

The South African Insurance Industry's Preparedness for Climate Change

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Abstract

The insurance industry is integral across various sectors and industries and is important in the economic activity of any country as it is responsible for protecting insured individuals, households and businesses against risk (Smet, 2023). Change of climate is one of the most tangible ecological issues affecting insurance companies and for insurance companies to remain viable and sustainable, they need to adapt, and adaptation takes a form of behavioural change (Webster and Clarke, 2017). The increase of disaster events in South Africa affected the insurance industry negatively across the lines of business as climate change induced natural catastrophic (Nat Cat) events result in the increase of insurance claims. The increase in disaster events resulted in SA being reclassified as a region with high Nat Cat events, which then led to insurance companies increasing rates, premium and change of terms and conditions to the insured. The findings of the investigation suggests that the South African insurance industry is well appraised and active in the climate change discussions however, the industry is reactive operationally and have not yet fully put measures to mitigate the increasing natural catastrophic (Nat Cat) losses to protect itself against the rising claims.

Keywords

Insurance Industry, Climate Change, South Africa, Natural Catastrophe, Risk Mitigation

1. Introduction

An investigation was thus commissioned by the writer to investigate the state of preparedness and readiness of the SA insurance industry for climate change. In spite of the massive losses to the insurance industry, preliminary findings indicates that the SA insurance industry is aware of climate change impact to their business. Almost 56% have already suffered significant losses due to climate change, however the overall response from the insurance industry appears to be that of not acting immediately until forced by circumstances.

The study in the SA market is significant to get the picture of what might be happening in the region as the insurance penetration in the SA market is higher in the scale. Based on the report by Deloitte (2024) in Figure 1, South Africa recorded insurance penetration rates of 11.54%, followed by Namibia with 7.41%. The SA figure is significantly higher than the 6.8% global average.

Even though the insurance penetration in SA is significantly high in comparison with other regions, it means if the insured suffers losses and only 11.54% of the insured are covered by insurance, the losses due to change in climate are more devastating and costly to the remaining 88.46% uninsured population, of which some have no immediate financial buffer to help them recover from the destruction of infrastructure, livelihood, assets, and properties.

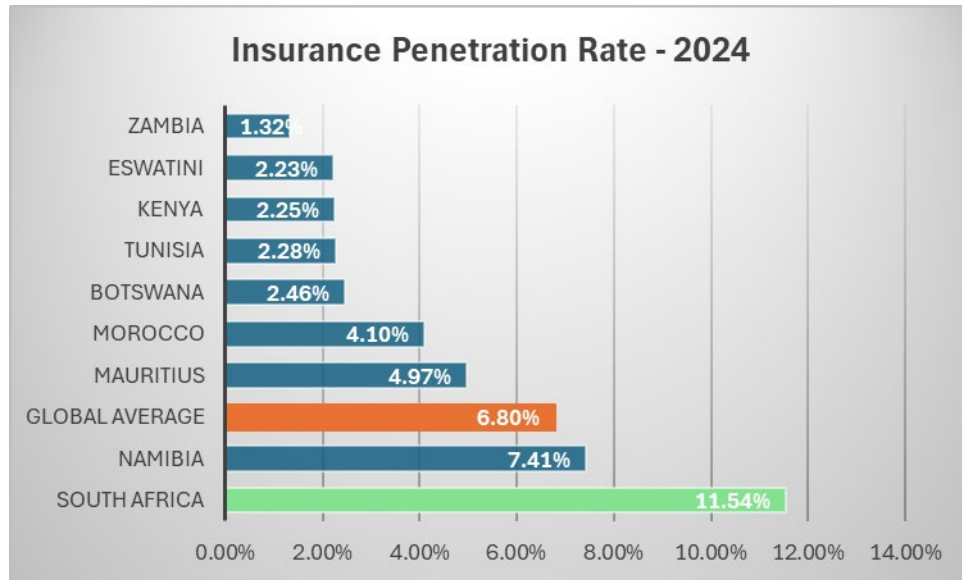


Figure 1. Deloitte – Africa Insurance Outlook 2024/2025 (Deloitte, 2024)

A climate change disaster would ordinarily compel involved parties to urgently seek ways of mitigation to limit the runaway losses, however from the outcome of this study, it was noted that even though the insurance and reinsurance industries suffered huge financial losses from Nat Cat events, when it comes to commensurate action in response to the losses, the SA insurance industry appears to be lagging in responding accordingly.

Drew (2024) observed in a survey he conducted where he was asking whether insurance company boards have approved the climate change strategy, and if there has been any mitigating action from the board decisions in response to the strategy. The outcome from the responses indicated that only 20% of the companies surveyed had implemented board approved climate change strategy, with another 50% in the process of developing one.

From the information gathered, the outcome suggests that there is a gap between the insurance industry's awareness of the changes in the risk landscape and implementation of commensurate response to reduce the gap, which then further suggest that there could be a deeper reason to be investigated on why the insurance industry appears to be more reactive rather than proactive on this subject as failure or delayed response when the pressure can still be absorbed may not hold when climate change immediate imperatives dictate how the insurance industry will be forced to respond under pressure.

The reactive approach could potentially result in a threat to the industry's future stability and sustainability, with the possible difficulty in managing increased claims from traditional and new trends of losses and insurable claims. Repercussions of stalling in responding could potentially also result in the denting of confidence that the market has in the insurance industry, and if the claims are increasingly repudiated and insurance terms and conditions continue to increase, with more exclusions and premium increases, the non-prepared and unresponsive insurance market may end up with an erosion of the growing market share that is already captured.

1.1 Problem Statement and Objectives

SA was previously classified as a Nat Cat free zone (OldMutual, 2024) and as such, there was little consideration by the SA insurance market on pricing of natural catastrophic events to their insured, however SA has increasingly been at the receiving end of frequent and intensive natural disasters occurrences such as wildfires, floods, droughts and storm, and this requires a relook on rating of risks and pricing thereof (Buthelezi, Hungwe, Mbirimi-Hungwe, & Seeletse, 2025). In addressing emerging risks, the insurance industry has always been at the forefront and currently the emerging risk is climate change, which has a far reaching effect beyond the insured (Krauss, 2024).

The key issue identified for this study and the objective of the study is that there appears to be an awareness and realisation by the insurance industry on challenges that change in climate pose to the insurance industry, however, the

urgency of the implementation of commensurate operational changes to the businesses seems not to match the urgency of the challenges identified.

Thus, in the paper, we investigate the operational readiness of the SA insurance industry for climate change and the actions taken in mitigation of the challenges brought to the industry by the changes.

2. Literature Review

2.1 the SA Financial Services Environment

Mills (2007), state that Insurance stands as the largest global industry and has the material potential to play a crucial role in decreasing the vulnerability of humans to natural hazards and systems. The business environments that the financial services sector operates in is characterised by rapid and constant change. The SA insurance industry has thus far coped and remain resilient, with little adaptation to the changes, however with the climate change in the mix, slow adaption has been weakened (Molloy & Ronnie, 2019).

Non-life insurance industry is made up of several companies, the top three being Santam Limited, Guardrisk Insurance Company Limited and Hollard, with market shares 23.8%, 9.3% and 9.1% respectively which was reported in the year 2022 that the gross written premiums was R140 billion (Danckwerts, Vosloo, & Odendaal, 2023).

Figure 2 indicates the 2022 insurance market share for the top 4 companies, who control over 50% of the market in SA. Santam controls 23.8% of the market despite negative underwriting results that were impacted by increased claim activities which included large Nat Cat events (Danckwerts, Vosloo, & Odendaal, 2023).

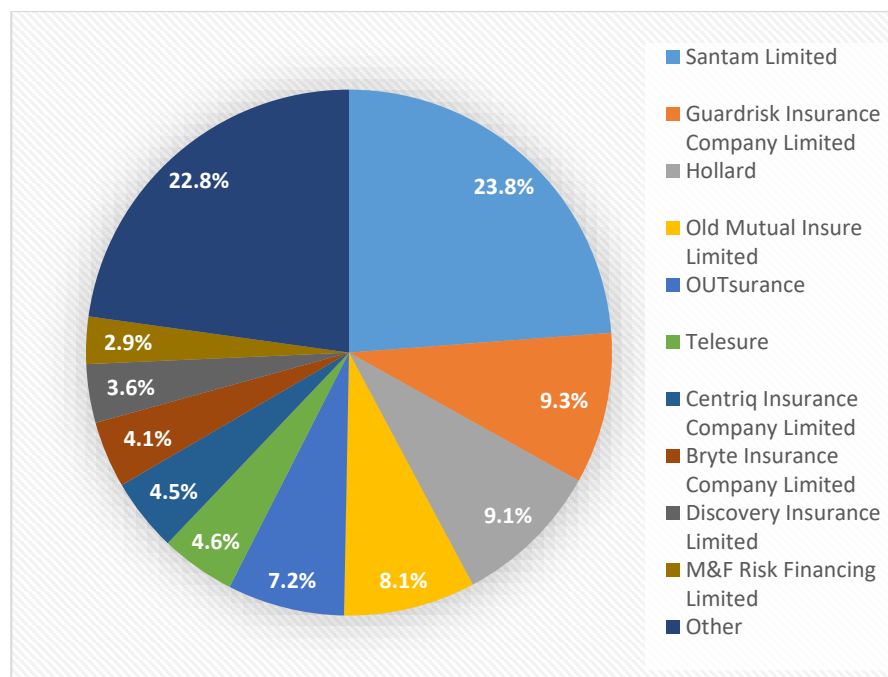


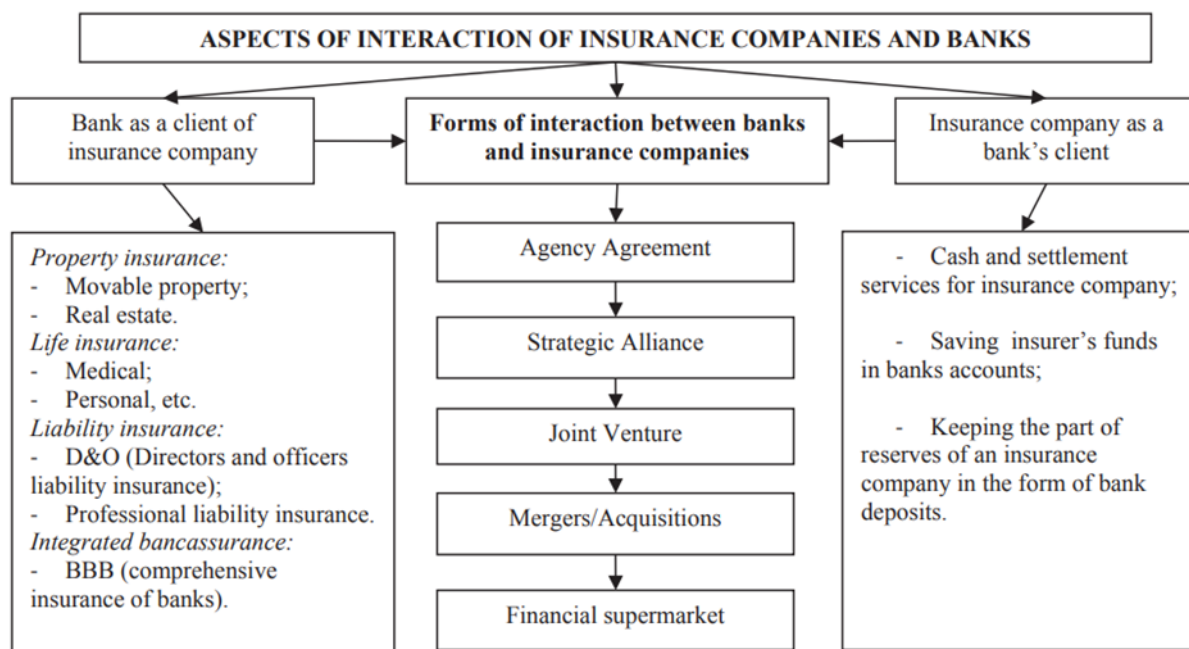
Figure 2. KPMG - The South African Insurance Industry Market Share 2022 (Danckwerts, Vosloo, & Odendaal, 2023)

In addition to insurance companies, the banking sector in SA has also generally remained resilient in-spite of the volatile economic onslaught that rocked the world banking sectors previously.

SA banks such as Nedbank, First National, Absa, and Standard have insurance divisions internally (Mosia, 2025), and there is a symbiotic interaction between insurance companies and banks as banks are clients of insurance companies and insurance companies are client of the bank.

From Table 1, information extracted is that insurance companies and the banks co share the benefits and to an extent, the detriment of climate change perils because when one sector is hit, the other will also feel the effects because of common clientele.

Table 1. Aspects of interaction of insurance companies and banks (Prikazyuk & Ganna, 2017)



According to Ehlers (2014) bank loans supply the largest share of financing infrastructure projects that insurance has interest in, and disruptions in the operations of the bank clients is likely to affect their repayments, so it is in the bank and insurance company's interest to play an active role in the risks related to change of climate, since banks and insurance have a significant part in the economy, which means their stability is important and relevant for the financial system (Gwatiringa, 2020).

2.2 Regulatory and Associate Bodies

Regulatory and associate bodies in the insurance business environment include the Financial Sector Conduct Authority (FSCA), which regulates the insurance industry (Financia Sector Conduct Authority, n.d.), the South African Insurance Association (SAIA), (South African Insurance Association, n.d.), and the Insurance Institute of South Africa (IISA) (Insurance Institute of South Africa, n.d.).

The climate change impact to the insurance sector is also of interest to these bodies as these intuitions regulate and ensure compliance with regulatory requirements related to climate risk disclosure and management (Financial Sector Conduct Authority, n.d.).

The FSCA oversight helps ensure that insurers adequately disclose climate related risks and take appropriate measures to manage those risks, fostering a more resilient financial sector to withstand climate change challenges, and this oversight aligns with international and national climate commitment and the key to contributing supports the country's objective of becoming carbon neutral by 2050 (Financial Sector Conduct Authority, n.d.).

SAIA recognises and acknowledge that shifting in weather patterns have resulted in the billions of rands cost to the insurance industry (South African Insurance Authority, 2022) and it is in their interest as a body which promotes self-regulation, best practices to ensure adherence to industry standards and climate change imperatives.

IISA as a custodian insurance knowledge can significantly broaden professional development opportunities by providing specialised training programs to enhance and advance career opportunities of the insurance practitioners (Malambo, 2023).

2.3 Climate Change Bodies

At the 26th conference of the parties (COP) Climate Summit in 2021, there was a \$8.5billion pledged by the world richest nations including the USA, France, UK, Germany and other EU countries to assist SA in transitioning from coal to cleaner energy sources between 2023 and 2027, and that would be subjected to an agreement on an investment set of rules (Presidential Climate Commission, 2022). That pledge has since been derailed by the withdrawal of the Trump administration from the Paris Agreement, as such the agreements have become harder to achieve and directly impact the poorer countries (Goldberg & McGlinchey, 2025).

Other bodies such as UNEP_FI have devised coping measures that insurers can use for climate change which can be implemented whilst working towards transitioning.

In Table 2, UNEP FI spotlights innovative and adaptive measures that started in the insurance industry as far back as 2006, showcasing a proactive approach to climate risk management. This is further evidence of a claim that the insurance industry is well appraised on the climate change subject.

Table 2. Climate Change Coping Measures used by Insurers (UNEP-FI, 2021)

Strategy	Regulatory Risk	Market Risk	Business Risk
Reduce Risk	Engage with government on building standards, land zoning, and flood defence funding	Avoid catastrophic risk like floods and withdraw from high-risk areas	Know and understand the sensitivity of new industries and locations
Correctly price risk	Seek approval to modify prices based on risk modelling	Seasonal forecast for hurricane risk. Trend allowance for climate change	Use Geographic Information System to discriminate risk
Transfer risk	Seek government backup	Reinsurance	Brokers to seek alternatives to reinsurance
Check aggregate	Stress-test exposure by disaster scenario (rating agencies, licensing authorities)	Internal capital-rationing (risk based capital)	Consider asset – liability correlation
Control loss	Defend actions that seek to expand coverage	Contingency planning pre-event deployment	Advance techniques for subsidence repairs
Diversify risk base	Open new markets e.g. rainfall insurance and reinsurance	Multiline insurance portfolio	Reinsurers to mine data to exploit new markets

2.4 Climate Change Impact to Insurance

The insurance industry, which inherently deals with risk, is highly impacted by climate change and this impact affects its sustainability and stability financially and the impact is also felt by the risk sharing service insurance provides (Noy, 2024). Continued industrialisation and economic activity which causes pollution (Voumik & Sultana, 2022) affect the insurance industry's commitment to net zero targets.

Indirect contribution to emissions comes from managing portfolio that are produced from investments into the coal and gas mining industries, so to make a significant dent in achieving carbon neutrality, investment firms with big pockets need to actively promote a green energy transition in their sectors while at the same time reducing or stopping the funding of harmful industries (Dawson, Dargusch, & Hill, 2022).

When insurance firms experience frequent natural disasters losses, they mitigate by adjusting the rates upwards, leading to loss ratios in the non-catastrophe years following a catastrophe to be lower than they were before, which can add to increased profitability (Born & Viscusi, 2006).

The escalating trend within the SA experience is a shift in its risk profile that stems from the fact that historically SA was considered a low catastrophe risk region, however, SA has faced large loss events, including severe flooding in KwaZulu Natal in April 2022, that resulted in a loss of more than 450 lives with insured damage and losses to assets estimated to have exceeded R15 billion, which is more likely to be repeat in future (Stokes, 2022).

Climate change poses major financial threat to sectors such as transport, health, construction, tourism and agriculture, with the value of damages in the billions of dollars, and this can drastically affect the viability of the industry generating costly insurance claims and also impacting the asset values (Nhamo, 2014).

Big losses to insurers are also shared by reinsurers, who do not regard SA as a low catastrophe risk region anymore, with the country having experienced a high frequency of large loss events and this invariably affect pricing of the risk (BusinessTech, 2018).

Submission from Buthelezi, et.al (2025) from their study on impact of change of climate on non-life insurance in SA suggest that insurers need to start rating for climate change risks in their premium covers to be able to withstand the severity of natural disaster risk events as this might help them to sustain their profit margins and improve the insurers' banks stability, stock market returns and international lending.

Even though there is resistance for policymakers to include climate change events in premium ratings due to fear of overpricing or under-pricing of products, new mathematical methods such as artificial intelligence and machine learning can assist in mitigating such risk (Buthelezi, Hungwe, Mbirimi-Hungwe, & Seeletse, 2025).

2.5 Coal Phaseout

When fossil fuels like natural gas, coal, and oil are burnt, there is an emission to the atmosphere of large amounts of carbon dioxide, which leads to a changing of climate and the negative effects of fossil fuel burning include degradation of the land, water pollution, and ocean acidification (Taylor, 2021).

The SA experience though, according to the 2022 Council for Scientific and Industrial Research (CSRI) report, state that coal still dominate and provide about 80% of electricity generated in South Africa (Pierce & Roux, 2022). It also emerged that insurance companies are increasingly putting a restriction on providing cover for gas, oil, and coal projects (Harris, 2022).

The repercussion of phasing out coal in SA will extend beyond the insurance sector and impact the entire value chain both within and outside the industry, and there is a concern that rapid disinvestment from coal will affect coal fired power stations, and could lead to stranded assets, which is infrastructure no longer generating economic return, potentially harming the country's economic stability (Hillenbrand-Saponar & Garatti, 2018).

2.6 Environmental, Social, Governance (ESG)

ESG risks have emerged as an area of increased strategic importance for international insurers and increased awareness and readily available information on key sustainability trends among regulators, investors and consumers, are of increasing importance to insurance regulators, investors and customers worldwide (Moody's Investor Services, 2019). Information extracted from Figure 3 extracted from the (Capital Group, 2023) indicates the regional variation in terms of ESG adoption. The African region appears to have adopted ESG and even without reference to corporate SA, ESG matters have been in the forefront of business decisions. A lower percentage of scepticism still exist in the ESG subject and that was also evidenced by a reduction from 79% in 2022 to 75% in 2023 in the North American region also due to the passing of laws and implementation of rules that increased scrutiny and change of approach by the US respondents (Capital Group, 2023).

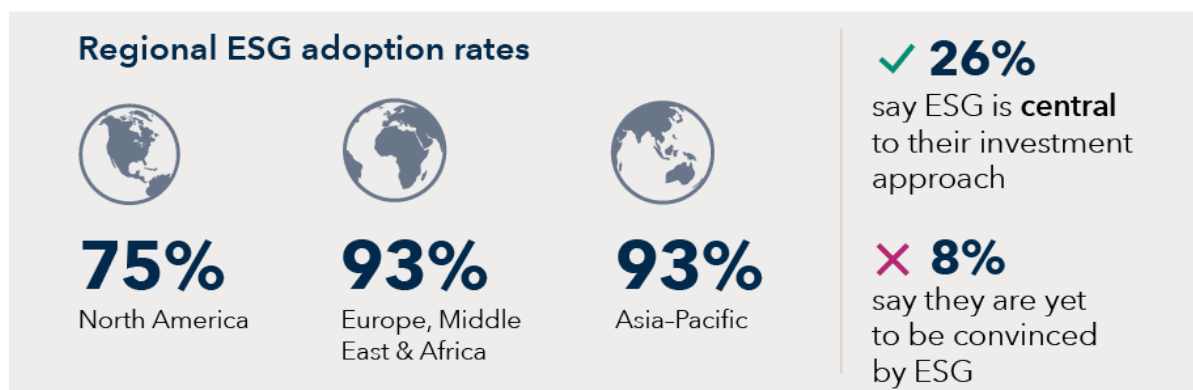


Figure 3. Regional ESG Adoption Rates (Capital Group, 2023)

King IV (2021) states that the governing body delegates to and exercises oversight over management, but cannot abdicate accountability and responsibility for responding to climate change, and that there should be full and clear management accountability for the climate-related performance of the organization, and that performance management should also include targets related to sustainability, and ESG matters, including climate change, and remuneration linked to the achievement thereof.

According to the Principles for Sustainable Insurance (PSI) developed by the United Nations Environment Program (UNEP), proactive measures should be taken by the insurance industry to mitigate ESG risks, posed by change of climate (Mendoza & Dai, 2023).

3. Research Method

The method of research employed was by using online data collection method by sending questionnaire to practitioners in the risk and insurance sector, who were selected based on their specific functions involving climate change risks and in addition their expertise, experienced and knowledgeable on climate change risk and insurances was a prerequisite for selection of the panel of potential respondents. This segmentation narrowed the sample to senior professionals in the risk and insurance sector with the understanding of insurance and climate change, which included underwriters, brokers, and risk consultants. The questionnaire was developed to guide data collection, and to extract both explicit and implicit information.

3.1 Methodology Type

Methodology type used was, as Patton (2015) states, qualitative research which aims to generate or test theory and contribute to knowledge, furthermore Creswell and Poth (2018) argue that qualitative research begins with assumptions and the use of interpretive/theoretical frameworks that inform the study of research problem.

3.2 Sampling Method

Suri (2011) mentions that purposeful sampling requires access to key informants in the field of study, and as alluded by Munzhelele (2022), the insurance practitioners that are specifically focussed on climate change are niche, as such professionals with average of fifteen years of experience in the industry were selected for this study. These practitioners were contacted in the insurance, reinsurance, risk consultancy, and insurance and reinsurance brokers. A response rate of just over 80% was achieved. The criteria used to select participants in the research include the functions they render in the business, organisational position / level of influence, knowledge and understanding of the SA insurance industry, and the number of years of experience in the sector.

3.3 Significance of the Work

Abraham (2024) state that an increase in the frequency and severity of natural disasters and the shift in the risk landscape has significantly increased the cost of insurance and reinsurance in SA. Buthelezi, et al., 2025, reiterated that SA is at the receiving end of increase in frequency and intensity of natural disasters such as floods, droughts, storm and wildfires, and this situation requires a relook into how this risk is rated and priced.

This work is thus significant and worth noting in consideration of the impact that climate change has to insured entities and to have commensurate operational strategies to deal with the operational changes brought by climate change.

The findings are essential and relevant for the understanding of how the insurance industry can ensure its sustainability and the continuity of industries and clients they insure, and the findings can further provide pointers for the development and actioning of commensurate measures in mitigation of the changes brought by climate change to the insurance industry.

4. Research Objectives

The study arises from an observation of the apparent gap between the SA insurance industry's awareness of climate change risks and implementation of commensurate strategic and operational responses in mitigation.

The insurance industry's current response appears not to be matching the escalation and frequency of severe climate related natural catastrophic events, suggesting that the insurance industry's response is reactive and potentially insufficient in addressing perils that pertain to changes in the climate, which can affect the short and long term impact to the country's insurance industry.

The specific research objectives are:

- o To examine how the insurance industry in SA responds to an increasing occurrence of natural catastrophic events and the change in climate.
- o To assess whether the existing underwriting, risk management and operational response is commensurate with the frequency and severity of the risk confronting the insurance industry.
- o To probe the external stakeholder on their opinions, perspectives and their overall view regarding climate change induced variations and their understanding of implications for the insurance sector.
- o To gauge the preparedness level and readiness of the insurance industry in terms of product offerings, human resources, and the administrative responses to climate change risks.

5. Results and Discussions

The findings from both literature review and the questionnaire suggest that the awareness and action gap does exist, and that the insurance industry runs a risk of having to be reactive rather than proactively driving the insurance industries response to the change. The following findings emerged from the study;

- a) Strategically and operationally, there appears to be a proactive effort by the insurance industry to develop insurance products in mitigation of climate change risks and by so doing, they are safeguarding the sustainability of the insurance industry.
- b) Almost a third insurance companies sampled do not put specific focus on KPI's across the ESG element.
- c) The responsibility of climate change agenda enjoys support across all sectors of the insurance organisations, from the board of directors, executive committees, and several strategic levels departments, including individual employees.
- d) The insurance industry is matching their plans with tangible commitments to achieve carbon neutrality. This commitment is shown by the adoption of key strategic interventions which include introduction of directives to phase out thermal coal, setting up carbon steering levy, green investment targets and carbon-net zero program and actively focussing on green energy solutions.
- e) Over 80% of the respondent's state that risks posed by low carbon drive will affect their businesses financially, with over half having suffered significant losses due to change of climate and as a result they had to revise their risk appetite for this line of business.
- f) In spite of the losses, over two thirds of the respondents indicated that climate change line of business is commercially viable for their business as such, over 80% of the respondents are revising their product offering to accommodate a full climate change portfolio and with the revision of product offering, updated policies have resulted in a change in terms and conditions of cover.
- g) A move to phase out coal and increase renewable power resulted in insurance capacity constraints, however, over 60% of companies surveyed have no intentions to exit the coal industry market yet.
- h) The insurance market, which include brokers up to the insured, received and understood the changes in insurance offering especially with international pressure mounting to embrace renewable energy risk in the insurance business portfolio.
- i) 94% of respondents consider climate change as niche that requires specialist skillset and over two thirds of the respondents report that their companies have allocated specific human resources to focus on climate change skill allocation in addition to other special skills and competencies that will be relevant to new portfolio. It is also reported that 78% of respondents have received training to deal with climate change risks. With regards to succession planning, over 60% of respondents report to have planned for the next generation of personnel competent in climate change risks.
- j) 78% of companies have adequate IT infrastructure with over 60% of the companies having procured additional specific tools such as pricing, risk assessment, and claims tools to accommodate climate change related risks, and only fifty percent are fully IT resourced for climate change risks.
- k) The insurance industry players are experiencing internal and external pressure to align with the prevailing climate change position however less than 30% are engaged with any of the advocacy group that deal with climate change and a third is also engaging dissident groups to consider their views and opinions in the climate change topic.
- l) Two thirds of the respondents are of opinion that public awareness on climate change is inadequate, as such companies are collaborating to come up with initiatives to provide training and engagement with the public using social media and by authoring articles in publications directed to the public for awareness.

5.1 Limitations

Constraints identified in this dissertation include;

- a) Insurance classes are classified under specific lines of business by different companies and even though climate change is topical in the insurance businesses, the sample size is still low to conclusively deduce the overall sentiments of the sector.
- b) The study commenced at the height of Covid19 pandemic, where there were several limitations of access to participants and the overall mood and morale in the business mindset was a bit low mainly due to the impact of the pandemic, which affected the outcome of the research.
- c) Ethical limitations also played a part as some crucial data was said to be confidential and consent to share data was not granted or limited in some companies.
- d) Since the study was focussed on the South African market, data limitations on the topic of climate change with reference to the insurance industry also contributes to the study's outcome.

6. Conclusion

The insurance sector is well appraised and active in the climate change subject however the industry is largely still reactive in operational measures because the motivation to abandon fossilised fuels, which are the main source of electrical energy in South Africa is not yet too stringent and practical yet.

With a rude and unexpected migration from a Nat Cat benign region to a now definite Nat Cat exposed region, there appears to be a noticeable gap between the SA insurance industry operational preparedness and being proactive in strategies to deal with climate change environment.

The acknowledgement of climate change impact to the industry emerged from the study, however the awareness is not fully backed up by an urgent need to respond accordingly. A less urgent 'wait and see' or at times 'knee jerk' reaction just to mitigate risk as they present themselves seems to be the norm, rather than being proactive in all areas of climate change risk management.

There is also a concern with skills shortage and a slow pace in upskilling practitioners with relevant technical understanding of this niche line of business.

The insurance industry appears to be rather tardy in improving information technology infrastructure to accommodate climate change portfolio.

On a positive side, some progress has been made in terms of addressing the risks by continuously relooking into changing of terms and conditions of insurance to accommodate climate change risk, even though the progress is still in early stages. To add to the urgency of terms and condition changes, the pressure of capacity constraints is also pushing for more alignment of the terms and conditions in line with the changes in the local and global insurance industry.

It is also commendable that the insurance industry has demonstrated resilience especially with increasing claims from climate change perils. Even at a limited niche competency availability, the industry has managed to manoeuvre this uncharted territory quite impressively.

This situation requires a proactive response from the insurance industry, not only in theory but also in action. The findings indicate a healthy environment of knowledge and understanding of the situation however there is a deficiency in taking commensurate action in alignment with what the theory suggests, and that is if the industry does not act decisively, the evolving climate change losses will continue to wreak havoc in the industry which will threaten the insurance industry and associated sectors sustainability.

References

- Abnett, K., Summer 2024 was world's hottest on record, EU climate change monitor says. Reuters, September 06, 2024. Retrieved from <https://www.reuters.com/business/environment/summer-2024-was-worlds-hottest-record-eu-climate-change-monitor-says-2024-09-06/>
- Abraham, S., How climate change is impacting insurers. Old Mutual, 2024. Retrieved from <https://www.oldmutual.co.za/news/how-climate-change-is-impacting-insurers/>
- Absa Group Limited, Net-zero announcement. Absa Group Limited, May 24, 2023. Retrieved from <https://www.absa.co.za/media-centre/press-statements/2023/net-zero-announcement/>

- Agence France-Presse, Britain runs coal power stations amid energy crisis. France24, 2021. Retrieved from <https://www.france24.com/en/live-news/20210923-britain-runs-coal-power-stations-amid-energy-crisis>
- Ahmed, J., Mrugalska, B., & Akkaya, B., Agile Management and VUCA 2.0 (VUCA-RR) During Industry 4.0, 2022. DOI: <https://doi.org/10.1108/978-1-80262-325-320220002>
- Allianz Commercial, Allianz Risk Barometer, 2024. Retrieved from <https://commercial.allianz.com/content/dam/onemarketing/commercial/commercial/reports/Allianz-Risk-Barometer-2024.pdf>
- Attari, S. Z., Krantz, D. H., & Weber, E. U., Climate change communicators' carbon footprints affect their audience's policy support. Climatic Change, 2019. DOI: <https://doi.org/10.1007/s10584-019-02463-0>
- Badias, J.-F., 'Necessary evil': France refires coal plant amid energy woes. Associated Press, 2022. Retrieved from <https://apnews.com/article/europe-business-france-climate-and-environment-government-politics-1d16e1c1cb53fef03a2a77a437f8410e>
- Baker, D. N., What is the main purpose of data collection? Savanta, September 9, 2023. Retrieved from <https://savanta.com/us/knowledge-centre/view/what-is-the-main-purpose-of-data-collection/>
- Bischof-Niemz, T., & Creamer, T., South Africa's Energy Transition - A Roadmap to a Decarbonised, Low-cost and Job-rich Future. Routledge, 2019.
- Born, P., & Viscusi, W. K., The catastrophic effects of natural disasters on insurance markets. Journal of Risk and Uncertainty, 33(1–2), pp. 55–72, 2006. DOI: <https://doi.org/10.1007/s11166-006-0171-z>
- Botzen, W. J., Deschenes, O., & Sanders, M., The economic impacts of natural disasters: A review of models and empirical studies. Review of Environmental Economics and Policy, 13(2), pp. 167–188, 2019. DOI: <https://doi.org/10.1093/reep/rez004>
- BusinessTech, South Africa no longer considered a low catastrophe risk country: expert. BusinessTech, January 30, 2018. Retrieved from <https://businesstech.co.za/news/finance/222027/south-africa-no-longer-considered-a-low-catastrophe-risk-country-expert/>
- BusinessTech, South African insurers are shooting themselves in the foot. BusinessTech, 2024. Retrieved from <https://businesstech.co.za/news/finance/771000/south-african-insurers-are-shooting-themselves-in-the-foot/>
- Buthelezi, S. J., Hungwe, T., Mbirimi-Hungwe, V., & Seeletse, S. M., Climate adaptation and insurance resilience. Edelweiss Applied Science and Technology, 9(4), pp. 856–868, 2025. DOI: <https://doi.org/10.55214/25768484.v9i4.6125>
- Capgemini Research Institute, Walking the talk: Sustainable transformation report, 2022. Retrieved from <https://www.capgemini.com/gb-en/wp-content/uploads/sites/5/2022/08/Walkingthetalk.pdf>
- Capital Group, How are style and inflation risks influencing ESG investors? Capital Group, October 9, 2023. Retrieved from <https://www.capitalgroup.com/intermediaries/gb/en/insights/articles/how-are-style-and-inflation-risks-influencing-esg-investors.html>
- Clemons, K., Preparing for Climate Change: Insurance and Small Business. The Geneva Papers on Risk and Insurance - Issues and Practice, 33(3), pp. 478–485, 2008. DOI: <https://doi.org/10.1057/palgrave.gpp.2510160>
- Copernicus Climate Change Service, C3S data for climate action, 2024. Retrieved from <https://climate.copernicus.eu/c3s-data-climate-action>
- Creswell, J. W., & Poth, C. N., Qualitative Inquiry & Research Design. SAGE Publications, 2018.
- Danckwerts, M., Vosloo, B., & Odendaal, T., The South African Insurance Industry Survey. KPMG, 2023. Retrieved from <https://assets.kpmg.com/content/dam/kpmg/za/pdf/insurance-survey-2023.low%20res.sml.pdf>
- Dawson, C., Dargusch, P., & Hill, G., Assessing how big insurance firms report and manage carbon emissions: A case study of Allianz, 2022. Retrieved from https://www.researchgate.net/publication/358776032_Assessing_How_Big_Insurance_Firms_Report_and_Manage_Carbon_Emissions_A_Case_Study_of_Allianz
- Deloitte, Africa Insurance Outlook 2024–2025. Deloitte, 2024. Retrieved from <https://www.deloitte.com/za/en/Industries/insurance/perspectives/africa-insurance-outlook-2024-2025.html>
- Department of Forestry, Fisheries and the Environment, Welcome to the Department of Forestry, Fisheries and the Environment. Retrieved from <https://www.dffe.gov.za/>
- Drew, A., South African insurance industry climate progress. Milliman, 2024. Retrieved from <https://za.milliman.com/en-GB/insight/south-african-insurance-industry-climate-progress>
- Ehlers, T., Understanding the challenges for infrastructure finance. BIS Working Papers, No. 454, 2014. Retrieved from <https://www.bis.org/publ/work454.pdf>
- Eliot Partnership, The climate talent crunch: How climate change is reshaping hiring in the insurance industry, 2025. Retrieved from <https://eliotpartnership.com/news-insights/the-climate-talent-crunch-how-climate-change-is-reshaping-hiring-in-the-insurance-industry/>

FANews, Severe weather trends could leave more consumers out in the cold as insurance protection gap widens. FANews, April 17, 2024. Retrieved from <https://www.fanews.co.za>

Giger, P., Climate change will be sudden and cataclysmic. We need to act fast. World Economic Forum, January 19, 2021. Retrieved from <https://www.weforum.org/stories/2021/01/climate-change-sudden-cataclysmic-need-act-fast/>

Goldberg, M., & McGlinchey, D., What President Trump's executive order does—and does not—mean for federal and international climate action. Woodwell Climate Research Center, 2025. Retrieved from <https://www.woodwellclimate.org/us-withdrawal-paris-agreement/>

Gupta, A., & Venkataraman, S., Insurance and climate change. *Current Opinion in Environmental Sustainability*, 67, 101412, 2024. DOI: <https://doi.org/10.1016/j.cosust.2023.101412>

Harris, T., With new coal uninsurable, insurers start to move on oil and gas. Greenpeace Africa, 2022. Retrieved from <https://www.greenpeace.org/africa/en/press/52476/with-new-coal-uninsurable-insurers-start-to-move-on-oil-and-gas/>

Haueter, N. V., Reinsurance Function and Market. *Oxford Research Encyclopedia of Economics and Finance*, 2020. DOI: <https://doi.org/10.1093/acrefore/9780190224851.013.268>

Jewkes, R., Gibbs, A., Mkhwanazi, S., Zembe, A., Khoza, Z., Mnandi, N., et al., Impact of South Africa's April 2022 floods on women and men's lives and gender relations in low-income communities: A qualitative study. *SSM - Mental Health*, 4, 100255, 2023. DOI: <https://doi.org/10.1016/j.ssmmh.2023.100255>

King-IV, Responsibilities of governing bodies in responding to climate change. Guidance Paper, 2021. Retrieved from https://cdn.ymaws.com/www.iodsa.co.za/resource/collection/04630F89-33B7-43E7-82B3-87833D1DC2E3/King_Committee_Guidance_paper_on_the_responsib.pdf

KPMG, The South African Insurance Industry Survey. KPMG, 2024. Retrieved from <https://assets.kpmg.com/content/dam/kpmg/za/pdf/2024/Insurance%20Survey%202024.med%20resf.pdf>

Krauss, A., The insurance implications of climate change. *Living with Climate Change*, pp. 345–360, 2024. DOI: <https://doi.org/10.1016/B978-0-443-18515-1.00024-1>

LeBlanc, P. J., Higher Education in a VUCA World. *Change: The Magazine of Higher Learning*, 50(3–4), pp. 82–89, 2018. DOI: <https://doi.org/10.1080/00091383.2018.1507370>

Lineman, M., D, Y., Kim, J. Y., & Joo, G.-J., Talking about Climate Change and Global Warming. *PLOS ONE*, 10(9), e0138996, 2015. DOI: <https://doi.org/10.1371/journal.pone.0138996>

Lipton, M., Wachtell, L., & Katz, R., The Friedman Essay and the True Purpose of the Business Corporation, 2020. Retrieved from <https://corpgov.law.harvard.edu/2020/09/17/the-friedman-essay-and-the-true-purpose-of-the-business-corporation/>

Liu, N., & Zhang, F., Urban green spaces and flood disaster management: Toward sustainable urban design. *Frontiers in Public Health*, 2025. DOI: <https://doi.org/10.3389/fpubh.2025.1583978>

Mendoza, M. G., & Dai, B., The insurance industry's adaptation practice to climate change. *The Journal of Applied Research and Practice*, 2023. DOI: <https://doi.org/10.34074/rere.00311>

Mills, E., Synergisms between Climate Change Mitigation and Adaptation: An Insurance Perspective. *Mitigation and Adaptation Strategies for Global Change*, 12(5), pp. 809–842, 2007. DOI: <https://doi.org/10.1007/s11027-007-9101-x>

Mills, E., A Global Review of Insurance Industry Responses to Climate Change. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 34(3), pp. 323–359, 2009. DOI: <https://doi.org/10.1057/gpp.2009.14>

Monnin, P., Sikhosana, A., & Singh, K., Transition and systemic risk in the South African banking sector: Assessment and macroprudential options. South African Reserve Bank, 2024. Retrieved from <https://www.resbank.co.za/content/dam/sarb/publications/working-papers/2024/transition-and-systemic-risk-in-the-south-african-banking-sector-assessment-and-macroprudential-options.pdf>

Moody's Investor Services, The impact of environmental, social and governance risks on insurance ratings, 2019. Retrieved from https://www.eticanews.it/wp-content/uploads/2019/07/Insurance_fullreport.pdf

MunichRe, Severe thunderstorms and flooding drive disaster losses in first half of 2024. *PreventionWeb*, August 1, 2024. Retrieved from <https://www.preventionweb.net/news/severe-thunderstorms-and-flooding-drive-disaster-losses-first-half-2024>

Murphy, R., What is undermining climate change mitigation? How fossil-fuelled practices challenge low-carbon transitions. *Energy Research & Social Science*, 108, 103390, 2024. DOI: <https://doi.org/10.1016/j.erss.2023.103390>

Nhamo, G., Breakthrough: Corporate South Africa in a Green Economy. HSRC Press, 2014.

- Noy, I., Increasing climate change losses and insurance industry financial stability. Green Central Banking, December 10, 2024. Retrieved from <https://greencentralbanking.com/2024/12/10/increasing-climate-change-losses-insurance-industry-financial-stability/>
- Oosthuizen, M., Vollenhoven, T., & Molala, R., The insurance sector's contribution towards a green economy, 2022. Retrieved from <https://inseta.org.za/wp-content/uploads/2024/03/Green-Economy-Research-Report.pdf>
- Palmié, M., Wincent, J., Parida, V., & Caglar, U., The evolution of the financial technology ecosystem: An introduction and agenda for future research on disruptive innovations in ecosystems. *Technological Forecasting & Social Change*, 151, 119779, 2020.
- Patton, M. Q., *Qualitative Research & Evaluation Methods*. Sage Publications, 2015.
- Pierce, W., & Roux, M. L., Statistics of utility-scale power generation in South Africa. CSIR, 2022. Retrieved from <https://www.csir.co.za/sites/default/files/Documents/Statistics%20of%20power%20in%20SA%202022-CSIR-%5BFINAL%5D.pdf>
- Prikazyuk, N., & Ganna, O., The impact of cooperation between insurers and banks on the development of the insurance system. *Baltic Journal of Economic Studies*, 3(2), pp. 121–127, 2017.
- PWC, Building climate resilience: Insurers can guide the way. Retrieved from <https://www.pwc.com/us/en/industries/financial-services/library/climate-risk-and-insurance.html>
- Reavis, M. W., *Insurance: Concepts and Coverage*. Friesen Press, 2012.
- Reinsurance News, Climate is single biggest opportunity for re-insurers: John Neal. *Reinsurance News*, 2021. Retrieved from <https://www.reinsurancene.ws/climate-is-single-biggest-opportunity-for-re-insurers-john-neal/>
- Rosenberg, E., Lotz-Sisitka, H. B., & Ramsarup, P., The green economy learning assessment South Africa: Lessons for higher education, skills and work-based learning. *Higher Education, Skills and Work-Based Learning*, 8(4), pp. 398–408, 2018. DOI: <https://doi.org/10.1108/HESWBL-03-2018-0041>
- Santam, Integrated Reports, 2022. Retrieved from <https://www.santam.co.za/investor-centre/integrated-reports/>
- Scott, M., & Lindsey, R., What's the hottest Earth's ever been? NOAA Climate.gov, 2023. Retrieved from <https://www.climate.gov/news-features/climate-qa/whats-hottest-earths-ever-been>
- Smet, B. D., Five ways insurance can stabilise an unstable world. World Economic Forum, 2023. Retrieved from <https://www.weforum.org/stories/2023/01/five-ways-insurance-can-stabilise-an-unstable-world-wef23/>
- Sood, K., & Ercan, Ö., A systematic review of ESG in the insurance industry: Navigating the path to sustainability. *International Journal of Sustainable Development and Planning*, 19(3), pp. 901–914, 2024. DOI: <https://doi.org/10.18280/ijstdp.190301>
- Swiss Re Institute, Sigma 3/2023 - World Insurance, 2023. Retrieved from <https://www.swissre.com/institute/research/sigma-research/sigma-2023-03.html>
- Task Force on Climate-related Financial Disclosures, Recommendations of the Task Force on Climate-related Financial Disclosures, 2017. Retrieved from <https://assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf>
- The Presidency, Just Energy Transition Implementation Plan 2023–2027. Pretoria, 2023. Retrieved from <https://www.stateofthenation.gov.za/assets/downloads/JET%20Implementation%20Plan%202023-2027.pdf>
- Trading Economics, South Africa - Insurance Company Assets to GDP. Trading Economics, 2024. Retrieved from <https://tradingeconomics.com/south-africa/insurance-company-assets-to-gdp-percent-wb-data.html>
- Trisos, C., Adelekan, I., Totin, E., Ayanlade, A., Efitre, J., Gameda, A., et al., Africa. In *Climate Change 2022: Impacts, Adaptation, and Vulnerability*, 2022. DOI: <https://doi.org/10.1017/9781009325844.011>
- United Nations Climate Change, The role of the insurance industry in unlocking capital, 2024. Retrieved from <https://unfccc.int/event/ilab-finance-the-role-of-the-insurance-industry-in-unlocking-capital>
- United Nations Framework Convention on Climate Change, The Paris Agreement, 2016. Retrieved from https://unfccc.int/sites/default/files/resource/parisagreement_publication.pdf
- Voumik, L. C., & Sultana, T., Impact of urbanization, industrialization, electrification and renewable energy on the environment in BRICS: Fresh evidence from novel CS-ARDL model. *Heliyon*, 8(11), e11457, 2022. DOI: <https://doi.org/10.1016/j.heliyon.2022.e11457>
- Webster, A. J., & Clarke, R. H., Insurance companies should collect a carbon levy. *Nature*, 549, pp. 152–154, 2017. DOI: <https://doi.org/10.1038/549152a>
- Witkowska, J., Stakeholders on the insurance market. *Olsztyn Economic Journal*, 9(3), pp. 215–223, 2014.
- World Bank, Eskom Just Energy Transition Project in South Africa. World Bank, June 5, 2023. Retrieved from <https://www.worldbank.org/en/news/factsheet/2023/06/05/factsheet-eskom-just-energy-transition-project-in-afe-south-africa>

World Bank Group, World Bank approves financing to lower South Africa's greenhouse gas emissions and support a just transition. World Bank Group, November 4, 2022. Retrieved from <https://www.worldbank.org/en/news/press-release/2022/11/04/world-bank-approves-497-million-in-financing-to-lower-south-africa-s-greenhouse-gas-emissions-and-support-a-just-transit>

World Resources Institute, South Africa's climate commitment much more ambitious than before. World Resources Institute, 2021. Retrieved from <https://www.wri.org/news/statement-south-africas-climate-commitment-much-more-ambitious>

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