with reference either to the amount of credit given by the supervisor for the SPE arrangement orin the capital requirement of the ceding insurer, where such mechanisms are used.

8.3.8 Accounting system for indemnity vs. non-indemnity triggers

Additionally, in some jurisdictions the accounting and regulatorytreatment of insurance risk transfer that uses non-indemnity triggers may be different from the accounting treatment of indemnity-based insurance. The supervisor should understand these accounting differences and the impact these may have on the financial statements of the ceding insurer and the reinsurer.

8.3.9 Ongoing Supervision

The supervisor should understand the various issues that emerge inthe ongoing supervision of SPEs and their use. Consideration shouldbe given to the following areas:

i. measures to be taken by the supervisor if any of the licensing or authorisation conditions are breached;

ii. level of capital and ability of the SPE to continue to respondadequately should covered events occur;

iii. level of reporting required by the supervisor to require that the structure is complying with its obligations;

iv. the SPE's response in the event of fluctuations in the valuesof invested assets (e.g. match/mismatch between collateral account and exposure, flow of premiums, fees, commissions);

v. arrangements put in place in the SPE to ensure that the "fully funded" condition is maintained in the case that the insurance risks assumed are rolled over from one risk periodto another; and

vi. where the SPE undertakes multiple transactions, arrangements put in place in the SPE to ensure that the funds corresponding to each transaction are appropriately segregated.

8.3.10 Unwinding of SPE arrangements

The unwinding of SPEs is often influenced by the dynamics of insurance losses. The supervisor should understand and gain comfort with the provisions in place to require orderly unwinding of SPEs. In particular, the supervisor should understand the process

related to the generation, mitigation and management of any residualrisk emerging from the unwinding of the SPE.

In addition, the supervisor should understand the process and stagesthat the SPE goes through when it comes to a natural end and its obligations have been fulfilled and the SPE is liquidated. There is a distinction between unwinding in the event of a loss and unwinding atransaction reaching legal maturity (without a loss having occurred). While the latter case is usually simple and straightforward, unwindingin a full or partial loss situation deserves close attention. Consideration should be given to the following areas:

i. issues relating to share buy-back and conditions to itsmaterialisation;

ii. issues relating to disposal of the investment portfolio;

iii. "dismantling" of the SPE and residual risks; and

iv. supervisory issues relating to risks which revert to the ceding insurer on termination of the arrangement.

8.3.11 Considerations for supervisors of insurers ceding risks to SPEs

Although in many jurisdictions insurance risk transfer to the capital markets is not permitted, the supervisor should consider that some ofthe insurers in its jurisdiction may be transferring insurance risk to SPEs located in another jurisdiction that permits insurance risk transfer to the capital markets. In this case, the supervisor of the ceding insurer should consider, among other things:

i. whether the risk transfer taking place involves an SPE that is licensed in the jurisdiction where the insurance risk is assumed;

ii. the supervisory regime to which the SPE is subject in its jurisdiction; and

iii. the extent to which the ceding insurer has adequately provided for the identification, assessment and management of the risks associated with buying protectionfrom an SPE (e.g. credit risk, basis risk).

8.4 Key issues for ILS conducive regulatory environment

Regulators should develop a new competitive corporate and tax structure for allowing Insurance Linked Securities vehicles to be domiciled in the their jurisdiction. working closely with the Taskforce to understand the ILS market and the structures used in ILS deals. With the right framework, jurisdiction can make a major contribution to the continued growth and development of ILS business. By supporting innovation within a trusted and robust regulatory framework, jurisdiction should be well placed to become a leading market for alternative risk transfer. What will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles. The following aspects will be critical to successful ILS ecosystem in the Continent:

i. Regulation of the SPV: The SPV that issues the ILS will generally be subject to regulation by the jurisdiction in which it is established. This may include requirements for capitalization, governance, reporting, and disclosure.

ii. Disclosure requirements: In order to ensure that investors have sufficient information to make informed investment decisions, regulators will typically require issuers of ILS to provide detailed disclosures about the underlying risks, the structure of the transaction, and any other relevant information.

iii. Investor protection: Regulators will generally seek to protect investors by requiring that the terms of the ILS are fair and transparent, and that investors have access to adequate information to assess the risks involved. They may also require that the SPV has sufficient capital and liquidity to meet its obligations under the ILS.

iv. Compliance with securities laws: In many jurisdictions, ILS are considered securities, and as such are subject to the same regulatory framework as other types of securities. This may include requirements for registration, reporting, and disclosure.

v. Oversight and supervision: Regulators will typically oversee the issuance of ILS to ensure that the transactions are being conducted in compliance with applicable laws and regulations. This may include ongoing supervision of the SPV and its activities.

vi. Regulatory authorities: In most countries, the regulatory framework for ILS is overseen by a financial regulatory authority. For example, in the United States, the Securities and Exchange Commission (SEC) regulates the issuance and trading of ILS. In Bermuda, which is a major hub for ILS issuance, the Bermuda Monetary Authority (BMA) is responsible for regulating the market.

vii. Disclosure requirements: ILS issuers are typically required to provide detailed information about the risks associated with the securities they are issuing. This information may include details about the insurance or reinsurance contracts that the securities are linked to, as well as information about the underlying risks (such as natural disasters or other catastrophic events). Investors need this information to make informed decisions about whether to invest in a particular ILS.

viii. Rating agencies: Rating agencies such as Standard & Poor's, Moody's, and Fitch play an important role in the ILS market by providing independent assessments of the creditworthiness of ILS issuers. These ratings are important because they help investors assess the risk associated with a particular ILS.

ix. Collateral requirements: Because ILS are typically linked to catastrophic events, they are considered to be high-risk investments. To mitigate this risk, many ILS issuers are required to hold collateral in reserve to ensure that they are able to meet their obligations to investors if a catastrophic event occurs.

x. Legal framework: The legal framework for ILS is also an important part of the regulatory framework. This framework includes laws related to securities regulation, insurance regulation, and contract law. In many cases, the legal framework for ILS is still evolving, as the market for these securities is relatively new.

CHAPTER NINE

9 CASE STUDY - INCREASING CAPITALIZATION OF THE RE/INSURERS IN TANZANIA USING INSURANCE LINKED SECURITIES (ILS)

9.1 Background to the ILS project in Tanzania

Insurance industry globally faces increasing exposure from existing risks that undergo a change in (frequency and) severity, and emerging risks such as those manifest from climatic change. In Tanzania, the insurance industry has been suffering capacity challenge which has been forcing the insurers to front and reinsure a significant portion of the premium. Opportunities from emerging risks such as oil and gas risks and other specialty risks that our market fails to accommodate cannot be adequately enjoyed at the existing capitalization of the insurers. Circular no.055/2017 on dealing with foreign reinsurers and reinsurance brokers underscored the Local Content policy of the Government of the United Republic of Tanzania as implemented in the insurance industry. However, the potential needs to continually be extracted for the benefit of the industry and Tanzania economy.

9.1.1 About the Capital Market in Tanzania

Capital Markets are Markets for long term funds. Companies and governments can raise funds for financing development projects by selling shares and other securities like bonds to members of the public. The key function of capital markets is to mobilize resources from savers and channel them to investments and thus fuel economic development.

In Tanzania, capital markets are being developed and regulated by the Capital Markets and Securities Authority (CMSA). CMSA is a Government Agency which is under the Ministry of Finance and Planning and was established by the Capital Markets Securities Act of 1994. Establishment of the CMSA was part of the Government's economic reforms agenda aimed at among others, liberalization of the capital market, insurance and banking sectors.

9.1.2 Capital Market as a solution for the insurance industry

Right now, risk is not the problem in our industry, capital is the problem. There's not enough capital to cover the risk domiciled in Tanzania. The insurance industry GWP for the year 2017 stood at Tzs. 637bn. Capitalization of insurers is estimated at a writing capacity of 3% - 10% of the capitalization. Risks in the emerging areas and solvency condition of the industry indicate a continuous weak position to retain risks internally. Taking the oil and gas sector as an example, the industry has been working on formation of a pool; rough estimates of the pool indicate that utmost the pool will have a capacity

to retain about 5% of the risks (disclaimer: there is lack of information regarding exposure and potential pool size at max or min levels). Nigeria took more than 43 years since starting exploration of oil and gas until putting in place a framework that was relevant to their context.

The total market capitalization of 28 companies listed on the DSE is TZS 21 trillion as of end of the year 2022. The capitalization of corporate and Government bonds is TZS 7 trillion. Total outstanding amount in Collective Investment Schemes operated by UTT-AMIS is TZS 285 billion. Value of Collective Investment Schemes by Watumishi Housing and Umande is TZS 50 billion. Therefore, total market capitalization in the capital markets sector is **TZS 28.3 trillion.** The total net worth of the insurance industry with 31 insurance companies in 2016 stood at **Tzs. 268.1bn**.

9.1.3 Tanzania Economy

Tanzania has one of Africa's fastest growing economies with nearly 7 % annual national GDP growth since 2000 (WB, 2021). With an average real GDP growth rate of 6.3% over the past decade (2010-2019), Tanzanian is among the fastest-growing economies in Africa and in the world. Following two decades of sustained growth, Tanzania reached an important milestone in July 2020, when it formally graduated from low-income country to lower-middle-income country status. Tanzania's GNI per capita rose by 6.1% during the ten-year period 2010–2019, from USD 720 to USD 1,080. In 2019, Tanzania became a middle-income country with a GNI per capita of USD 1,080, against an average of USD 1,550 in Sub-Saharan Africa. Tanzania's achievement reflects sustained macroeconomic stability that has supported growth, in addition to the country's rich natural endowments and strategic geographic position.

According to the IMF, the real GDP of Tanzania grew by 4.8% in 2020 reaching USD 64.4 billion versus USD 60.8 billion in 2019. The IMF projects a GDP growth for Tanzania of +4.0% and +5.1% in 2021 and 2022, and 6.0% in 2026. However, in its East Africa Economic Outlook 2021 report, the AfDB estimates that Tanzania's GDP will grow by 2.8% in 2021, and projecting a strong rebound for 2022 and 2023 with 4.9% and 6.3% economic growth respectively.

Inflation fell to 3.3% in 2020 from 3.5% in 2019, due to a steady decline in food prices. Exchange rates remained stable partly due to BoT measures. The economic outlook is positive, with real GDP projected to grow 4.1% in 2021 and 5.8% in 2022, due to improved performance of the tourism sector and the reopening of trade corridors.

The Bank of Tanzania (BoT) estimated the country's GDP to be 5.5% in 2020. The Bank of Tanzania (BOT) released its Economic Bulletin of June 2021 revealing that in the quarter ending March 2021, the economy of Tanzania grew by 4.9% compared with 5.9% in the previous year. Tanzania has fared relatively well compared to its regional peers.

NBS (2020) in its National Data of Tanzania Mainland of 2013-2019 report states that at current market prices, Services made the highest shares of GDP (40.0%) followed by

Industry and Construction (31.1%) and Agriculture, Forestry and Fishing (28.9%). In November 2020, URT Government announced that in the next five years its government will put great emphasis on key economic sectors, viz agriculture, industry, mining, trade, and tourism. In April 2021, Tanzania's new president Samia Suluhu Hassan gave her first speech to the parliament, stating the goal of the Sixth Phase Government in the next five years to reach a GDP growth rate of at least 8% yearly.

Figure 9.1 The PESTEL Macro-Environment Analysis

<table>
<tr><td></td><td>Economic
• GDP growth: 6.9 % in 2017, 6.8% in 2018 and 6.8% in 201
5.5% in 2020, 4.6% in (2021e).
• Low inflation - currently at 3%.
• Unemployment levels: 2.16% (2020); 1.96% (2019); 1.99
(2018)
2.03% (2017) – SSA av. 6.6%, SA highest – 34.4%
• Membership of National Health Insurance Fund (NHI
reached 8% of population in 2020.
• Disposable income – $1,105 (nominal, 2019 est.), $3,40</td></tr>
<tr><td>• Political climate influencing investment
• Peaceful transition to new President March, 2022.
• President interest on agriculture and health insurance
• Heightened Government supervision and enforcement in the financial sector in Tanzania.
• NFIF II
• FSDMP 2030
• National Insurance Policy create mandatory insurance</td><td></td></tr>
<tr><td>Social
• A life expectancy of 62.6 years (2017e)
• Population growth rate of 2.75%
• The millennials are 12 million strong.
• Urban dwellers constitute 26% of the population.
• 60 million population
• Sacco's and vicobas are substitutes to insurance products.
• Demographics – growing middle class
• Economic mobility – declining poverty rate at 24%
• Levels of education – highly literate population – 77%
• Consumer attitudes and trends – more</td><td>Technological
• More than 29 million smart phone users in Tanzania.
• Mobile penetration is 90%; Internet penetration is 90%.
• High engagement on social media (6 million faceboo
accounts; 2 million active users on twitter; 10 millio
WhatsApp active users; 3 million Instagram and 1.5 millio
on LinkedIn).
• Over 29.7 million mobile money subscribers – transactin
av. Of 7.5trillion per month.
• Insurers warming up to technology-based products (sma
contracts, internet of things)
• Consumer buying mechanisms via mobile phones</td></tr>
<tr><td></td><td>Legal
• Regulatory regime
• Risk fronting restrictions (export restrictions)
• Laws favouring business investment
• New guidelines and Anti-Money Laundering
• Bancassurance regulation 2019</td></tr>
</table>

9.1.4 Government Initiatives and Aspirations in the Insurance Sector

Tanzania is implementing its third Five-Year Development Plan, 2020/21 to 2024/25 (FYDP III), spearheaded by H.E President Samia Suluhu Hassan, 6th President of the United Republic of Tanzania. The focus of the plan is Industrialization for Competitive Economy. According to the World Bank, the successful implementation of FYDP III relies on quality and strength of Tanzania's human capital to go hand-in-hand with infrastructure investments so that farmers in rural areas are linked to markets and people to services and the resultant fruits of growth are shared with rural communities across Tanzania for a resilient economy.

The National Financial Inclusion Framework II (NFIF II) envisages insurance coverage of 50% of the adult population by year 2028. The NFIF II is now replaced by the Financial Sector Development Masterplan 2020 – 2030 which coordinates the financial sector in the decade of transformation. FSDMP 2030 has set ambitious goals and opportunities for the insurance subsector with the goal to reach 50% of adult population with one type of insurance; 5% insurance penetration ratio to GDP where 3% of premiums from life assurance and 2% of gross non-life premiums/GDP. The FSDMP 2030 has set the following targets for the insurance industry:

i. 10% of beneficiaries of retirement plans use annuity products by 2030
ii. Ten (10) new demand driven insurance products developed by 2030
iii. 90% of the population have health insurance by 2030
iv. Eight (8) Affordable insurance distribution channels developed by 2030
v. 20% of adult population have life savings products
vi. 80% of population are aware of insurance matters by 2025
vii. 10% total insurance premium contributed by agriculture insurance by 2030
viii. Insurance pools and consortium established by 2030

When these targets are reached, the FSDMP 2030 of the insurance industry in Tanzania anticipates increase from the current insurance premium from $ 400m (2018e) to $ 6.75billion if the industry can grow at an average growth rate of 22.2% per annum for ten (10) years.

9.2 East Africa (EAC) Insurance Market

East Africa insurance market is led by Tanzania in terms of profitability at 15.2% ROE, followed by Uganda and Rwanda. Kenya leads in industry size in terms of GWP at $ 1.15bn, followed by Tanzania at about $ 500m, Uganda $ 188.5m and Rwanda $ 77.6m. Rwanda leads in retention levels at 98.8% life insurance and 75% general insurance followed by Kenya with 93.4% life insurance and 70.6% general insurance.

Table 9.1: Highlights of the Insurance industry in East Africa

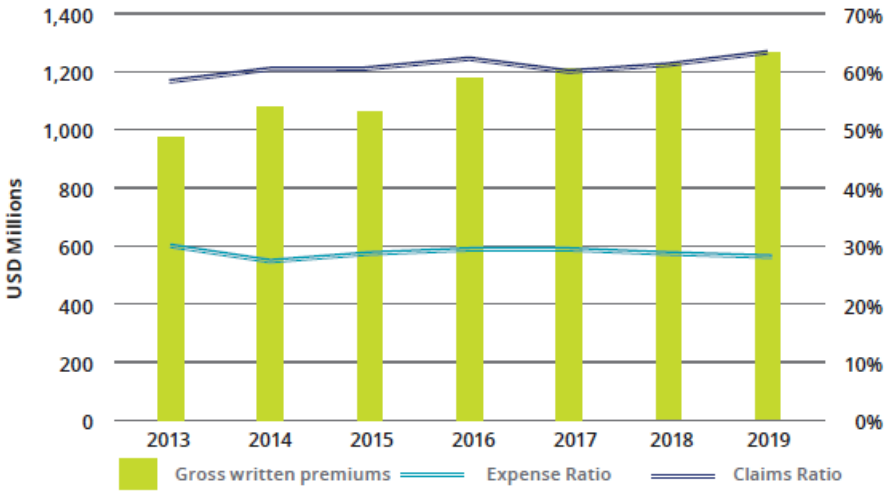
Description	Tanzania	Kenya	Uganda	Rwanda
Population (Millions)	60	48.7	45.74	12.95
GDP size (USD Billion)	62.41	94.82	37.37	10.33
GDP growth rate (%)	6.1	6	4.1	4.3

Insurance Penetration	0.58%	2.17%	0.77%	1.61%
GWP ($ million)				
1. General	500	1,155.70	188.51	77.60
2. Life	60.1	900.20	92.04	89.20
NWP ($)				
1. General	156.1	815.93	101.75	58.2
2. Life	51.1	840.63	24.89	88.10
Retention Ratio				
1. General	52.0%	70.6%	54.0%	75.0%
2. Life	85.0%	93.4%	27.0%	98.8%
Players				
Life Insurers	5	18	9	3
General Insurers	24	32	21	9
Composite	1	6		
Reinsurers	2	5	2	0
Broker	105	222	44	15
Bancassurance	16	26	20	8
Agents	742	11,247	2,588	1,137
Profitability				
ROE (av. 5 yrs) (%)	15.21	4	14	12

9.2.1 Kenya insurance market overview

Kenya has the highest insurance penetration ratio to GDP of about 2.7% but has the lowest profitability and return on equity. The general insurance industry experienced stable but slow growth in GWP from 2013 to 2019. The expense and claims ratios have been on a slightly upward trend for the past six years with a slight decline in expense ratio for the years 2018 and 2019.

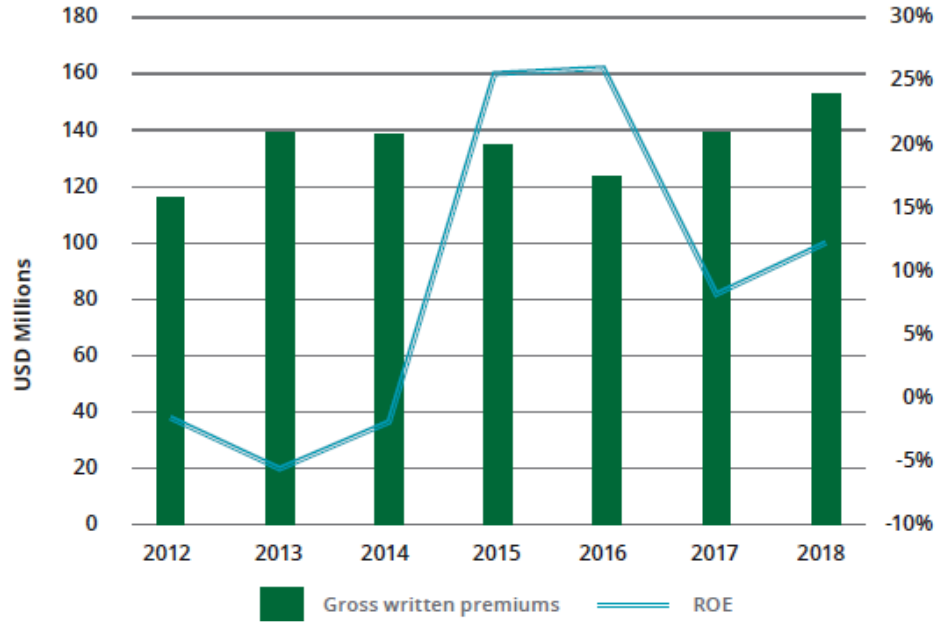
Figure 9.2: Kenya general insurance industry expense ratio and claims ratio



9.2.2 Uganda insurance market overview

Motor is the largest business class (compulsory cover) and the least profitable. Fire being the fastest growing business class and has a relatively lower loss ratio. Most players in the market experienced an increase in growth and profitability in the year 2018. The fastest growing business classes are engineering, fire and motor businesses. Engineering and fire have also recorded the lowest loss ratios besides being the fastest growing. Motor class of business is the largest in premium size; however, it is also one of the least profitable classes. The return on equity has not been stable overtime, despite stable policy and political regime.

Figure 9.3: General insurance industry performance 2012 - 2018



Source: E&Y (2021)

9.3 Tanzania insurance market

The liberalized insurance industry in Tanzania is in its second decade. Significant progress has been achieved, and some constraints are yet to be addressed for the industry to make more contribution to the economy. Tanzania economy is the 10th strongest economies in Africa reflected in the pace of its insurance industry growth average in the Continent. The industry is the second largest in East Africa contributing 1% to the Africa's non-life premium.

9.3.1 Players in the market/ ecosystem

Insurance industry ecosystem is built up by insureds, intermediaries, insurance companies, reinsurers, retrocessionaires, supporting organizations, self-regulatory organizations and regulators as shown in figure 9.4 and 9.5 below:

Figure 9.4: Insurance players

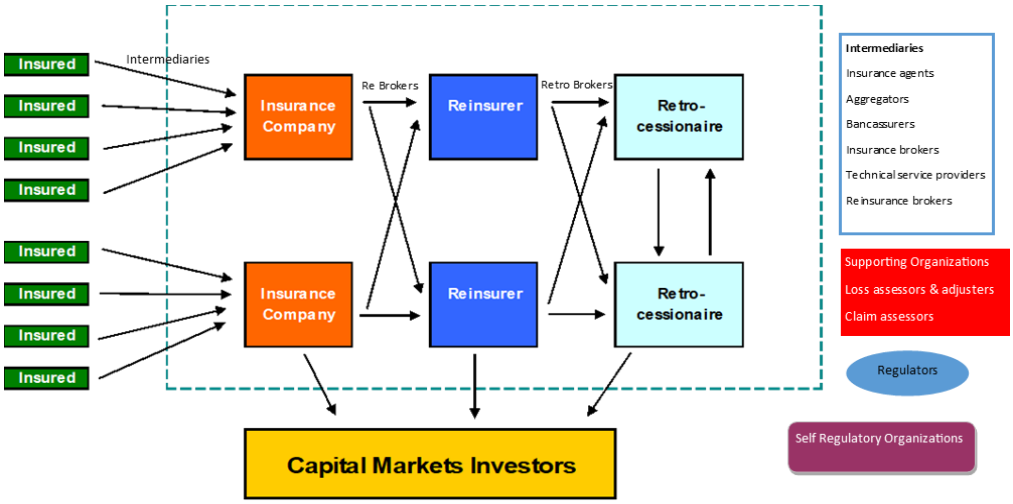


Figure 9.5: Insurance players' hierarchy

Tanzania Insurance Industry Assessment - SWOC

Analysis of Strengths, Weaknesses, Opportunities and Challenges of the Inclusive Insurance

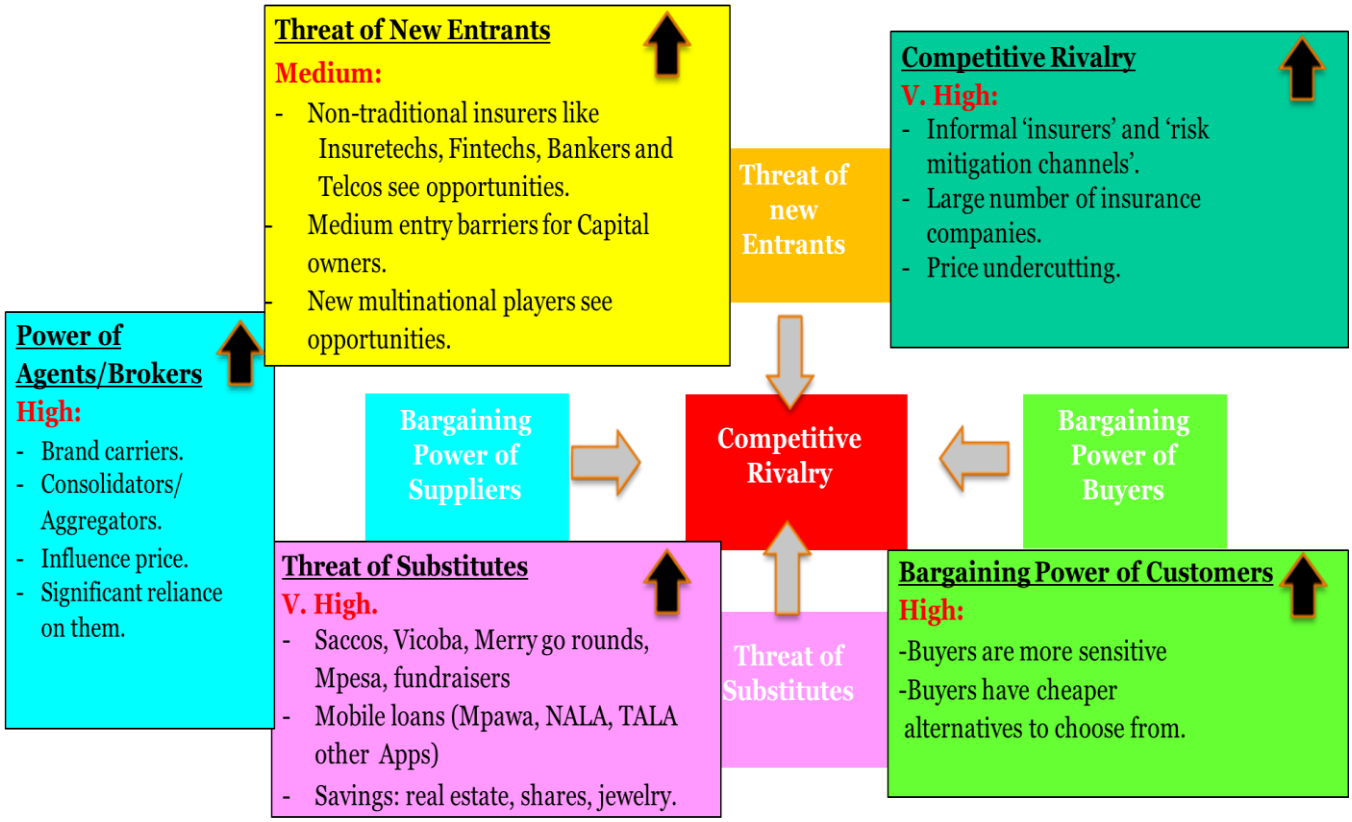
Table 9.2: SWOC analysis of the Tanzania insurance market

SN	AREAS	STRENGTHS	WEAKNESSES	OPPORTUNITIES	CHALLENGES
1.	**Regulatory & Enabling Environment**	1. Supportive regulatory environment 2. Supportive development partners 3. Risk Based Capital (RBC) approach to be implemented 4. Existence of market coordination function 5. Proactive SROs	1. Limited skills and exposure of practitioners 2. Cumbersome product registration procedures 3. Limited resources to implement inclusive insurance strategies	1. Responsive regulatory environment 2. Good pace of economic growth rate 3. Government commitment to upgrading infrastructure	1. Inadequate government funding for R & D. 2. Lack of local professional insurance certification board
2.	**Supply of Insurance Services**	6. Availability of key local experts 7. Increasing number of insurance service providers (ISPs) 8. products variety availability	4. Limited innovation 5. Limited skills and exposure of practitioners 6. Limited appropriate products 7. Limited public outreach 8. Slow adoption of technology 9. Averseness to honor claims	4. Large untapped market 5. Leverage banks & MNOs agency network	3. Inadequate use of technology 4. Lack of long term investment goals 5. underwriting capacity for mega & emerging risks 6. Inability to lobby for favorable policies 7. Inadequate gender inclusion
3.	**Demand for Insurance Services**	9. High literacy levels above 70% of population	10. Low levels of engagement to demand insurance 11. Low levels of insurance literacy & trust	6. Existence of social and technological infrastructure 7. Population size, growth rate, demographics, life expectancy.	8. Low saving culture 9. Limited customer loyalty

9.3.2 Tanzania Insurance Industry Analysis – Porter's Five Forces Modelling

This industry analysis below uses the Porter's Five Forces model which assess demand-supply trends, degree of competition within the industry, state of competition of the industry with other emerging industries, future prospects of the industry taking into account technological changes, and the influence of external factors on the industry.

Figure 9.6: Tanzania Insurance Industry Porter's Five Forces

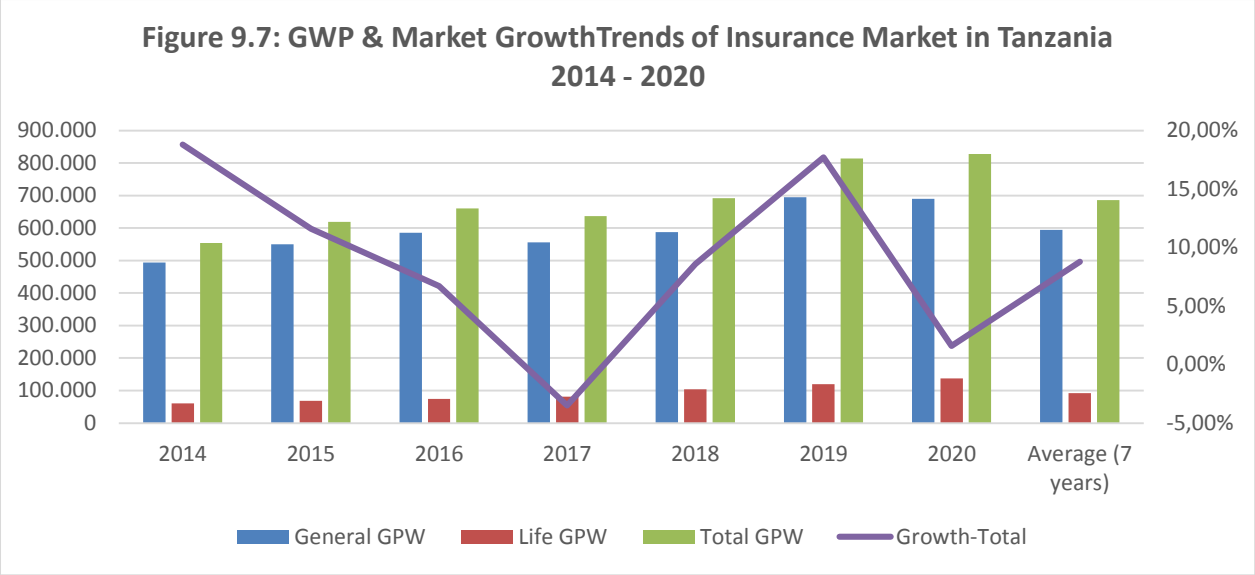


9.4 Tanzania Insurance Industry Performance and Trends

Insurance penetration in Tanzania has remained below 1 % for the past five years. On average, the industry has been growing at the rate of 8.8% for both life and general business. On class wise basis, life assurance had higher average annual growth rate of 15.4% compared to 8.4% of general business (including medical). Despite life assurance higher growth rate than general insurance, its market share has remained small at about 17% in the year2020 as seen in the figure below.

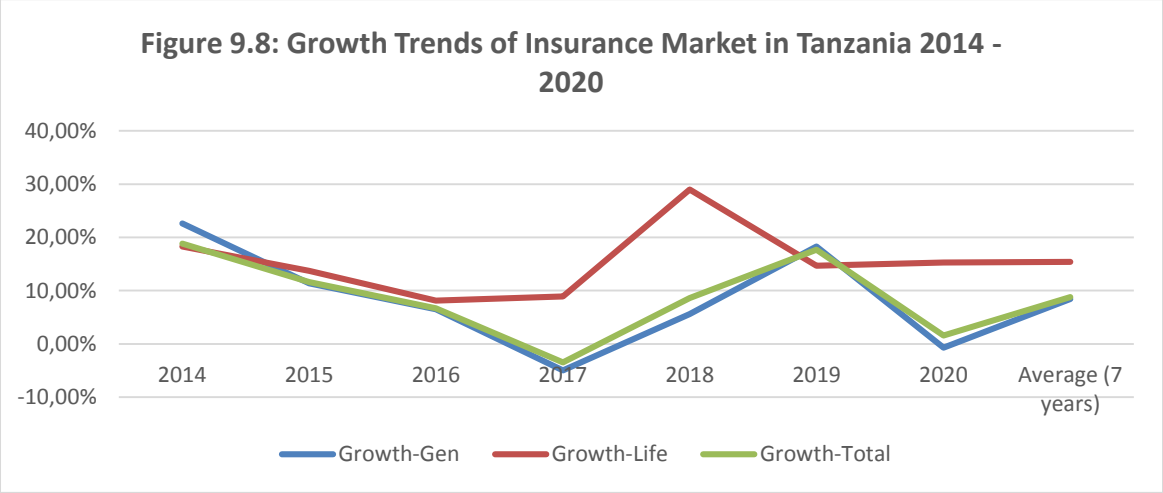
9.4.1 Gross Written Premium and Market Growth Trends 2014 – 2020

Gross written premium has been growing year by year in the period under review i.e 2014 – 2020 from Tzs. 554bn in 2014 to 827.9bn in 2020. With an average growth rate of 8.8%, the market experienced a negative growth in 2017 due to significant changes in regulatory landscape, and rebounded in the following year to 8.6% growth.



Market growth and market share trends – general vs. life

General insurance has dominated the industry business volume at an average of 87% over the period despite higher growth rates of life assurance averaged at 15.4%. Its market share has grown slowly from 11% in 2014 to 17% in 2020.



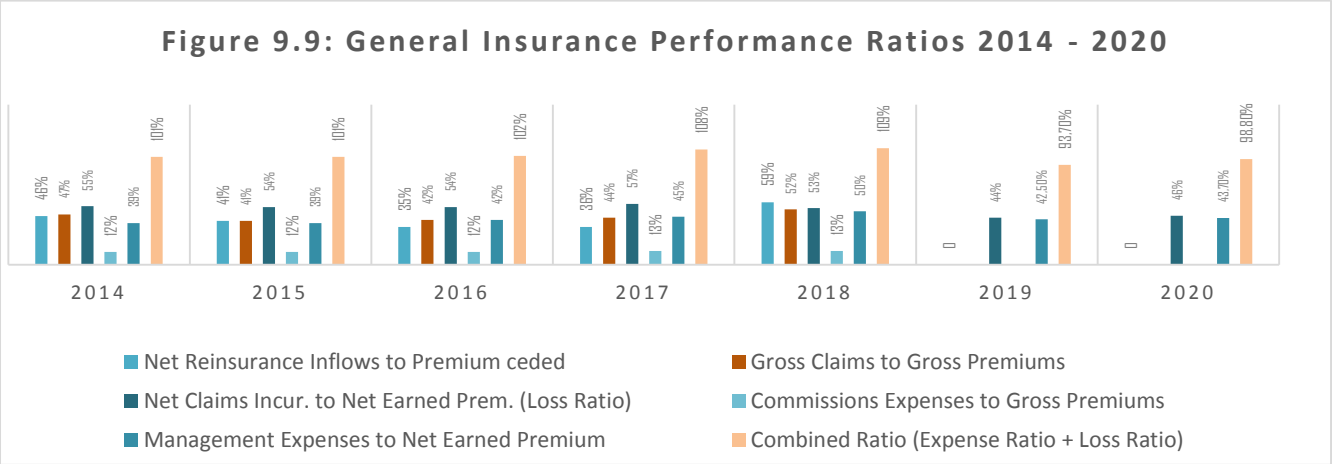
9.5 General insurance performance 2014 - 2020

The industry suffered an underwriting loss for the five years commencing 2014 to 2018 at an average of negative -1.9%. For the years 2019 and 2020, the general industry experienced positive underwriting results with underwriting profit ratio of 6.3% and 1.2% respectively.

As percentage of gross premium written, Commission expenses remained stable until 2018. Drastic decline of the ratio observed in the years 2019 and 2020 indicating adequate adherence to stipulated commission rates as per Circular 29/2015 issued by TIRA, among other factors.

In 2019 and 2020, the market registered a combined ratio of 93.7% and 98.8% which was an improvement from past performance largely due to improved medical claims ratio. However, the average of 7 years remains higher at 102%.

The overall retention ratio ranged from 53% to 57% which suggests at least 50% of gross premium written is being retained by the industry while the net reinsurance inflows to premium ceded were averaging at 43% indicating a negative inflow. The decrease in underwriting profit was also associated with the increase in management expenses, commissions and excess reinsurance with a continuous negative reinsurance inflow of which the regulator has reminded the insurance players to adhere to the limits prescribed in circular 074/2019 and circular 55 on retention.



9.5.1 Market Share Trends for General Insurance

The Jubilee Insurance Company of Tanzania Limited (JICTL) command the market with highest market share among general insurers with 14.6% in 2020 followed by Alliance (10.9%). Milembe and Star General (Under voluntary liquidation) are the least among the general insurers in terms of market share. For 2019, Milembe market share is estimated at 0.4% being the second least after Star General with market share of 0.4%.

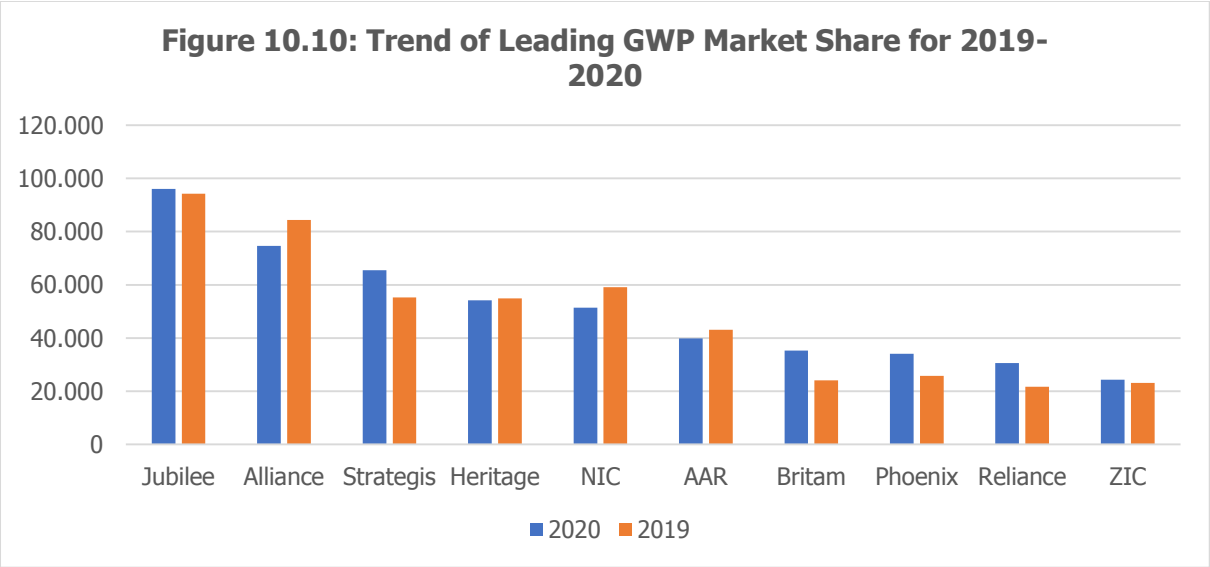
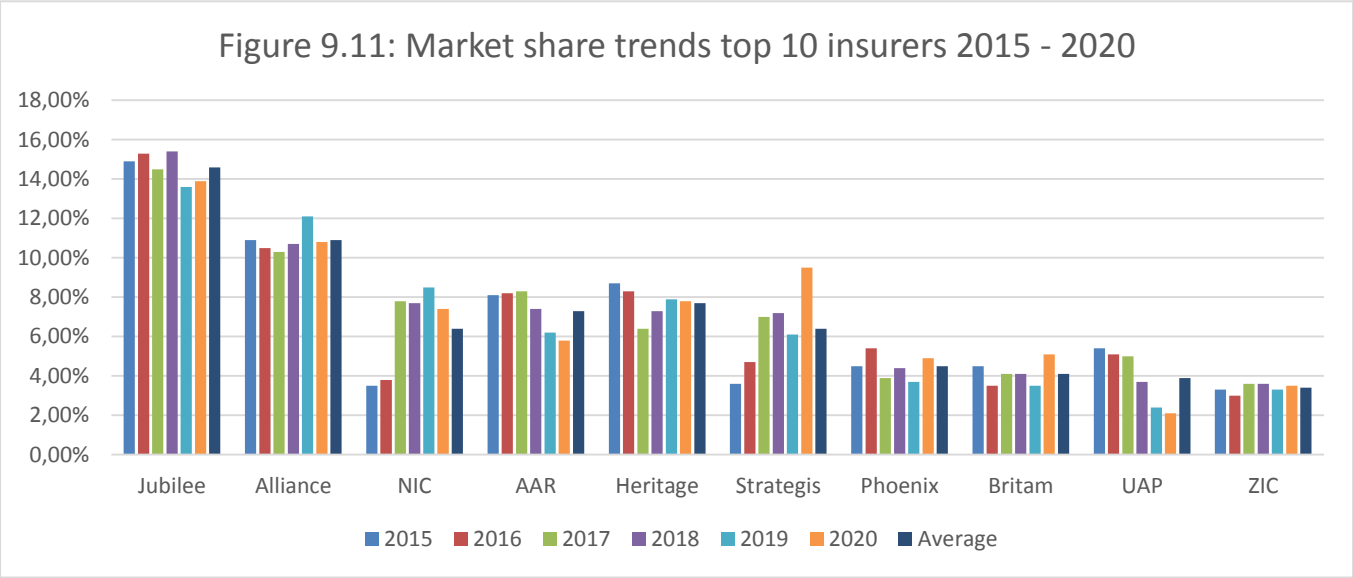


Figure 9.11 below indicates market share movement for the top 10 insurance companies as of 2020.



9.5.2 Profitability of General Insurance Business

As per TIRA's report for the year 2018, only 10 out of 26 insurers that transacted general insurance business during the year recorded underwriting profits, as evidenced by respective combined ratios that were less than 100 %.

As per official TIRA's report for 2018, companies which had the highest levels of underwriting profits were Jubilee (TZS 3,887 million), Alliance (TZS 3,796 million), Heritage (1,209 million), Phoenix (TZS 982 million), Mayfair (871 million), Zanzibar Insurance (TZS 682 million), National Insurance Corporation (TZS 641 million), Metropolitan (TZS 498 million), Mo Assurance (TZS 288 million) and Tanzindia (TZS 42 million). On the other hand, the top three companies which had the highest levels of underwriting losses were AAR (loss of TZS 8,591 million), followed by UAP (loss of TZS 7,669 million) and Resolution (Loss of TZS 5,369 million).

9.5.3 Net profit after tax

For the year 2018, Alliance Insurance Corporation had TZS 5.9 billion as Net Profit after tax and therefore stood as the leading insurer with highest positive financial results. AAR had the largest Net Loss of TZS 5.4 billion during the same period. For the year 2019, Alliance continues to lead the market with TZS 8.7 billion as Net Profit after Tax followed by Jubilee (5.2 billion), Phoenix (4.6 billion), Reliance (2.4 billion) and Heritage (2.1 billion). Consolidated profitability of the industry stood at TZS 3 billion for 2018.

9.5.4 Retention and Reinsurance Ratio

The most current report indicates that most insurers with high retention levels were transacting retail business with less complexity and risk exposure. IGT retained 86% of its gross premium written into to its net account (For 2019: Bumaco lead by having 87% as retention); this is above the industry retention ratio of 54% (2019: Estimated at 55%). On the other hands Heritage Insurance Company retained the least of its gross premium written compared to other players and therefore its retention ratio stood at 29%.

9.6 Rationale for Insurance Linked Securities to Capitalize Insurance Industry

9.6.1 CURRENT STATUS

Regional Progress on Risk Retention (SUB-SAHARAN COUNTRIES)

The African reinsurance market has been growing steadily for almost a decade. Its turnover now amounts to approximately 8.3 billion USD. However, reinsurers are faced with a number of challenges:

i. Inflation leads to an unfavorable change in exchange rates;

ii. Competition among insurers leads to a decline in the volume of premiums;

iii. Claims frequency and management costs are on the rise;

iv. Due to restrictions on financial flows headed abroad, investment opportunities remain low; and

v. Return on investment remains low.

Despite these constraints, the African reinsurance market remains attractive. International reinsurers are competing over premiums with local players whose numbers have increased substantially. This attraction for the African continent is supported by the relative absence of natural catastrophes. Africa remains hardly exposed to this type of claims, which provides international reinsurers with diversification of their portfolio without increasing their exposure to these risks. Capitalization of local and regional reinsurance companies ranges from weak to strong. Return on equity remains stable at over 12%. ***(Source: Atlas Magazine-18th March 2019)***

Looking at Kenyan insurance market; industry retention ratio stood at an average of 80% compared to an average of 50% for Tanzanian market ***(Source: Annual Market Performance Report-IRA Kenya)***. A number of factors contribute to this deviation; such as presence of many reinsurance players in Kenyan market which enhance country's retention capacity. See Table below;

Table 9.3 : Trends in key performance ratios

Ratio	Years				
	2013	2014	2015	2016	2017
*Net commission ratio	9.0	8.9	9.2	8.1	7.4
*Management expense ratio	30.5	29.5	29.3	25.7	24.5
*Retention Ratio	80.1	80.4	80.5	80.5	79.4
Investment income ratio (GB)	11.3	7.1	7.4	5.8	7.8
Incurred claims ratio (GB)	58.4	60.9	61.7	62.7	61.5
Combined ratio (GB)	94.2	97.7	102.7	102.4	101.1

** Ratios for combined businesses (long-term and general insurance)*

9.6.2 Reinsurance Arrangement and retention levels in Tanzania

Reinsurance is a global business, therefore is being arranged or conducted in a manner which allows various reinsurance players around the world to effectively participate in providing such services. Looking at Tanzanian insurance market perspective; there is no difference from the global practices. Below are the modalities in which both life and general underwriters manage their reinsurance facilities.

Facultative Reinsurance

Facultative reinsurance covers individual underlying policies and are written on policy specific basis. Facultative is normally done when a risk cannot be placed in the treaty and is rarely done in this market due to the nature of life business.

Treaty Reinsurance

Every insurance company is required to have in place Reinsurance Treaty Program for its license to be renewed annually. Therefore, all underwriters have in place reinsurance treaties and therefore makes Treaty reinsurance to be the most common reinsurance arrangement practiced in the market. It gives an insurer ability to automatically place business above its retention limit as long as the risk is within the terms and scope of the particular treaty.

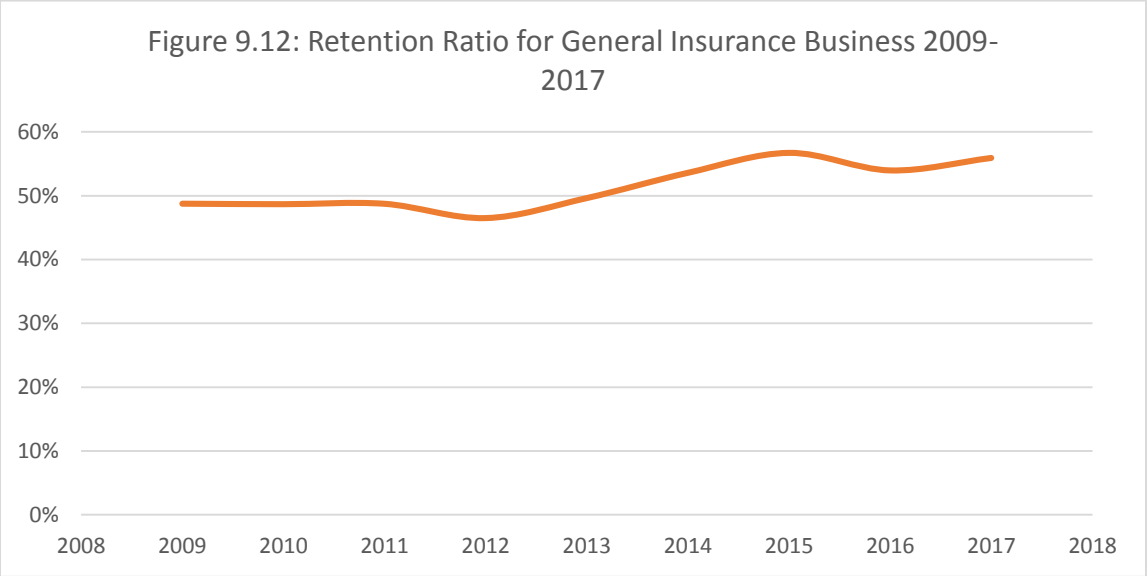
Table 9.4: Retention Limit for Tanzania – General Business

RETENTION FOR GENERAL INSURANCE BUSINESS (Millions) 2009-2017									
PARTICULARS	2017	2016	2015	2014	2013	2012	2011	2010	2009
Gross Premiums (GPW)	556,298	585,797.72	550,167.76	493981.107	417675.0021	362,887.79	308,438	255,746	209,559
Premiums Ceded (RP)	245,193	269,634.94	238,094.75	229243.2469	210371.9176	194,173.63	158,124	131,267	107,398
Net Premiums (NPW)	311,105	316,162.78	312,073.01	264737.8601	207303.0845	168,714.16	150,314	124,479	102,161
Retention Ratio	55.9%	54.0%	56.7%	53.6%	49.6%	46.5%	48.7%	48.7%	48.8%
Annual Increase	3.6%	-4.9%	5.8%	8.0%	6.8%	-4.6%	0.1%	-0.2%	-2.3%

Source: Annual Market Performance Reports-TIRA

As indicated in the above Table; retention ratio for general insurance business stood at an average of 51% for the past 9 years from 2009 to 2017. Prudentially, an insurance company is advised to retain an average of 33% to 70% of risk portion. Developed Insurance markets such as South African Insurance Market has an average retention level of more than 85%. This is due to presence of reputable reinsurance players with extremely huge financial capacity to accommodate risks emanating from and outside South African market.

Without ignoring the concept of diversification within insurance sub sector while enhancing national saving by allowing insurance players to retain more of their risk portions; there is a need to develop models in which insurance players will have alternative risk absorption mechanism to increase their retention and hence the national saving.



9.6.3 Retention Limit for Tanzania – Life Business

It is observed that the Life insurance industry has been growing at an average of around 13% over the past five years, where GWP stood at around TZS 80 billion as at 2017. The gross claims have also been increasing over the past five years in line with an increase in the GWP with the claims ratio averaging around 27% over the same period.

Table 9.5: Performance of life assurance business 2013 -2017

Description	2013	2014	2015	2016	2017
Gross Written Premium	56,410	60,420	68,691	74,249	80,812
Reinsurance premium(excluding Tan-Re & Local Fac)	4,531	5,563	6,714	7,074	6,653
Gross claims	15,315	15,686	16,012	20,605	24,159
Reinsurance recoveries(Excluding Tan-Re and Local Fac)	2,435	2,218	2,813	4,841	4,593
Gross Claims Ratio	27%	26%	23%	28%	30%

Source: Individual Company's Financials & Annual Market Performance Reports

The trend of Gross Premium Written and Gross claims for the last five years has been graphically illustrated on Chart 1 below.

The average portion of gross written premium which has been externalized out of Tanzania (i.e. excluding those ceded to TAN-RE and local facultative business) stood at 9% of the Gross Written Premium with an average size of around TZS 6 billion per year for the last 5 years (2013-2017).

Table 9.6: Trend of externalization of premiums 2013 - 2017

Description	2013	2014	2015	2016	2017
Externalized Portion	8%	9%	10%	10%	8%

The trend of reinsurance premium ceded outside Tanzania had been increasing from 2012 to 2016 and then decreased in 2017. This decreasing trend is expected to continue in 2018 given a significant increase in risk retention levels for some direct writers in the market for the year 2018 and regulatory emphasis on minimizing externalization of risks.

9.6.4 Government initiatives

The Government has recently developed the Local Content policy aimed at empowering the local economy and its citizens. The Local content policy lead to amendment of laws governing operations in the extractive industries to, among other things, ensures integration of the extractive activities with the wider economy. One avenue pursued by the legislative action is requiring extractive companies (the Contractors) to source material and service inputs locally and therefore increase the local content of their value chains.

The Local Content Regulations promulgated under the Mining Act and the Petroleum Act requires contractors to comply with local insurance laws. The Government's policy objective of retaining insurance premiums in the Tanzanian economy will not be achieved if local insurance companies are not adequately capitalized.

Thus ensuring strong capacity of the local insurance companies is of strategic importance for the country, and an opportunity for local insurance companies to raise adequate capital through the capital markets, which in turn will stimulate economic growth and development of our country.

9.7 Proposed Solutions For Capitalizing The Insurance Industry In Tanzania

9.7.1 Raise Capital requirements

The primary option is for the Authority to raise capital requirements for the insurers. This option has been considered by the Authority previously, and it is recognized that this option will force the existing insurers to inject more capital from the shareholders as has been the norm. Alternatively, the insurers may opt merger and acquisition, and thus gain capital from new shareholders who will buy the company.

Advantage of raising capital requirements

i. The solution will ensure only well capitalized insurance companies operate within the market.

Disadvantage of raising capital requirements

i. The Authority has been employing this methodology for companies with solvency deficit, as the fund comes from existing shareholders, it is difficult for companies to effectively address regulatory concern due to limited resource of shareholders. A significant number of insurers will not be able to raise capital that is anticipated to unleash the potential of our industry, and therefore it is not considered to be a successful strategic solution in our current context.

ii. The solution will require amendment of the Insurance Act for compliance reasons.

iii. The method may result to mergers and acquisition and/or closure of existing companies due to failure to meet the required capital. The situation will create industry's tension while liquidation of companies may take quite long period and therefore service to existing policyholders and potential claimants may be cumbersome in terms of operations.

9.7.2 Enlist in the Stock Exchange via Public Offering

The capital markets provide opportunities for insurance company to strengthen their capital adequacy by using equity (shares) or debt instruments (corporate bonds) process referred to a **Listing to the Stock Exchange**. Insurance companies in other emerging markets have used capital markets to capitalize their businesses. For example in Kenya, insurance companies such as, Jubilee Holding Ltd; Sanlam Kenya Plc; Kenya Re-Insurance Corporation; Liberty Kenya Holding Ltd; Britam Holding Ltd; and CIC Insurance Group Ltd have used capital markets to strengthen their capital adequacy and they are listed on the Nairobi Securities Exchange (NSE).

Likewise, in South Africa, insurance companies such as, Alexander Forbes Group; Old Mutual Ltd; Clientele Ltd; Discovery Ltd; Liberty Holding Ltd; MM Holding Ltd; Rand Merchant Investment Life Insurance; and Sanlam Insurance Ltd have used capital markets to strengthen their capital adequacy and they are listed on the Johannesburg Stock Exchange (JSE).

Advantage of Enlisting in the Stock Exchange via Public Offering

i. No amendment of existing legal requirement is needed for effective operation of this methodology. Currently, every insurer is allowed to list their stock in stock exchange market as per the existing legal framework.

Disadvantage of Enlisting in the Stock Exchange via Public Offering

i. Insurance companies in Tanzania can also strengthen their capital adequacy through issuance of shares or corporate bonds to the public and list on the DSE. However, stock exchange listing is a rigorous, complex and lengthy process.

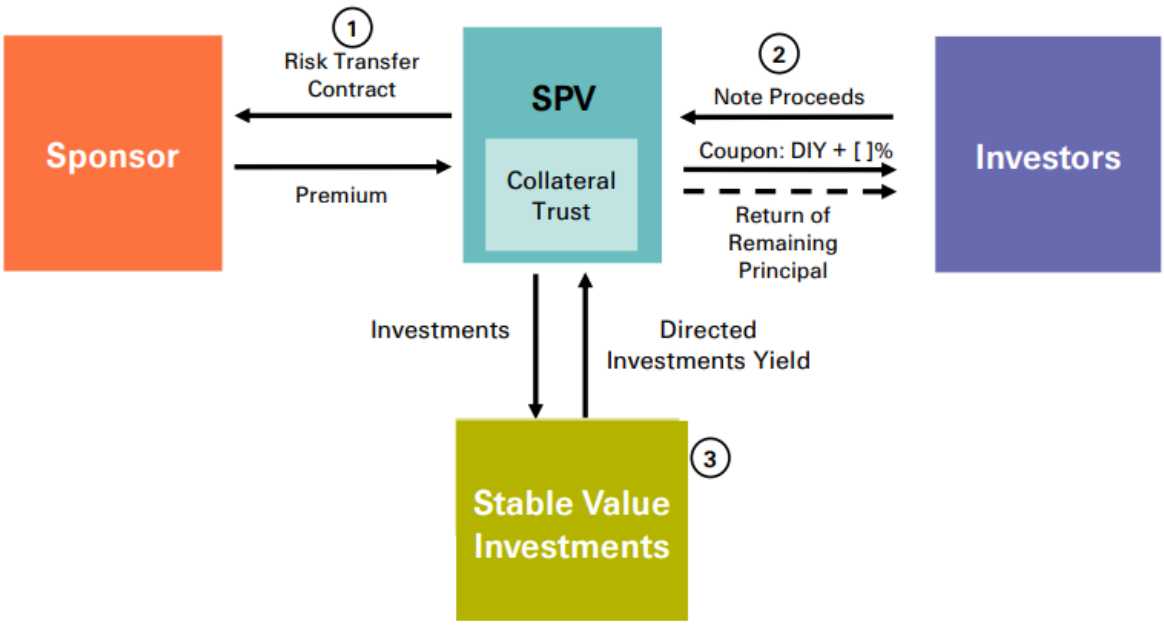
ii. In connection to the above, not every company intends to be public owned. In the current context, listing will not create equal access of the capital market fund to all insurers.

9.7.3 INSURANCE LINKED SECURITIES – ILS: The proposed solution

The Insurance-linked securities (ILS) are a means of selling insurance-related risks to the capital markets by using synthetic securitization techniques.

- The selling insurance company enters into a financial contract with a Special Purpose Vehicle (SPV) where the former transfers premiums to the latter in exchange of claim payments (1)
- The SPV issues notes to investors in the capital markets (2)
- Proceeds from the notes are invested in high-quality securities and held in a collateral trust (3)
- Investment returns from the collateral are swapped to a LIBOR-based rate by the Swap Counterparty (4)
- *Investors receive a stream of coupon payments that compensate them for the use of their funds (LIBOR) and their risk exposure (spread financed by the premiums) (5)*

Figure 9.13: Flow of ILS transaction



ILS can be issued for two main purposes:

1) To transfer Insurance risks to financial markets

2) To finance insurance activities

ILS offers sponsors a viable alternative to enhance risk transfer programs. ILS provides diversification of the source of risk capital, multi-year coverage, and also competitive rates compared to traditional reinsurance.

Second, there is strong demand from investors given ILS' low correlation with other asset classes, and low volatility. To illustrate, the Swiss Re Global Cat Bond Index has an annual volatility under 3%[1], much below the 15% and 5% for equities and corporate bonds respectively. In addition, catastrophe bonds also offer ILS investors a liquid investment option as they can be traded on the secondary markets.

The ILS market has continued to innovate in response to the growing and changing needs of sponsors and investors. This innovation is happening along different dimensions, namely in risk types, geography, and structures.

ILS has now expanded its scope to cover other lines of business like operational risks and mortgage risks. Once the preserve of large and complex risks such as property catastrophe and mortality risks with a long history of well modelled losses, it is now considered for lines previously deemed uninsurable, such as cyber.

Advantage of ILS

i. ILS offers a wide range of benefits. ILS complements and extend traditional reinsurance – enabling insurance risk to be transferred outside the insurance sector thus increasing risk bearing capacity overaII;

ii. ILS offer additional hedging opportunities to insurers by means of securitization. Potentially Iarge Iosses are broken down into smaIIer pieces. This offers additionaI hedging opportunities and facilitates better risk diversification on the part of the insurer transferring the risk;

iii. ILS can provide an additional source of funding – In the Life insurance market embedded vaIue can be monetized by means of securitisation and thus serve as an additionaI funding source to the insurer. ILS can offer mult year pricing stability – the typical term for CAT bonds is 3 years which enabIe insurers to obtain protection at fixed IeveIs;

iv. In contrast to conventional cover arranged with a reinsurance company, they offer insurance and reinsurance firms a means of transferring risk to the capital markets. ILS has helped to expand the capacity of the reinsurance market and it has also provided protection buyers with cover which is generally less exposed to counter-party default; and

v. Unlike the traditional listings; ILS provide investors with an option to invest only in a particular segment of the company's portfolio. A company may be

having an overall underwriting loss but making profit in "Oil and Gas" portfolio or "Health portfolio"; an investor would rather invest in ILS which specifically securitized profitable or promising portfolio and not investing in the whole company (as a company's stock) which may results to losses.

Disadvantage of ILS

i. The proposed solution requires recognition on statutory instruments such as Insurance Act, Regulations or Guidelines issued by the Authority.

9.8 Expected Outcomes upon Implementing ILS Solution for The Insurance Industry

The Capital Market in Dar es Salaam has demonstrated ability to provide long term capital for various companies above projected goals:

Equity Market Performance in Tanzania

- ✓ Tanzania Breweries Ltd (TBL) raised TZS 297.6 billion compared to the plan of TZS 121.5 billion, a subscription rate of 245%;
- ✓ CRDB Bank Plc raised 82.6 billion compared to the plan of TZS 18.8 billion, a subscription rate of 439%;
- ✓ NMB Bank Plc raised 224.9 billion compared to the plan of TZS 63 billion, a subscription rate of 357%;
- ✓ Mwalimu Commercial Bank Plc raised TZS 31 billion compared to the plan of TZS 25 billion, a subscription rate of 124%;
- ✓ DSE Plc raised TZS 35.77 billion compared to the plan of TZS 7.5 billion, a subscription rate of 477%;
- ✓ Vodacom Tanzania Plc raised TZS 476 billion as planned, a subscription rate of 100%.

Bonds Market Performance in Tanzania

- ✓ NMB bank Plc Medium Term Note Programme (MTN) worth TZS 200 billion. In the first tranche, the bank raised TZS 41.4 billion *on compared to the plan of TZS 20 billion, representing a subscription rate of 207%.*
- ✓ Exim Bank (T) Ltd issued a 6-year Exchange Traded Retail Bond worth TZS 10.0 billion. The total amount raised from the bond issue was TZS 19.967 billion, representing 99.67% oversubscription.
- ✓ Tanzania Mortgage Refinance Company (TMRC) Medium Term Note Programme (MTN) worth TZS 120 billion. In the first tranche, the bank raised TZS 12.5 billion compared to the plan of TZS 12 billion, representing a subscription rate of 104%.

The Dar es Salaam Stock Exchange PLC (DSE) 28.1 trillion capitalization poses as a significant source of capital for the insurers in this market. ILS is the only tool that can guarantee equal access for all insurers operating in the market to this capital market as a capitalization tool. Furthermore, the DSE creates a room to access a significant number of investors who can inject required capital to companies through purchasing of security.

The Capital Market through ILS offers an opportunity to address deficit retention deficit timely and strategically. If the insurance industry could tap only 1o% of the funds available in the capital market, its capacity will shoot from about Tzs. 66 bn to about Tzs. 2.8 trillion, a 39 times growth.

9.9 Conclusions

It is time Tanzania find a solution that works for Tanzania market. Tanzania must initiate a process that will tell us what will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles.

The Authorities should work with the insurance industry to help strengthen the sector's contribution to the economy and enhance the Tanzania's position as a financial hub in East and Central Africa. Tanzania should develop a fit-for-purpose regulatory and tax framework for ILS business to enable the industry participates competitively in the alternative risk transfer market.

9.10 Recommendations and Policy Implications

1. Authorities responsible for insurance and capital market development i.e Tanzania Insurance Regulatory Authority (TIRA) and Capital Market and Securities Authority (CMSA) should formulate and establish the ILS Taskforce, a group of industry practitioners with expertise in specialist capital market products, reinsurance and alternative risk transfer business to develop a framework which fit for our market.
2. The taskforce main objective will be to deveIop a framework that wiII guide the capitaI market and insurance pIayers to implement innovative insurance Iinked securities that will enabIe insurance industry to improve retention capacity.
3. In developing the ILS, the following key aspects must be taken onboard:
   i. Gap analysis: Determine insurance industry retention capacity of the emerging speciaIty risks.
   ii. Identifying risk types potential for ILS in the insurance industry in Tanzania.
   iii. Data for risk quantification: EstabIish maximum possibIe Ioss and maximum probabIe Ioss for potential ILS risks.
   iv. ILS structures: Describe innovative insurance Iinked securities which can enhance insurance industry retention capacity.
   v. Develop a corporate/legal structure for the ILS vehicles.

vi. Establish competitive tax regime for ILS vehicles that will attract ART capital from around the globe.
vii. Develop regulatory framework for innovative insurance Iinked securities.

APPENDIX I: TERMS OF REFERENCE

ToR	Sub-ToR	Description of TOR
1		**Overview of ILS**
	A	Gap Analysis-Determine insurance industry retention capacity of the emerging specialty risks.
	B	Identifying risk types potential for ILS in the insurance industry in Tanzania.
	C	Background information about ILS in respect of Tanzanian Financial Market
	D	Situational Analysis – In other jurisdiction which have implemented ILS Framework
2		**Quantification of Risks**
	A	Establish Maximum Probable Loss in respect of special risks
	B	Assessment of Current Capitalization and Reinsurance Facilities to accommodate identified MPL
3		**Formulation of Suitable ILS Framework for Tanzania Insurance Market**
	A	Development of ILS Framework Customized for Tanzania Market
	B	Requirements for Implementation for ILS (including set up of conducive environment for ILS to operate)
	C	ILS Coordination Framework
	D	Development of joint-supervised Guidelines/Regulations on ILS
4		**Consultative Meeting with Stakeholders on the Proposed Framework**
	A	Hold consultative meeting with CMSA, TIRA, Insurance Companies, Investors, Securities Brokers etc.
	B	Summarize inputs from the Meeting and incorporate the same on the Proposed ILS Framework
5		**Finalization of ILS**
	A	Submit the ILS Framework Final Proposal to the Study Team

CHAPTER TEN

10 CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

10.1 Conclusions

Innovation is the fundamental drive of the new beyond insurance business model. Innovation in itself is a factor in the development of finance and insurance: nowadays it takes different shapes, innovation in market demand (customer centricity), contractual innovation (new risk transfer contracts, smart contracts, etc.), digital innovation.

This thesis looks at risk as a system (complex risk) which is a set of elements (risk components) connected by relations that affect the purpose of the entities's activities and its financial result.

Risk in recent climate change assessments has been defined as the potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. Many risks to health and property in modern life emerge from the interaction between people and businesses. On the one hand, there are everyday risks such as when a worker has an accident in the workplace or a customer is injured in a store. On the other hand, there are large-scale catastrophes such as bodily injury from toxic chemical exposures or property damage from accidents during energy production. The large-scale events can involve hundreds of thousands or even millions of injured parties, and tens to hundreds of businesses.

The study identifies in chapter 4 complex and climate related risks in Africa employing the Cambridge taxonomy of macro-catastrophe threats framework. Five categories of risks are identified including finance and trade risks; geopolitics and society risks; natural catastrophes and climate risks; technology and space risks; and other risks emerging in the landscape. Individually, the study identifies a number of risks qualifying as complex risks including agriculture risks, health risks, energy risks, infrastructure breakdown or failure, water crisis, war and civil unrest, natural calamities, systemic sectorial risks such as financial sector, logistics, environmental pollution, climate action failure, extreme weather, cyber crime, food crisis, biodiversity loss, political risks and governance failure, mass unemployment, fiscal crisis, unmanageable inflation/deflation, failure of urban planning, and illicit trade.

Based on the demand-side data available through the FinScope datasets, on chapter 5 the study defined the risk protection gap as the number of individuals who used coping mechanisms other than insurance to manage insurable risks, or who did nothing and therefore could not manage the risk event. Inferencing model used by Cenfri (2020) to establish individual protection gap,

The study establish that 32.13% of the population did nothing to manage risks they faced, 1.98% used insurance and 65.898% used other coping mechanisms. At high health per capita cost as per the UN 2022 of $ 129 the Africa health protection gap expand to five (5) times. Africa agriculture risk protection gap stands at $ 48.79bn. Based on Africa GDP estimates by the AfDP of 2022 whereas Africa GDP stood at $ 2.6 trillion and the estimated loss on GDP from climate change of between 5% - 15% the study establishes that Africa climate protection gap is between $ 62billion to $ 322bn. With the insurance gross written premium of $ 68 billion for year 2022, the African insurance market has a significant protection gap which requires new products and business models to cater for this growing gap.

Chapter 6 of distinguishes between risk transfer through alternative carriers as encompassing self-insurance, pools, captives and risk retention groups (RRGs) and risk transfer through alternative products: includes transactions such as integrated multiline products, insurance-linked securities (or CAT bonds as they are commonly referred to), credit securitization, committed capital, weather derivatives, and finite risk products.
The study finds that the global capital market size in year 2021 was $ 256.6 trillion whereas $150.8 trillion was bond capitalization and 105.8 was equity. While reinsurance capital has grown from $ 386 billion in 2006 to $ 527billion in year 2022 a 73% growth; the alternative capital has grown from $ 17 billion in 2006 to $ 94 billion in 2022, a growth ratio of 180.85%.

Chapter 7 demonstrate ILS innovation that instead of simply transferring risk up through a chain of different insurance entities, but essentially keeping it within the insurance market, the major innovation was to transfer risk directly to the capital markets. ILSs are generally thought to have little or no correlation with the wider financial markets, as their value is linked to insurance risks (such as natural disasters, longevity risk and life insurance mortality) but in any case they increase interconnectedness between insurers and investors (via insurance securitisations). These solutions have been developed especially in those economic cycles where traditional reinsurance premiums are very high or coverage is not available.

The study in chapter 8 establishes that regulatory framework for ILS is designed to ensure that investors are protected and that the transactions are conducted in a transparent and fair manner. It is important for issuers and investors to be familiar with the regulatory requirements in their jurisdiction in order to ensure compliance and avoid potential legal or financial consequences. Regulators should develop a new competitive corporate and tax structure for allowing Insurance Linked Securities vehicles to be domiciled in the their jurisdiction. working closely with the Taskforce to understand the ILS market and the structures used in ILS deals. With the right framework, jurisdiction can make a major contribution to the continued growth and development of ILS business. By supporting innovation within a trusted and robust regulatory framework, jurisdiction should be well placed to become a leading market for alternative risk transfer. What will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles.

Chapter 9 is a case study of Tanzania - Increasing Capitalization of the Re/Insurers in Tanzania Using Insurance Linked Securities (ILS). In Tanzania, the insurance industry has been suffering capacity challenge which has been forcing the insurers to front and reinsure a significant portion of the premium. Opportunities from emerging risks such as oil and gas risks and other specialty risks that our market fails to accommodate cannot be adequately enjoyed at the existing capitalization of the insurers. Circular no.055/2017 on dealing with foreign reinsurers and reinsurance brokers underscored the Local Content policy of the Government of the United Republic of Tanzania as implemented in the insurance industry. at a writing capacity of 3% - 10% of the capitalization. Risks in the emerging areas and solvency condition of the industry indicate a continuous weak position to retain risks internally. Taking the oil and gas sector as an example, the industry has been working on formation of a pool; rough estimates of the pool indicate that utmost the pool will have a capacity to retain about 5% of the risks (disclaimer: there is lack of information regarding exposure and potential pool size at max or min levels). Nigeria took more than 43 years since starting exploration of oil and gas until putting in place a framework that was relevant to their context.

The total market capitalization of 28 companies listed on the DSE is TZS 21 trillion as of 2022. The capitalization of corporate and Government bonds is TZS 7 trillion. Total outstanding amount in Collective Investment Schemes operated by UTT-AMIS is TZS 285 billion. Value of Collective Investment Schemes by Watumishi Housing and Umande is TZS 50 billion. Therefore, total market capitalization in the capital markets sector is TZS 28.3 trillion. The total net worth of the insurance industry with 31 insurance companies in 2016 stood at Tzs. 268.1bn. The Capital Market through ILS offers an opportunity to address deficit retention deficit timely and strategically. If the insurance industry could tap only 1o% of the funds available in the capital market, its capacity will shoot from about Tzs. 66 bn to about Tzs. 2.8 trillion, a 39 times growth.

It is time Tanzania find a solution that works for Tanzania market. Tanzania must initiate a process that will tell us what will be needed for an effective and competitive approach to the authorization and supervision, corporate structure and taxation of ILS vehicles. The Authorities should work with the insurance industry to help strengthen the sector’s contribution to the economy and enhance the Tanzania’s position as a financial hub in East and Central Africa. Tanzania should develop a fit-for-purpose regulatory and tax framework for ILS business to enable the industry participates competitively in the alternative risk transfer market.

10.2 Policy Implications

Complex and climate risks takes a chance with influence individual organizations, however more essentially they influence numerous organizations simultaneously, and produce foundational results across the entire large scale monetary climate, delivering possible effects on the monetary framework and venture resources. As a result, there

are a lot of stakeholders involved in ensuring that these complex risks are well understood and managed. In order to evaluate and control their risk, each stakeholder group will likely employ the ILS innovation framework in different ways.

This study affirms that alternative solutions for the transfer of risks or techniques other than insurance or reinsurance capable of covering the risk of losses have for some time been added to traditional insurance/reinsurance products. According to the estimates of specialised intermediaries, today these solutions, in terms of volume, account for around 15-20% of total reinsurance business, measured in terms of dedicated capital. The development of these products is due to the limited capabilities of the reinsurance market, especially in the most severe downturns, to offer traditional risk mitigation techniques in a market that is increasingly characterized by complex risks such as those arising from natural disasters (earthquakes, floods, etc.) or business interruption, also in light of the changes in weather conditions resulting from climate change. In addition to that, the need for insurance undertakings to reduce the volatility of their solvency position based on Solvency II market consistent principles, has also prompted the search on the reinsurance market for products with a specific or primarily financial content, designed to mitigate both insurance and market risks.

If the portfolio's risk-to-return profile is improved, adding an ILS to it may be beneficial. As a result, the process of determining whether or not an ILS investment makes sense is very similar to that of investing in any other security. If the minimal effect of adding an ILS to the portfolio further develops its gamble return profile more than accessible other options, the speculation likely appears to be legit. To put it another way, insurance-linked securities are appealing to investors because they offer either yield or diversification. Investors naturally take into account this asset class because they are always looking for ways to diversify their portfolios and get more returns. When choosing the best ILS structure to transfer an insurance risk to the capital markets, insurance-linked securities structurers take into account the fact that investors' needs should be met.

Insurers and reinsurers are also aware of the changing demands made by multinational corporations for protection against complex risks to their international operations. Cyber risk, business interruption as a result of pandemics, and contingent business interruption as a result of multi-cause perils are some emerging threats that are of concern to global businesses. Insurers may be able to offer new products and services in these areas if they can become familiar with the threat, access cost-effective hedging mechanisms and loss limits, and acquire sufficient underwriting expertise regarding the peril. Traditional insurance products of peril-specified direct-loss coverages cannot easily accommodate some of the threats identified in the study. In geographical accumulation zones, it can be difficult to manage some threats. A framework approach to the global threat landscape and the risk posed to the interconnectivity and dependencies of modern business systems may lead to the development of new insurance business classes and approaches to product designs. The ILS innovation

framework will make it possible to accommodate these necessary changes.

Significance of ILS has to be considered given the **e**volving and new risks whereas new risks are emerging while some risks have become more important than previously. Futhermore there are insufficient homogeneous exposures to allow for predictive analytics. The gaps with traditional reinsurance in terms of availability, limited cover or high costs of insurance can be addressed. Insurance cycles and uncertainty for the big clients which present budget dilemmas, especially hardening markets, such as soon after the pandemics reinsurance rates hardened globally while Africa had the least impact from Covid 19. Increasing corporate complexities and liability exposures pushed up by legislative changes and consumerism and tightening regulatory capital requirements makes ILS as the best bet to be used to relieve capital pressure and help achieve premium targets in risk-based capital regimes, which are becoming ubiquitous.

A systematic risk framework also enhances efforts by national governments to provide contingency planning for future threats to national security, for energy, food and natural resources security, and for civil defense resource allocation. Prioritizing resources for civil emergences requires a systematic assessment of the frequency, severity and characteristics of the threats faced, along the lines of the available resources. ILS products extend the financial coping tools available to governments that can be deployed timely in response to a catastrophic event such as a natural disaster, a pandemic or mega infrastructural collapse.

Innovation must underpin the progress of ILS in Africa so as to enable principles of value creation and enhancement borrowing lessons from the technology industry, where the quest to innovate is nonnegotiable, and simplicity and cost effectiveness underlie innovations. ILS will enable solving the insurance penetration in Africa with alternative products innovation for health, agriculture and cyber risks. The insurance sector must continue to be at the forefront of reducing the risk protection gap in the Continent.

10.3 Recommendations

Limited experience/knowledge, regulatory uncertainty and transaction costs are a trio of the most significant impediments to ILS market expansion. Thus, ILS development must start with capacity building to create necessary expertise required to develop solutions. Regulators must ensure conducive regulatory framework exists which influence reduction in the transaction costs.

Regulators should focus their attention on the contractual terms of the treaty with a view to verifying the effective transfer of the insurance risk or the improper use of the treaty with the sole purpose of circumventing capital requirements.

SPV treaties should not result in a significant level of basic risk or in the emergence of other risks, unless this possibility is taken into account in the calculation of the Solvency Capital Requirement. Attention should also given to possible regulatory arbitrage between different legal systems.

The technicality and the complex contractual arrangements of these products raise also a question of level playing field in the supervisory practices adopted in the various countries. This issue has been brought to the attention of the EIOPA, which in 2021 published an Opinion on the use of risk mitigation techniques, aimed to ensure convergent supervision of reinsurance structures in all the member states, highlighting the key elements to be considered when examining risk mitigation techniques. The opinion establishes that a full and accurate analysis of the reinsurance arrangements is the responsibility of the undertaking's actuarial function and that the ORSA process should give due consideration to risk interrelationships, their mitigation and capital endowment. The Opinion also contains some recommendations inspired by "good practices", such as the recommendation on undertakings to start an early dialogue with supervisors especially when there are "complex" reinsurance structures or the need for NCAs to coordinate and cooperate in the assessment of reinsurance structures that are relevant across multiple jurisdictions.

It is difficult and probably not desirable to strictly regulate the ILS. It is in the remit of the Supervisory Authorities to make their expectations clear but, at the same time, strong risk governance and management practices at insurance/reinsurance firm level are necessary. Regulators should bridge the gaps in the current prudential reporting on reinsurance structures in order to facilitate national and international supervision and collaboration.

ILS is a complement to traditional reinsurance and should not be perceived as a competitor or an inconvenience. The insurance market can deploy ILS to improve insurance penetration in Africa only if products will be re-engineered to fit the context and needs of the Continent.

10.4 Future Research

In order to provide a more comprehensive analysis of the risk and performance implications of insurance securitization, it is necessary to conduct additional research in the areas of ILS innovation, complex risks, and climate risks. Here, we talk about three different ways that this thesis's work could be extended.

To begin, future empirical research must focus on the investor's perspective in order to identify additional factors that could influence the success of insurance securitization in the future. One of the most common justifications for investing in ILS is that, because Cat bond returns are thought to have little or no correlation with traditional asset classes (Litzenberger et al.,), they

present attractive risk-return opportunities when included in diversified stock and bond portfolios. 1996). However, there has not yet been an empirical investigation into whether or not ILS have actually fulfilled this expectation. The most recent years, including the 2008 financial crisis, are particularly suitable for determining whether ILS returns are indeed highly correlated with other (more conventional) asset classes.

Second, it should be looked into in future studies whether insurance securitization only affects companies that issue insurance-linked securities. Insurance securitization may have had (universal) effects on systemic stability, as previously argued, or it may have increased competition for catastrophe reinsurance, resulting in lower premiums for all insurers (Froot, 2001).

Thirdly, the quantitative findings of this study should be complemented by more robust qualitative data from subsequent studies. Future studies on insurance securitization may use questionnaires and interviews with insurance and reinsurance companies, potential investors, and fund managers to gather additional primary data for this purpose. In this area, which is relatively new for the insurance market in Africa, a more in-depth qualitative analysis is still essential. This approach is particularly suited to the reasons that insurance and reinsurance companies engage in insurance securitization. Additionally, this method may enable a deeper comprehension of how insurance securitization affects non-listed insurance and reinsurance companies.

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INSURANCE LINKED SECURITIES INNOVATION FRAMEWORK FOR COMPLEX AND CLIMATE RISKS IN AFRICA

QUESTIONNAIRE

INSURANCE LINKED SECURITIES FOR AFRICA QUESTIONNAIRE

PhD Student : Anselmi Anselmi

NAME OF THE ORGANIZATION: …….

Questionnaire no:……. Delivery Date :…… Return Date:……

PART 1: INTRODUCTION

This questionnaire is part of a research work for PhD Student Anselmi Anselmi Mushy as required by the University of Selinus a thesis entitled — Insurance Linked Securities Innovation Framework For Complex And Climate Risks for Africa in fulfillment of the requirements for the degree of Doctor of Philosophy at the Selinus University of Sciences and Literature, Rome Italy.

Therefore, you are requested to fill in the questionnaire to the best of your ability. You have been purposefully selected to fill in this questionnaire given the specialty of the subject under study. It is the hope of the researcher that your insights will assist to inform the research and findings, which are important for development of the insurance industry and capital markets in Africa while at the same time contributing to the Climate Change agenda.

For any inquiries and clarification in filing the questionnaire contact the researcher Mr. Anselmi Anselmi through +255713655934 or email: anselmi.anselmi@acisp.africa

DETAILS OF THE RESPONDENT

Organization	
Respondent Name	
Position	
Date	

Key

Degree of Importance	Rank	Degree of Efforts
Most important	4	Maximum effort
Important	3	Above average effort
Somewhat important	2	Average effort
Least important	1	Minimum effort
Unimportant	0	No effort

Complex and climatic risks found in the economic sectors in Africa

7. What is the prospect of Africa Economy?

☐Very strong
☐Strong
☐Neutral
☐Poor
☐Very poor
☐Others specify:……

8. What are the complex and climatic risks in Africa?

☐Agriculture risks
☐Health risks
☐Energy risks
☐Infrastructure breakdown or failure
☐Water crisis
☐War and Civil unrest
☐Cyber crime
☐Natural calamities
☐ Systemic sectorial risks such as financial sector, logistics
☐ Environmental pollution
☐ Climate action failure
☐ Extreme weather
☐Food crisis
☐ Biodiversity loss
☐ Political risks and governance failure
☐ Mass unemployment
☐Fiscal crisis
☐Unmanageable inflation/deflation
☐ Failure of urban planning
☐ Illicit trade
☐Others specify:……

9. What are the key features of complex and climatic risks in Africa?

☐Chaotic
☐Ambiguous
☐Unpredictable time horizon
☐Limited information and knowledge on the risk
☐Volatile
☐Uncontrollable
☐Multifaceted
☐Others specify:……

Underwriting capacity for complex and climatic risks industry in Africa

10. How would you rate the state of insurance industry in Africa?

☐Developed
☐Semi developed
☐Developing
☐Underdeveloped
☐Others specify:……

11. How would you rate the underwriting capacity for complex and climatic risks in Africa?

☐Very strong

☐Strong
☐Neutral
☐Poor
☐Very poor
☐Others specify:……

12. What factors are critical in assessing underwriting capacity for complex and climatic risks in Africa?
    ☐ Access to Capital
    ☐ Expertise and human resources with required skill-set
    ☐ Size of the market
    ☐Demand for insurance
    ☐Technological solutions
    ☐ Conducive regulatory environment
    ☐Availability of accurate data
    ☐Proper risk pricing

<u>Underwriting capacity gap for priority complex and climatic risks in Africa</u>

13. What are the priority CCRs in Africa as per their size, potential number of population affected and strategic importance to the economy/development of Africa?
    ☐Agriculture risks
    ☐Health risks
    ☐Energy risks
    ☐Infrastructure breakdown or failure
    ☐Water crisis
    ☐War and Civil unrest
    ☐Natural calamities
    ☐ Systemic sectorial risks such as financial sector, logistics
    ☐ Environmental pollution
    ☐ Climate action failure
    ☐ Extreme weather
    ☐Cyber crime
    ☐Food crisis
    ☐ Biodiversity loss
    ☐ Political risks and governance failure
    ☐ Mass unemployment
    ☐Fiscal crisis
    ☐Unmanageable inflation/deflation
    ☐ Failure of urban planning
    ☐ Illicit trade
    ☐Others specify:……

14. How would you rate the underwriting capacity gap for complex and climate risks in Africa?
    ☐Strong high
    ☐Moderate neutral
    ☐Weak low

15. How would you rate the following aspects of the supporting underwriting capacity for complex and climate risk in Africa?

Aspect	Strong high	Moderate neutral	Weak low	Recommendation What needs to be done?
Access to Capital	☐	☐	☐	
Expertise and human resources with required skill-set	☐	☐	☐	
Size of the market	☐	☐	☐	
Demand for insurance	☐	☐	☐	
Technological solutions	☐	☐	☐	
Conducive regulatory environment	☐	☐	☐	
Availability of accurate data	☐	☐	☐	
Proper risk pricing	☐	☐	☐	

ILS solutions can be used to cover the underwriting capacity gap

16. What is the level of importance of capital market as supplement to reinsurance capacity?

Degree of Importance	**Rank**
Most important	☐4
Important	☐3
Somewhat important	☐2
Least important	☐1
Unimportant	☐0

17. What ILS product types does capital market offer to insurance market?

……

……

18. Can innovation enable strategic structuring of ILS solutions to enable insuring complex and climatic risks in Africa?

☐Yes

☐No

19. What are the traditional structures of ILS?

……

……

20. What steps are critical in structuring ILS products?

☐Risk identification for transfer

☐ILS type determination

☐Terms setting

☐Raise capital

☐Pay coupons

☐Indemnify risk

☐Close the ISPV end of term

21. Is innovation needed to structure ILS in accordance with CCRs affecting Africa?
    - ☐Yes
    - ☐No
22. Which innovation conceptual perspective is important to structure ILS in accordance with CCRs affecting Africa?
    - ☐Innovation type
    - ☐Innovation characteristics
    - ☐Innovation framework in financial services
23. Which innovation dimensions are critical for innovating ILS solutions for CCRs in Africa?
    - ☐Product innovation
    - ☐Marketing innovation
    - ☐Technological innovation
    - ☐Process innovation
24. Which innovation principles must be followed in innovating ILS solutions for CCRs in Africa?

    ……
    ……
25. What are the regulatory aspects of ILS?

    ……
    ……
26. Which regulatory framework address ILS?

    ……
    ……
27. Which conducive regulatory conditions can enable ILS ecosystem to prosper?

    ……
    ……
28. How will the innovation in ILS for CCRs affecting Africa benefit the markets?

    ……
    ……
    ……
    ……
    ……
29. Overall, how would you briefly explain the move towards using ILS to enable underwriting of CCRs in Africa?

    ……
    ……
30. Is there anything you will like to add with regard to this subject researched?

.....
.....

INSURANCE LINKED SECURITIES FOR AFRICA

PhD Student : Anselmi Anselmi

INTERVIEW GUIDE

Insurance Linked Securities Innovation Framework for Complex and Climate Risks in Africa

Interview no:……. Interview Date :……..…

PART 1: Introduction

This questionnaire is part of a research work for PhD Student Anselmi Anselmi Mushy as required by the University of Selinus a thesis entitled — Insurance Linked Securities Innovation Framework For Complex And Climate Risks for Africa in fulfillment of the requirements for the degree of Doctor of Philosophy at the Selinus University of Sciences and Literature, Rome Italy.

Therefore, you are requested to fill in the questionnaire to the best of your ability. You have been purposefully selected to fill in this questionnaire given the specialty of the subject under study. It is the hope of the researcher that your insights will assist to inform the research and findings, which are important for development of the insurance industry and capital markets in Africa while at the same time contributing to the Climate Change agenda.

For any inquiries and clarification in filing the questionnaire contact the researcher Mr. Anselmi Anselmi through +255713655934 or email: anselmi.anselmi@acisp.africa or ancesage@yahoo.com

DETAILS OF THE RESPONDENT

Organization	
Respondent Name	
Position	
Date	

The main objective of this research is to develop a framework that will guide the capital market and insurance players in implementing innovative Insurance Linked Securities (ILS) that will improve the underwriting capacity of the insurance industry for complex and climate change-increasing events.

Specific objectives of the study includes:

7. Identify complex and climatic risks found in the economic sectors in Africa.
8. Assess the underwriting capacity for complex and climatic risks industry in Africa.
9. Establish underwriting capacity gap for priority complex and climatic risks in Africa.
10. Establish ILS solutions that can be used to cover the underwriting capacity gap.
11. Establish how ILS solutions can be structured to enable strategic insuring of complex and climatic risks in Africa.
12. Establish conducive regulatory requirements for ILS ecosystem to prosper.

Free consent and confidentiality

Now, I request your consent for this interview. All your responses will be treated with confidentiality.

PART II – INTERVIEW QUESTIONS

KEY QUESTION:

How can insurance and capital market players implement innovative ILS solutions which can increase underwriting capacity of insurance industry for complex and climate risks in Africa?

MAIN QUESTIONS

13. What are the complex and climatic risks found in the economic sectors in Africa?
    - How is the state of African Economy?
    - What are the complex and climatic risks in Africa? Can you explain a bit on the taxonomy of the CCRs?

Economic sectors	Complex risks	Climate risks
Agriculture		
Construction		

14. What is the underwriting capacity for complex and climatic risks industry in Africa?
    - How is the state of insurance industry in Africa?
    - What is the underwriting capacity for complex and climatic risks in Africa?
        i. Underwriting ? Capacity – technical/financial?

sn	Complex Rs	$_{e}$Size	GWP	$_{e}$SA	Climate Rs	$_{e}$Size	GWP	$_{e}$SA

15. What is the underwriting capacity gap for priority complex and climatic risks in Africa?
    - What are the priority CCRs in Africa as per their size, potential number of population affected and strategic importance to the economy/development of Africa?
    - What it the estimated underwriting capacity gap? Technical/ financia ($_{e}$Size - $_{e}$SA)

16. Which ILS solutions can be used to cover the underwriting capacity gap?
    - What is the estimated size of the capital market?
      List of African countries, capital market size, GDP, GWP

sn	Country	CMs	GDP	GWP	$_{e}$SA	Prot Gap

    - What product types does capital market offer to insurance (ART/F and ILS products)?
    - Which ILS products can cover the u/w capacity gap based on:
        i. Traditional designed and used to cover CCRs eg Catbonds
        ii. Structure allow for flexibility to cater for CCRs
        iii. Possible size of ILS vs. estimated gap size of CCRs
17. How can innovation enable strategic structuring of ILS solutions to enable insuring complex and climatic risks in Africa?
    - How is ILS structure traditionally?
    - What innovation is needed to structure ILS for CCRs in Africa
        i. Innovation
        ii. Innovation framework in financial services

iii. Innovation in insurance
iv. Innovation for ILS structuring to cover CCRs in Africa

18. What is the conducive regulatory requirements for the ILS ecosystem to prosper?
    - What are the components of ILS ecosystem?
    - What are the regulatory requirements for ILS?
    - Which regulatory framework address ILS? Solvency II and ICP 13
    - What are the conditions required for ILS prosperity?
    - Which conducive regulatory conditions can enable ILS to prosper? Sandboxing, Regtech, Tax incentives, etc.
19. Overall, how would you briefly explain the move towards using ILS to enable underwriting of CCRs in Africa?
20. Is there anything you will like to add with regard to subject of our interview?

Thank you for your cooperation and responses. We will make sure to include your important inputs in this work.