Research Paper Submitted to the Research Competition of the Tenth International Aqaba Conference 2025

The Impact of The Emerging Technology Risks on The Performance of Insurance Companies

Proposed Topic:

How would Arab insurance industry address the risks posed by key emerging technologies and their respond towards capitalizing on its opportunities to achieve their governments' goals for Vision 2030?

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بسم الله الرحمن الرحيم

وَكَانَ أَبُوهُمَا صَالِحًا

(سورة الكهف - الآية 82)

وَأَنْ لَيْسَ لِلإِنسَانِ إِلَّا مَا سَعَى*وَأَنَّ سَعْيَهُ سَوْفَ يُرَى * ثُمَّ يُجْزَاهُ الْجَزَاءَ الأَوْفَى

(سورة النجم _ الآية 39: 41)

وَقُل رَّبِّ أَدْخِلْنِي مُدْخَلَ صِدْقٍ وَأَخْرِجْنِي مُخْرَجَ صِدْقٍ وَاجْعَل لِّي مِن لَّدُنكَ سُلْطَانًا نَّصِيرًا

(سورة الأسراء _الآية 80)

فَقَالَ رَبِّ إِنِّي لِمَا أَنْزَلْتَ إِلَيَّ مِنْ خَيْرٍ فَقِيرٌ

(سورة القصص_ الآية 24)

وَمَا أُوتِيتُم مِّنَ الْعِلْمِ إِلَّا قَلِيلًا

(سورة الإسراء_ الآية85)

وَاجْعَلْنَا لِلْمُتَّقِينَ إِمَامًا

(سورة الفرقان_ الآية74)

وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

(سورة التوبة_ الآية105)

وَمَنْ يَتَّقِ اللَّهَ يَجْعَلْ لَهُ مَخْرَجًا * وَيَرْزُقْهُ مِنْ حَيْثُ لَا يَحْتَسِبُ

(سورة الطلاق_ الآية2: 3)

من هدى السنة النبوية الشريفة

قال رسول الله صلّى الله عليه وسلّم: (من سلَكَ طريقًا يبتغي فيهِ علمًا سلَكَ اللهُ بِهِ طريقًا إلى الجنَّةِ وإنَّ الملائِكةَ لتضعُ أجنحتَها رضاءً لطالبِ العلمِ وإنَّ العالمَ ليستغفرُ لَهُ من في السَّمواتِ ومن في الأرضِ حتَّى الحيتانُ في الماءِ وفضلُ العالمِ على العابدِ كفضلِ القمرِ على سائرِ الكواكبِ إنَّ العلماءَ ورثةُ الأنبياءِ إنَّ الأنبياءَ لم يورِّثوا دينارًا ولا درْهمًا إنَّما ورَّثوا العلمَ فمَن أخذَ بِهِ فقد أخذَ بحظٍّ وافرٍ)

Researcher's Declaration

I, the undersigned hereby declare that this study submitted is entirely my own work, composed in my own words for the purpose of participating in *The Tenth International Aqaba Conference 2025 Research Competition.*

I confirm that all references consulted during the research process have been properly acknowledged, with all quotations, diagrams and figures accurately referenced and appropriately credited based on *Harvard Style*

Moreover, I affirm that this work is original and has not been published or submitted in any form elsewhere. I fully recognize the ethical responsibilities associated with conducting and presenting research, and I have adhered to these principles throughout the process.

I hope that this submission aligns with the expectations and criteria set by the Judging Committee.

Thank you for your time and consideration.

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Abstract

This research explores the recent emerging technological advancements and its associated risks in the Arab insurance industry, focusing on integrating sustainable insurance model with other industries towards achieve SDGs, ESG, and Vision 2030 goals particularly in Egypt, Saudi Arabia, and UAE.

The research also explores technological emerging risks including their influence on insurance companies' performance and their adverse impact on the KPIs. This analysis is supported by an extensive literature review for the practical and academic references, articles, figures, and exhibits to provide comprehensive insights by addressing successful case studies from global insurers AXA, Allianz, Ping An and Arab insurers ADNIC, Tawuniya, GIG showcasing their strategies to mitigate such technological risks and utilization it.

The research methodology adopts an Analytical-Descriptive approach, utilizing a diverse range of sources, including books, studies, and articles, all cited in Harvard style. In addition, interviews were conducted with top executives' level from various stakeholders of Arab insurance industry. A survey questionnaire was distributed to a sample of 500 individuals across various job levels, conducted between November 2024 and early January 2025.

The results, analysed by using SPSS, reveal that there were no significant differences between the opinions of the researcher and the participants on most aspects of the 30 research's questions. However, notable variance was observed in responses to two questions: *"How can emerging technology risks influence insurers' performance and KPIs?" and "How can reforms and recommendations mitigate technological risks in the insurance industry?"* These differences are attributed to the diversity in participants' experience level and educational backgrounds.

Several challenges were encountered during the study, including concerns over cyber-attacks that threatened the security of the google form digital questionnaire link or QR code, preferring consideration of paper forms as an alternative. Another challenge was the lack of region-specific reports on technological risks and their impact within the Arab insurance industry.

Ultimately, the research proposes reforms and strategies aimed at addressing emerging technology risks, with a focus on contributing to the achievement of Vision 2030 goals and fostering a green economy. Additionally, the research provides an outlook on the future of the Arab insurance industry over the next decade.

Keywords: [Emerging Risks, SDGs, ESGs, Sustainability, Emerging Technology, Technology Risks, Vision 2030, Artificial Intelligence, Financial Inclusion, Climate Change, IT Drivers, Regulatory Reforms, Cyber Security, Green Economy, KPIs, Security Measures, Resilient Ecosystems, Machine Learning]

Introduction

The ***Insurance Industry*** which is segment of the non-banking financial services has an equally critical responsibility of offering health insurance, protection against property damage, or third-party liability coverage for the individuals and business firms. The insurance industry includes wide range of cover for the physical and financial risks involved but quite a safeguard to the belongings as well as the business continuity during the period of the uncertainty. Additionally, the industry also promotes an investment strategy focused on extending the productive capacity of its asset base over longer time frames and their effective management by providing of life insurance policies, including ones designed to provide for one's retirement or certain events such as children's education or weddings and other significant life goals. Therefore, the insurance industry plays critical role towards the enhancing social resilience and fostering broader of economic stability.

It is worth noting that during the recent years, many societies and economies in the world including the insurance industry have undergone major changes owing to the ***Emerging Global Risks*** such as climate change, resource depletion, pollution and overpopulation. These risks have dramatically changed how insurers perceive risk and the innovation of products. For example, factors like increasing energy prices and catastrophic risks driven by global warming have triggered the need for the industry to embrace greater and more proactive risk management (AXA Future Risks Report, 2022). Besides these, in addition, more risks such as threats of ***cybersecurity***, geopolitical conflict, changing consumer behaviours, and financial market volatility, bolstered by global interruptions such as pandemics and trade disputes have further increased the risk for insurance companies all around the world including the Arab region (Bender, 2022).

In response of these emerging global risks, there are a variety of initiatives taken by the United Nations, governments, social associations and business organizations worldwide that have been devised dealing with the negative consequences. These have ***Sustainable Development*** established new programs and policies in a bid to protect the present and future generations while taking care of the ecological and environmental concerns.

Adherence to ***Sustainable Development Goals*** (SDG) has been adopted by many of the organizations in the strategic considerations cut across public and private sectors. Most graphic examples of such an alignment are their ***Vision 2030*** briefing requirements of the Arab countries governments affecting sustainability approaches in numerous industries. Consequently, new terms in business models and practices such as ***Sustainable Insurance, Sustainable Finance, Sustainable Investment, Sustainable Technology as well as Waste Management*** became more popular.

In the Arab world, the financial and more broadly the non-financial business industries and institutions are joining forces with authorities, regulators, federations, central banks, associations and governments in quest of solutions to address sustainability challenges and address emerging risks. All these activities are consistent with involving the support of the governmental efforts in the region such as Vision 2030 directed to improvement of the population's digital skills, development of technologies and the strengthening of the economy via and with the help of innovations and digital technologies. This is especially regarding the creation of new business models oriented towards ***financial and social inclusion*** of SMEs, informal labourers, credit mortgage portfolios, and new green business industries. Such models increasingly focus on the use of technology for risk mitigation while supporting various aspects of economic development.

Moreover, the ***Key emerging new technologies*** has become prevalent even in the analysis of environment and culture. It changed that how people communicate, how they access information, how they work, how they learn, and how they entertain themselves. This transformation has been enabled by ***New Technological Drivers***, which include ***Internet of Things (IoT), Big Data, Artificial Intelligence (AI), and Machine Learning.***

However, there are new threats, which are associated with the evolution of these technologies' drivers. New challenges like ***Emerging technology risks***, such as ***cybersecurity risk including data breaches, ransomware, and the rapid pace of digital transformation,*** have caused many changes in the operational performance of the insurance industry. It should embrace timely solutions with the increasing digitization to remain relevant. In response, some ***Reforms and Initiatives*** have been made or suggested to preserve this industry and allow it to continue satisfying its social and business responsibilities.

The ***Arab Insurance Companies*** shall have to conform to the global practices to optimize new technological advantages as well as protect against the adverse side effects ***towards enhance the industry outlook and achieve the goals vison 2030 of green economy***. Insurers in our Arab region can learn from successful case studies and change their strategies to integrate with Vision 2030, in which case they will be able to address the new risks without compromising the long-term sustainability of the region (Kessler & Pohl, 2023).

Research's Objective

The purpose of this research is to assess how current changes linked to the emerging technological revolution and new IT drivers, primarily AI and the IoT, are affecting concrete areas of the insurance market on both global and regional scales. The research generalizes creative activity of an insurance industry and its working towards sustainable development as well as risks associated with such advances in the technology sphere. Then, the analysis will focus on the most pertinent ways to mitigate these risks that relate to new technologies through a

careful evaluation of literature reviews and case studies internationally to provide the best regional practices. Thus, the main goal will be to support the Arab insurance industry with best-practice recommendations that enable the industry to remain in line with the government's sustainability agenda, especially in the context of Vision 2030 which is currently being rolled out in several Arab countries.

Problem Statement

Emerging Technologies Innovations has transformed numerous industries, including insurance industry, at both global and Arab market levels. Despite this, there is a seemingly growing untapped adoption of these technologies, with scant regard to the potential challenges and risks underlying them, more so, in the insurance business. It is important to note that these risks are extremely critical since they determine the capability of the industry to realize its business and social obligations, especially in respect to emerging risks management and sustainability promotion model. This is particularly relevant to the Vision 2030 initiatives of Arab countries that provide strong focus on sustainability and development of advanced technologies. Nonetheless, there have been plausible gaps on how these technological changes would enhance rather than inhibit the traditional mode of the insurance companies to respond to these risks going forward. This research's core seeks to explore the possible risks posed by the emerging technologies in the field of insurance and propose some actionable change strategy with respect to the appropriate case studies developed elsewhere. Some focus will be for Arab insurance markets and companies and the relation how it is possible for them to grow under conditions of the fast technological changes while adhering to economic and sustainability principles.

Research's Questions

In pursuit of the research objective, the study will try to answer the following important research questions:

1. How does within the broader vision 2030 of Arab countries, the insurance industry positively manage emerging risks, facilitate sustainable development and promote the green economy?
2. How do green technologies and new key emerging technology drivers help insurance companies perform their functions, and improve business metrics and individual well-being in the context of development of the Visons 2030?
3. What potential risks do emerging technologies pose including Key Performance Indicators (KPIs) of insurance companies, what strategies exist for addressing those technologies in corporate governance systems and their management efficiency and effectiveness?
4. How about the global and the Arab countries experiences on how to manage the risks emerging technologies pose and more so what risks are being

posed and managed? This will include successful global and regional case studies and literature reviews.

5. What measures, policies or approaches are possible for Arab insurance companies to deal with emerging technologies risks and take full opportunities from them?
6. How do these risks which include emerging technology risk especially looking at cases and or samples help in achieving some of the targets as set out in the Arab governmental Vision 2030 especially going forward beyond the targeted period?

Research Topic's Importance

Practical Importance: This research is significant because of the great relevance that technology risks hold on the performance of Arab insurers. The industry is evolving, and this brings about new challenges such as cyber security and data privacy; therefore, there is need to appreciate these risks for survival purposes. The speedy digital metamorphosis among the Arab countries earns a positive impact to the rest of the world whilst fostering the SDG's and vision 2030 goals. The insurance industry is likely to realize operational enhancements, improved client satisfaction, and enhanced social creativity and economic growth, whence technology risks are well controlled. This study will combine the global and local best practices and provide practical recommendations for the companies to help the insurers cope with changes in the market and achieve state goals within the framework of Vision 2030.

Scientific Importance: As many studies have been conducted concerning technology risks within various industries, there appears to be little attention given to the research into the Arab insurance market. This study intends to provide a solution towards that problem by assessing the impact of emerging technologies risks on the performance of insurance companies in the Arab region which has different socioeconomic and regulatory settings based on literature reviews. Questionnaires, interviews with top-level of executives of several sectors and case studies will aim at combining techniques to achieve new approaches in risk management and factors that shape the insurance performance in the digital world. During the research, it will be also possible to obtain information from different management and professional levels within different sectors of insurance companies which will be helpful in providing useful recommendations.

Research's Scope

Geographical Scope: This aim of this research is to assess and measure the effects of the IT Revolution as well as the new emerging technological risks on the operation of the insurance companies, much focus being on the risk management and sustainability in Arabian markets. The subject matter of the study will be limited to main pioneers' markets namely, Egypt, UAE and Saudi Arabia and will not go into political issues.

Moreover, the study will present a comparison of the Arab region to the world on the management of technological risks in the insurance industry. It aims at understanding best practices as well as lessons that could be learned from the regional and international perspectives based on extensive review of the literatures in question.

Temporal Scope: The study will investigate the impact of the last technological revolution and how it has given rise to new business model structures in the Arab insurance markets. This timeline extends back from 2015 to the present day. This period is appropriate since it is during this period that technology integration into various platforms started steadily during the backdrop of sustainability strategies such as the Vision 2030. It is such developments that enhance the understanding of technology integration practices of reforms and innovations with the aim of reducing technology risks.

In addition, the research will determine the level of compliance with the Vision 2030 objectives for the three selected markets. It will consider the events of this period including the changes in legislation, the socioeconomics, and technology to give a comprehensive perspective.

Research's Assumption

This study is built upon two important assumptions:

The ***First assumption*** that technological drivers have a positive influence on the performance of insurance companies. In this context, the performance and roles of insurance companies are treated as independent factors, and the risks originating from the emergence of these technologies are dependent factors.

Second assumption states that there are initiatives and reforms geared towards increasing the level of technology in any possible direction and this correlates with the insurance industry's capacity to operate in alignment of vision 2030.

As such, by examining these assumptions, this research tries to suggest how properly deployed technology may bolster the insurance practice with specific regard to the threats that will present themselves in the business processes and roles of insurance companies.

Research's Methodology

This research employs an ***Analytical Descriptive*** method that synthesizes the findings of previous studies, researches, articles, books, interviews with top-level of executives as well as survey questionnaires to examine the risks brought by emerging technologies along with the implications on the various facets of the insurance industry. Other facets include risk management approaches, performance both operational and financial, as well as the management of related risks in comparison between the global and the Arab experience. Case studies and

literary reviews of the texts will be employed to portray connections between the challenges and the opportunities.

The research focuses on the analysis of data emanating from the participants in the research to be able to make conclusions and recommend changes and measures which can be handled by the Arab insurance companies in their bid to curtail technology-based risks while enhancing the incorporation of these technologies. In addition, the research evaluates the effectiveness of dealing with these risks in relation to the goals of the Vision 2030 initiatives of the Arab governments, in this case giving a long-term perspective on the area of the insurance industry based on the questionnaire and interviews results.

SPSS Statistics program is utilized to analyse the data collected through the survey questionnaire and interviews. The survey is targeted to a proportionate random sampling of professionals being employed in regulatory authorities, insurance and reinsurance companies, banking, IT development and in social or governmental organizations within diverse ranks. The survey is designed to seek the opinions regarding the future of insurance in the international context as well as the key research objectives set in the present study.

Previous Researches

The researcher has conducted a detailed analysis of the literature on the effect of technological risks on insurance companies, in a global as well as regional perspective. This body of work brings to the fore the emerging concerns on the technological risks which remain under-researched. The studies enumerated below are of particular importance because they address these technological drivers and investigate the implications and the risks of such technologies in insurance business. The following are the most important contributions to research that are relevant to the topic of the study:

i. *The Technologization of Insurance: An Empirical Analysis of Big Data and Artificial Intelligence's Impact on Cybersecurity and Privacy (Shauhin A. Talesh and Bryan Cunningham, University of California, Irvine School of Law,2021)*
   - ***Research's Objective:*** The purpose of the study is to examine the influence of big data and new technologies on people and the insurance market with a special interest on cybersecurity and data breaches. It explains how insurance companies help to reduce cybersecurity threats specifically risks through provision of cyber insurance and management services.
   - ***Research Methodology:*** The researcher used mixed methods including guiding interviews with participants in the industry, performing quantitative analysis on a large dataset and making observations at cyber insurance conferences.
   - ***Practical Implications:*** Although new technologies are transforming processes in insurance, the improvement of the cybersecurity posture is

very low. The changes are rather cosmetic and do not offer much practical advantages for risk management and security.

- ***Conclusion:*** The study states that cyberspace seconds insurance has been enhanced by technological advancements. The study advice on the use of technologies that do not only enhance effectiveness and profitability but also fairness and data security.

ii. *Insurance Opportunities and Challenges in An Artificial Intelligence Society (Ben Kajwang PhD, College of Insurance, Nairobi, Kenya,2022)*

- ***Research's Objective:*** Sought to investigate the opportunities and challenges present in the insurance industry in view of the society that has been s transformed by artificial intelligence. The study hopes to recognise and evaluate the insurance areas that have the potential to transform them as well as the critical threats that insurance companies must contend with.
- ***Research methodology:*** Quite a lot of publications and active research on AI applications in the insurance industry were published between 2017 and October 2022. For these reasons, the authors also analysed the most relevant and recent studies in this area to include studies that are the most relevant to the topic under discussion.
- ***Practical implications:*** It has been suggested that there are ethical hurdles that must be overcome that AI marketing professionals working in the insurance industry face and they need to be addressed so that management will have to think of training programs to upskill their employees and come up with proper legislation.
- ***Conclusion and Recommendations:*** Having investigated the question (what business value do most AI solutions bring to the insurance business), it can be stated that AI-enabled solutions add value to insurance throughout the risk management process, with the customer lifecycle, claims management, and even customer interactions being some examples provided.

iii. *Digitalization and Sustainability – Opportunities and Challenges for Insurance Industry (Jelena Z. Stanković,Jovica Stanković,Zoran Tomić, University of Niš – Serbia,2020)*

- ***Research's Objective:*** The research intends to study the use of IT technology in the insurance industry and highlight the obstacles that hinder its effectiveness in the face of a digital world as well as the need to sustain the planet. It also seeks to assess how insurance can play a role in realising the UN Sustainable Development Goals. The scope of the research pertains to the working of decision engines and artificial intelligence that assists individuals in receiving tailored risk profile services.
- ***Research methodology:*** Literature review, data analysis, and possibly some qualitative approaches such as interviews or questionnaires in other studies.

- ***Practical implications:*** When insurance companies and the wider economy embrace digital transformation, it ushers tremendous opportunity to improve service delivery, hence speeding up both economic and social progress on unreached populations. To do this, however, there is a need for an appropriate digital transformation plan that understands the role of technology and the transformations in value creation, reallocation of resources, and financial bottlenecks.
- ***Conclusion:*** A properly formulated strategic approach towards digital transformation will enhance that industry's capacity to help in bridging the sustainability deficit using appropriate digital technologies.

iv. *Evaluating the impact of AI on insurance: the four emerging AI- and data-driven business models (Alex Zarifis, Christopher P. Holland, Alistair Milne – Loughborough University, Loughborough, United Kingdom,2023)*

- ***Research's Objective:*** The aim of this research was to examine the role of artificial intelligence (AI) in the transformation of business models in the insurance industry by choosing 20 insurance companies and to propose and examine four business models driven by AI and data that are changing the patterns of operation of the insurers and their interaction with the customers.
- ***Research Methodology:*** The current study was exploratory in terms of evaluating the effect of artificial intelligence (AI) as an emerging technology on the operations of the insurance industry. It included cross-case studies involving 20 insurance companies and a focus group consisting of industry practitioners while substantiating case studies with literature sources.
- ***Practical Implications:*** The research insights reveal that embedding AI technologies in the activities of insurance companies leads to improved productivity, efficiency of operations, active monitoring of and responses to risks as well as enhancing customer relationships. It further elaborates on the importance of robust data governance and open collaborative approaches across ecosystems for the achievement of innovative objectives. The extent of implementing clean AI technologies in practice depends on anchoring critical privacy issues and following a well-thought-out succession plan.
- ***Conclusion:*** This study indeed provides a window into the various capabilities that AI technologies can potentially transform in the insurance industry claiming that the impact is similar to that of the internet. It captures the present geospatial usage of AIs, devises a fresh AI-led and data-centric approach to the management of insurance business to customer transactions, and discusses four business models being developed which subsequently inform the implementation approaches.

v. *Development of an Intelligent Decision Support System for Attaining Sustainable Growth within a Life Insurance Company (Mohammad Farhan*

Khan, Farnaz Haider, Ahmed Al-Hmouz and Mohammad Mursaleen, Cranfield University ,2021)

- ***Research's Objective:*** assess aspects of customer behaviour towards a commercial life insurer operating in India to facilitate toward the development of further marketing and designing the product strategy and, in particular, its segmentation, as a starting point incorporate the AI-driven approach.
- ***Research Methodology:*** Use of multiple quantitative and qualitative models and methodologies to draws an oriented specific AI-based market segmentation model around which AI driven marketing activity as a whole is organized strategy, CRM systems, advertising, social and new media
- ***Practical Implications:*** The findings of this study will contribute to the literature and enhance marketing practice with respect to the life insurance industry and the country's economy. The potential that the support vector machine and logistic regression models demonstrated in correctly identifying the target customer segment is quite significant with the Achieved high accuracy levels of the models (98.82% and 89.20%).
- ***Conclusion:*** There is a lack of product innovation in India's life insurance market leading to inadequate growth that embodies development in the economy. There is evidence of strong correlation between demographic, economic and psychographic elements with consumer perception of life insurance products. Using a smart decision support system to target the prospects accurately can help the insurance companies in retaining their market reach securely.

vi. *The Impact of digital Technologies on Insurance Industry in light of digital transformation (Sherif Mahmoud Radwan, Blom Egypt investments and Insurance Brokerage & Consultancy ,2019)*

- ***Research Objective:*** The research aims to analyse the processes of blockchain technologies, IoT and AI innovations and their application potential in the insurance industry with emphasis on insurance value chain restructuring and business model composition.
- ***Research Methodology:*** The study utilizes a systematic literature review of relevant books, articles, working papers with the focus on the insurance industry in the Arab region. Employing qualitative and quantitative research designs, it utilizes case studies and past research data and combines them with information of a theoretical and practical nature.
- ***Practical Implications:*** The research is significant to the insurers establishing strategies on how digital technologies can be utilized in enhancing customer service, operational efficiencies, and individualization of the service delivery process.
- ***Conclusion:*** The research studies and amazing facts convince us that digital transformation is a must if the insurers want to remain relevant in the market. The rapid adopters of emerging technologies will be the first

movers to capitalize on the new business opportunities while the late leavers once again put themselves at a disadvantage. The formulation and implementation of strategies as well as the investment in technologies is very vital especially in the Arab region insurance market which has not properly leveraged these technologies.

Research's Gap

Numerous past studies have pointed out that there is a gap in the literature considering how the emerging technology related threats are transforming the working of insurance companies on the global and the local level. Existing studies invariably concentrate on models and the theses, but detailed examinations of these risks specifically in the insurance industry context are not available.

In order to fill this gap, efforts will be made to conduct a systematic review of the literature, as well as contacting and organizing interviews and surveys at various levels and groups in the industry. The scope of the study also includes the emerging risk of emerging technologies' application within business which has to do with sustainability strategies and the goals of Vision 2030 which are being more incorporated into business. Consequently, the research poses the central question: ***How would the Arab insurance industry deal with emerging technologies' risks and opportunities so as to fit into the government's vision of 2030?***

To accomplish this, the researcher will be conducting a comprehensive research approach utilizing surveys and interviews to gather data on how these technological risks affect the performance of insurance firms. Technological advancements will also be identified in this research and their relevance to the scope of the industry explained and analysed. The research will ultimately assist in completing the suggested reforms where recommendations will be provided, assisting the insurance companies in urban areas to avoid too much risk associated with new technologies while still promoting their opportunities to achieve long term objectives such as Vision 2030.

Content's Overview

In order to achieve the research goal, this study was divided into three chapters, as follows:

1) ***Chapter One: Insurance and Emerging Technology utilization towards achieving Vision 2030***

Considering the rising importance of sustainability as response of the current emerging risks, as stressed by the United Nations and a range of social and governmental organizations, this notion has been adopted at the highest level by governments, especially with respect to initiatives such as Vision 2030 within the Arab markets. The insurance industry, as one of the strategic industries, has been part of those contributing to sustainability and achieved the common goal of social and financial inclusion through partnership. This chapter is divided into two sections as stated here below:

> ***Section One: Insurance's engagement of Vision 2030*** through the approach of the sustainable insurance model, characterized by the inclusion of Environmental, Social and Governance (ESG) elements, allows for the development of new initiatives and business models. Such strategies are mostly based on robust infrastructure as well as on the application of modern, emerging technologies.
>
> ***Section Two: Emerging Technology Innovations and AI Revolution*** through examines how technological drivers, especially those generated by artificial intelligence, are changing the ways in which the operational models of the insurance industry are employed. It addresses the issues of the most recent IT-based developments, new models of doing business in the insurance topped with a view of the strategy for 2030.

2) ***Chapter Two: Emerging Technology's Impact on insurance companies***

This chapter explores the role of innovative technology drivers and new business models in streamlining business processes within the insurance industry. While these technological advancements facilitate operational efficiency, they also introduce several risks that may adversely affect insurance companies' financial stability, operational effectiveness, and reputation. This chapter is divided into two sections as stated here below:

> ***Section One: Emerging technology risks and its impact*** This particular sub-section considers the risk posed by the emergence of new technologies on insurance companies as measured by key performance indices (KPIs) such as financial performance, operational efficiency, reputational integrity, and regulatory compliance. The most salient risks are client privacy, cyber-attacks, fast evolving technology, regulatory changes and talent shortages. Such risks can be effectively managed by the usage of

KPIs of customer satisfaction, claims settlement period and growth of the business by focusing on the expansion of services that are expected to yield maximum returns.

Section Two: Literature Review and Case Studies This section presents a literature reviews on multiple and specific issues in relations to this technological advancement and its challenges. Case studies of global and Arab insurance experiences will be addressed. Several of the studies, books and articles were reviewed in order to address the best practice and reforms that can help the insurers in embracing technology innovations but while curtailing the peril that comes with the innovations.

3) ***Chapter Three: Enhancement of the Insurance's infrastructure technology***

This chapter presents the development of insurance industry technological infrastructure with emphasis on systematic reforms aimed at addressing technology-associated risks. This analysis is based on an extensive literature review involving various recent studies, publications, articles, successful global and Arab regional case studies and survey questionnaire outcomes assessment. The research identifies key reforms and strategies that enable mitigating emerging risks. This chapter is divided into two sections as stated here below:

Section One: New proposed reforms and strategies in this section, the new reforms and strategic recommendations which help the insurance industry capitalize on the technological risks and their adverse KPI's towards achieve Vision 2030.

Section Two: How the address of the emerging technology risks contributes towards achieve the goals vison 2030 and green economy? This section looks at how the management of risks of developing technologies can help realize goals of Vision 2030 and promote green economy. The scope includes programs and models that are in line with identified SDGs, and which incorporate ESG to build a more resilient and enhance the future outlook of the sustainable insurance industry.

Chapter One

Insurance and Emerging Technology utilization towards achieving Vision 2030

Recently, the world has faced significant threats from ***Emerging Risks***, such as global warming, loss of biodiversity, increase in inflation, debt crises, disruption in global supply chains as well as enhanced social inequality and polarization. These issues threaten society and fuels tensions additional potentially heightening societal tensions in regions worldwide. Technological hazards like cyber threats and irresponsible tactics utilizing artificial intelligence are additional serious threats to data and information confidentiality. Meanwhile the current geopolitical risks further compound these challenges, creating an increasingly complex and interconnected risk landscape.

Emerging risks of these nature pose a whole set of challenges for the individual adversely affecting individual incomes and living standards. These effects have also been extended for the corporate sector where many businesses have struggling to secure and maintain their operations.

Therefore, the ***United Nations***, as well as several governments and social organizations, has prioritized addressing these threats. The United Nations intends, through its ***17 Sustainable Development Goals (SDGs),*** to promote the well-being of people and the planet by the year 2030. These goals aim at all people being free from poverty, the protection of the planet and maintaining peace and prosperity for everyone. The SDGs cover a wide spectrum which includes eradication of hunger, ensuring health and well-being, quality education and gender equality, access to clean water and low-cost energy, and decent work and economic growth. Such objectives also include sustainable cities and communities, reduced inequalities, sustainable production and consumption, climate action, and life below water and on land. In addition, they urge the need for peaceful and inclusive societies, effective and accountable institutions, and resilient partnerships for the achievement of these objectives. Collectively, the SDGs are a holistic strategy that is designed to ensure a fair and just world within well-defined parameters which seeks to promote a sustainable global community for the coming generations (United Nations, 2015).

Consequently, many organizations have thus adopted sustainability and the SDGs by mainstreaming these global risks into their operations and business cycles with their partners. This line of thinking has prompted the development of the ***Environmental, Social, and Governance (ESG)*** criteria, which call for investment and business practices that are reasonable and sustainable.

Moreover, ***Arab governments*** have also aligned their nation's vision with the sustainability agenda drawn by the United Nations through ***Vision 2030*** which is similar to the SDG's targets. Countries like ***Egypt, Saudi Arabia, and the United***

Arab Emirates are making great progress towards achieving their sustainability aspirations. The emphasis of Vision 2030 in Saudi Arabia, driven by the Crown Prince, is to lessen reliance on oil, increase renewable energy and boost economic diversification, thus directly impacting several SDGs. Vision 2030 in Egypt aims to achieve poverty eradication, social equity, and promote inclusive economic growth which is in line with the basic principles of the SDGs. The same goes for the UAE, whose UAE Centennial 2071 plan has been well advanced and supports sustainable development, innovation, and education for the future.

One of the main significant roles of ***Insurance*** in the support of ***sustainability*** is paramount in fostering adaptation, financing environmental, and promoting good practices. Because they provide such coverage on sustainable construction practices like building that withstands extreme weather conditions and the use of renewable energy sources, which are climate adaptive, insurance companies also assist in environmental risk management and mitigation. They are also important investors who place significant resources in verticals that support sustainable development goals including clean energy, green construction, and ecologically sensitive business practices. (Surminski, Bouwer and Linnerooth-Bayer, 2016)

Furthermore, companies design insurance for sustainability, such as those covering renewable energy technologies and microinsurance for low-income people. Such measures enhance the adaptive capacity of societies towards climate change while enabling more progress towards a sustainable economy. A unique leverage that insurers have is the capacity to embed climate risk within the underwriting and investment decision making as such they are in a good position to promote global together with local change in line with the SDGs. (Berliner, 2020)

Technological innovations notably support the attainment of sustainability objectives within the insurance industry. In particular , development of analytics tools and modern emerging technology drivers assist the insurers to assess potential risks and their related occurrences emanating from climate change and natural catastrophes which enable more focused capacity of writing insurance and more sustainable use of appropriate pricing and premium factors that reflect relevant green behaviour. In this way, these technologies enable the insurance industry not only to improve business processes but also to develop environmentally friendly practices and adjust products and services to cover climatic aspects, which also means overcoming the emerging risks.

The researcher will also explore in the following lines the integration of the insurance towards achievement of vision 2030 with respect to using modern emerging technology, including consider sustainable business models. These elements will be dealt with in the subsequence of the below sections.

Section One: Insurance's engagement of Vision 2030 through the approach of the sustainable insurance model, characterized by the inclusion of Environmental, Social and Governance (ESG) factors, allows for the development of new initiatives and business models. Such strategies are mostly based on robust infrastructure as well as on the application of modern, emerging technologies.

Section Two: Emerging Technology Innovations and AI Revolution through examines how technological drivers, especially those generated by artificial intelligence, are changing the ways in which the operational models of the insurance industry are employed. It addresses the issues of the most recent IT-based developments, new models of doing business in the insurance topped with a view of the strategy for 2030.

Section One

Insurance's engagement of Vision 2030

The ***Insurance Industry*** understands the importance of adopting Vision 2030 in the context of global sustainability and resilience of the economy Moreover, the insurance industry integration of sustainable practices is essential for the realization of the 17 Sustainable Development Goals ***(SDG)***. There is a growing tendency among insurers to incorporate environmental, social and governance ***(ESG)*** issues into the products they offer, the underwriting decisions they make and policies they adopt at corporate level, hence, helping to manage changing global risks. This commitment not only aids in containment of adverse effects of climate change and socio-economic problems but also fosters socio-economic development thereby promoting societal welfare in the long term.

Furthermore, the ***Sustainable Insurance Principles*** have several focus areas as in optimal risk assessment, research and underwriting, investment approaches, as well as the establishment of creative green products. Which include several innovate ***business solutions and models*** catering security to the less privileged populations and collaboration with multitudes of partners which are targeted at Vision 2030 which is currently being implemented in our Arab countries. Further discussion on this topic will be presented in the following lines.

Sustainable Insurance respond towards address SDGs

Sustainable insurance significantly contributes to the efforts of attaining the SDGs, and more specifically in alignment of Vision 2030 in Arab markets. It provides risk management solutions range from protection against the adverse effects of climate change and investments into renewable energy that are consistent with the environmental, social and economic sustainability objectives. Sustainable Insurance advances *SDG 1 No Poverty* through creating and distributing low-cost microinsurance products. These products cover economically marginalized people against risk events such as natural disasters and health emergencies, related issues that would otherwise lead to poverty deepening.

For SDG 3 Good Health and Well-being, sustainable insurance is instrumental in expanding health coverage including mental health services to make health care more inclusive and equitable (WHO, 2020). With regards to *SDG 7 Affordable and Clean Energy*, sustainable insurance also reduces the risk of investing in renewable sources of energy, such as converting solar and wind power to be able to enhance these projects, hence contributing to curbing the challenges to shifting to clean energy (UNEP FI, 2021).

In relation to *SDG 8 Decent Work and Economic Growth*, sustainable insurance promotes good working conditions of its workers while shielding them from economic loss, providing protection that enhances inclusive and sustainable growth that builds resilience of both the workforce and the economy (ILO, 2021). Furthermore, *SDG 11 on Sustainable Cities and Communities* is also addressed by sustainable insurance in that it ensures protection of urban infrastructure, flood control measures and disaster assistance which are all essential components in enhancing urban resilience (World Bank, 2018).

Regarding the *SDG 13 Climate Action* because it has made it a point to underwrite climate risks and provide solutions which mitigate the adverse effects of climate change on the economy. Such actions reduce the exposure of communities and industries to climate risks and motivate behaviour which is aimed at reducing carbon emissions (OECD, 2020). Last for *SDG 15 Life on Land*, sustainable insurance encourages land management practices and the conservation of biodiversity through restrictions on negative agricultural activities and support for sustainable agriculture and conservation projects. It can therefore be concluded that sustainable insurance has a great potential in furthering the attainment of the SDGs, buildings resilience and instilling good economic, social and environmental behaviour.

Principles for Sustainable Insurance towards incorporate ESG factors

Sustainable insurance is a global approach of sustainability which achieved through partnerships and intelligence. ***Risk prevention and reduction*** is a key principle whereby insurers effectively encourage activities that assist clients and the community to avert such risks especially those related to climate change and catastrophes. Additionally, the inclusion of the recent new term ***Environmental, Social and Governance (ESG)*** factors in the various day-to-day operations for the industry including underwriting and investment activities is another key pillar, which ensures the industry self-regulates regarding its effects to the environment and society.

Encouraging transparency and accountability is another vital principle as the insurers have reporting regarding their progress and the challenges, they encounter on the journey towards sustainability including the management of ESG issues and contribution to sustainable development. ***Collaboration and partnership*** through work with governments businesses and communities to enhance resilience and sustainable solutions.

Therefore, the PSI by UNEP FI, give an outline for insurers on how to implement sustainability in their operations including guiding principles towards integrating ESG factors within the industry which encourage the partnerships with other industries towards contribute for the achieving of the SDGs and vision 2030.

Sustainability Insurance's partnership with other industries

As the Insurance companies incorporate ESGs factors into their operations and activities, they do not only mitigate their underwriting and investments business's but also encourage enhancing the sustainability approach in different industries. Therefore., new business practice and new products have been adopted and developed to expand their contribution to sustainability aligning with the goals of Vision 2030 and SDGs. The following industries exemplify such progress:

1. Energy Industry

Sustainable insurance plays a crucial role in providing tailored and advanced solutions that meet the evolving needs of the energy industry through supporting renewable energy projects such as wind, solar, and other clean energy initiatives by insurance products foster innovation and help accelerate the green energy transition. These products also provide vital financial backing for environmentally friendly projects, supported by high-rated reinsurers, to ensure the long-term stability and success of these initiatives.

Literature Reviews: According to the study by *Barreira .A* (2022), sustainable insurance products significantly reduce the perceived risks associated with renewable energy projects, thereby facilitating the flow of funding from both private and institutional investors. These insurance solutions often include lender endorsements, securing the interests of financing parties. By mitigating financial uncertainties, sustainable insurance attracts greater investment, which in turn accelerates global energy objectives.

Case studies: There is a notable shift in the transition to a low carbon economy initiative such as Dubai's Clean Energy Strategy 2050, therefore launched of key renewable energy projects such as the Noor Solar Plant, Benban Aswan solar plants, as well as the NEOM project of Saudi Arabia further reaffirm the notion of the region's potentially sustainable energy future. They are also illustrating the importance of green finance and sustainable insurance against risks to foster sustainable development initiatives.

Additionally, the first regulated voluntary carbon market of the Egyptian stock exchange was introduced by the financial regulatory authority (FRA) of Egypt to stimulate carbon trading further supporting ecological interventions.

Egypt's COP27 in 2022 and UAE's COP28 in 2023, positioning the insurance industry as a key player moving the agenda forward that would help to boost region sustainability.

2. Agricultural Industry

The global climate crisis poses some of the major threats and challenges to the agricultural industry as there is increasing risk caused by climate change, natural disasters and volatility in the market prices which undermines food security and

more importantly farmers' livelihood. In this regard, the concept of sustainable insurance becomes very important as it helps to mitigate those risks and provide necessary assistance. This creates a unique opportunity for insurance industry to involve with partnership with the agriculture and food industry in promotion of sustainable agriculture, less environmental degradation, and increase food security. By making available insurance products that encourage sustainable agricultural practices, foster climate friendly regenerative agriculture practices and risk management against climate change risks, insurance industry has a major role to play in addressing the emerging risks and increasing the resilience of the food systems (Hengli Wang, Hong Liu, and Danyang Wang, 2022; Hoda Badawi, 2020).

Climate-indexed insurance is another such insurance which shields the farmers from crop failure because of adverse weather changes. These unique offerings help in protecting agricultural output and enhancing economic well-being considering the uncertainty of climate variability and hence are indispensable in enhancing resilience in the industry (Food and Agriculture Organization, 2021).

Literature Reviews: according to research conduct by the *Department of Agricultural Economics & Business Management, Faculty of Agriculture, University of Peradeniya, Sri Lanka states* that rural practice in developing nations has become resilient to climate shocks in a more advantageous manner because of the uptake of climate-indexed insurances in these nations. These insurance plans help sustain farming practices, provide support to rural communities, improve food security, and ensure the sustainability of rural households. Also employing technologies such as remote sensing and weather forecasting increase the precision and accessibility of these products and consequently the effectiveness of these insurance products.

Case studies: As stated in *Kamal (2017),* this recent development in Egypt's Agricultural Climate Insurance features a new crop insurance that allows climate to be used as a parameter to index risks. The solution provided was the formulation of weather index-based agriculture insurance products that are responsive to the local climatic conditions. It attempts to insulate small farmers from catastrophic risk and at the same time provides a new model to deal with crop insurance market imperfections in others Arab countries.

3. Healthcare Industry

Sustainable health insurance is a relatively recent response to new health threats associated with systemic environmental and socially vulnerable factors, focusing on primary health promotion, consumption and conservation of resources, and system regenerative care. It also brings the range of health insurance services to encompass factors such as effluent management and psychosocial intervention programs which are expected to be cost saving in the long run (World Health Organization, 2023,)

Literature Reviews: Innovative strategies, as highlighted by Mehrotra (2023), key ideas being proposed are – PPPs for the efficient performance of the system; provision of UHC for equitable and affordable access to services, green health systems for sustainable development, and risk pooling in addition to other means of sharing risk. These strategies combined seek to ensure that while the healthcare system is robust, the economy and environment are not compromised.

Case studies: Egypt has recently implemented reforms under the Universal Health Insurance System (UHIS) towards expand equitable health care coverage through employer, employee and state contributions, while ensuring a focus on financial sustainability, effective healthcare resources and achieve social solidarity. Similarly, the mandatory health insurances in UAE which are also employer-funded, provides efficiency using digital tools, eases costs through a focus on wellness and promotion of sustainability through greener processes such as reduced waste.

4. Construction Industry

There is an argument that the coverage offered by the Insurance industry regarding the renewable energy, the green building, the energy-efficient transport systems and resilient infrastructure could greatly help in the advancement of new sustainable infrastructure projects. Hence, these parties are position to promote eco-friendly construction activities and help deal with climate hazards which will go a long way to alleviate the losses suffered due to climate change catastrophes and facilitate the growth of eco-friendly projects. (Nadine Gatzert, Philipp Reichel & Armin Zitzmann,2020)

Literature Reviews: According to the research conducted by *SUNANDA GHOSH (2024)*, it is necessary to draw attention to construction projects that apply sustainable insurance as they will face less difficulty in overcoming regulations in the future such as those that require stricter environmental standards and green certification requirements. Additionally, it can be advantageous for the stakeholders as sustainable insurance can incur considerable savings associated with long-term liabilities and operational risks.

Moreover, sustainable insurance approach new practices to the contractors such as sourcing out green materials and waste management solutions, which lessen the effect of the industry on the environment. There are also insurance products that cover the risks of natural disasters which are becoming relevant due to climate change.

Case studies: There has been a recent trend witnessed of construction mega projects in the Arab Gulf in which sustainable insurance is adopted as part of the infrastructure, for example, in the infrastructure for Expo 2020 Dubai and Qatar world cup. The developments leverage of sustainable insurance in order to avoid environmental non-compliance and climate risk which indicates a more serious

approach towards sustainable development in mega cities as well as infrastructure development.

New Arab emerging insurance's business models driving sustainability

Due to the recent growing integration of sustainability practices into other industries, the insurance industry is starting to follow suit. This transformation is characterized by the innovation of new business models, which align with the initiatives undertaken by governments and regulatory bodies. The Arab insurance industry has shown a strong intention to be the most responsive to these endeavours, addressing emerging risks and meeting the expectations of concerned parties. Additionally, insurers are gaining new opportunities in sustainability; these opportunities include, but are not limited to, the following models in the Arab region.

1. Financial Inclusion

One of the most successful business models recently implemented is engagement of insurance with financial institutions, which offers several products aimed at covering the ***SME sector, informal workers, credit mortgage portfolios, and emerging industries.*** This is achieved through collaboration with banks, investment firms, and other financial institutions which have promoted sustainable finance and investment practices, such as the issuance of ***green bonds or gender bonds*** which provide financing for environmentally friendly initiatives or women's empowerment.(Mohamed Mahrous Saadouni,2021) These initiatives are a significant step towards expanding business results, gaining tax advantages, exploring new products, enhancing climate risk resilience, eliminating discrimination, and promoting equal opportunities in order to prioritize sustainability and inclusivity before seeking financial finance or insurance coverage.

2. New emerging green insurance policies

The Insurance industry has the potential to significantly contribute to the advancement of new sustainable infrastructure and agriculture projects through offering specialized insurance programs that encompass the renewable energy industry, green buildings, energy-efficient transportation systems, and resilient infrastructure. Therefore, Insurers can encourage sustainable construction practices and assist in managing risks linked to climate-related incidents which will help mitigate risks associated with climate-related events and support expand of friendly environmental projects. (UN Environment Programme) (Nadine Gatzert, Philipp Reichel & Armin Zitzmann,2020)

3. Promoting Sustainable Agriculture

The Insurance companies have the opportunity to collaborate with the agricultural and food industry to encourage sustainable farming practices, reduce environmental impacts, and enhance food security through providing insurance products that incentivize sustainable agricultural practices, supporting the adoption of regenerative farming techniques, and mitigating risks associated with climate change impacts on food production which represents a significant step for the insurance industry in contributing to the response to emerging risks. (Hengli Wang, Hong Liu, and Danyang Wang,2022) (Hoda Badawi,2020)

4. Insurance Awareness

A notable change was observed in the last twenty years as stated in Exhibit No. 1; it may be noted that uninsured losses have always been greater than insured losses by more than 50% over the period of five decades. The insurance industry is hence mandating its clients to take pre-emptive measures, for instance sponsoring financial literacy programs that seek to enlighten individuals on the significance of purchasing insurance and the other risks it covers. Such initiatives are directed towards improving knowledge even for critical aspects such as the nature of the available insurance and its provision, and how and when it can be claimed, especially in low-income areas.

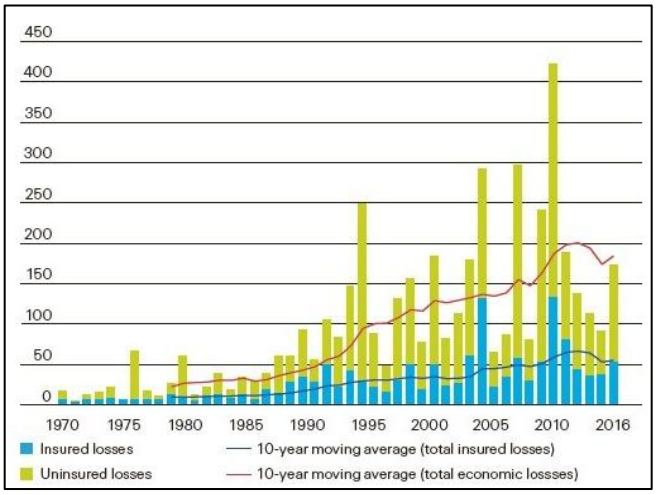


Exhibit 1: Economic Losses

Source: Cat Perils and Swiss Re Institute

5. Social Inclusion

Insurance companies have also taken different approaches with regards to social inclusion and outreach to the vulnerable population. This is further supported by their formulation of microinsurance products which are meant to fit the economic and financial capabilities of low-income individuals. There is a growing number of inclusive underwriting standards to allow different groups of people equal access to insurance coverage. Further, community outreach programs are designed to make the cost and relevance of insurance companies bearable for the poor and other social classes. Such initiatives seek to ensure that people have the minimum resources required to participate equally in social, economic, and political activities. In this regard, it is worth noting that ***Takaful we Karama*** programs seek to alleviate poverty, aid some families and empowering women within the Egyptian society.

Summary and Conclusion: it shown clear from the previous lines that the insurance industry contributes greatly toward achievements of the Vision 2030 and SDGs across the Arab countries. This is especially apparent to the incorporation of ESG factors that had spurred inter-industry cooperation towards advancing business models and enhancing operating processes.

Technological advancement, in particular emergence of technology, digitalization, and digital transformation greatly improved the working effectiveness of the industry, allowing it to progress toward these ambitious goals and collaboration between the insurance and other industries.

The significant improvement in the performance of the insurance industry enables it to embark on integrating advanced technologies which can further modelling into the risk appetite and enhancing operating processes and developing affordable and inclusive insurance products. In doing this, it not only promotes sustainability performance but also enhances the wider objective of building more resilient economy in our Arab countries.

Section Two

Emerging Technology Innovations and AI Revolution

New Emerging technologies have made drastic improvements by making communication, collecting information, making the work environment, the education systems in place, healthcare, transportation and entertainment better than before which presents a ***Technological Revolution***. Such a technology revolution does not only occur in certain industries but rephasing the full operations. Consequently, several business associations use digital systems and processes combined with automated systems rather than manual processes as they seek to enhance workflow and efficiency while reducing dependence on manual processes. Such initiatives aim not only the exploitation of technology but also the achievement of economy, welfare, satisfaction of individuals and the society at large.

As far as sustainable business models are concerned, integration of digital drivers, and high technologies is essential. In this context the use of the ***Artificial Intelligence (AI) and Machine Learning***, is expediting the organizations transition to full automation. These technologies enhance workflows, cut down human errors, lower operational expenses and allow human resources to concentrate on the important tasks which are the value-adding activities. Such a change is in the process of improvement of the current business models, and at the same time, it encourages creativeness that helps towards achieve the SDGs and Vision 2030.

In the next analysis, focus on the great examples of how technological development combines with sustainability for transforming the insurance industry including Arab economies cases studies emerging resilience fit within the context of Vision 2030.

Key Sustainable Green Technology drivers

The recent emerging IT drivers can change the IT landscape in the insurance industry which create new opportunities in underwriting and claims management, especially concerning fraud detection, sales and marketing. In addition to improving operational performance and enhancing business results, these technologies further constructively contribute to the infrastructure needed in achieving Vision 2030 goals while including incorporating the ESGs (Mahmoud, H., Jabbar, S. & Issa, J., 2024). Some of key IT advancements which progressively impact the insurance industry include:

1. ***Internet Of Things (IOTs)***

The insurance field is experiencing a noticeable transformation due to the use of IOT as it enhances real-time data acquisition, risk management practices and strengthens customer interaction. Specifically, insurance companies are using

vehicles with telematics systems and households with smart sensors as sources of information that assist in designing risk models and specifications of very tailored insurance products. One type of insurance which is ***Usage Based Insurance***, takes advantage of IoT telematics to adjust premiums according to the number of accidents and claims made by a certain customer due to their driving behaviour which is a more effective model (McKinsey, 2021; BCG, 2021). Further, IoT in the form of, sensors for detecting water leakage, or fire suppression in property insurance facilitate early action which minimizes destruction and losses greatly.

Literature Reviews: Literature has pointed out the importance of IoT in enhancing operational efficiency and enhancing sustainability. In particular, Jafarnejad et al. (2020) point out that IoT analytics help automate generates precise incident descriptions, subsequent speeding of the claims settlement. The use of IoT in health insurance for instance fitness, trackers create opportunities for insurance firms to encourage clients to be healthier which is beneficial to both clients and the insurers (KPMG, 2021).

Case studies: recently the insurance companies operating in the Emirati market are modifying their operations by embracing IoT-based telematics which helps them to expand their customer base beyond low-risk drivers. For example, insurance companies assess the real-time data collected from telematics assisting devices and can provide usage-based premiums thus, rewarding drivers with good driving behaviour (Deloitte, 2022). The strategy is also in line with international developments where insurance companies are enhancing the innovative capabilities of insurance products through IoT technologies (McKinsey, 2021).

2. Blockchain

The introduction of blockchain technology in insurance is improving its inefficiencies, adding more transparency, and fighting against fraud. The insurance trusts the policy again as the decentralized ledger system strengthens data security and the confidentiality of the contract. The blockchain application of smart contracts enables actions such as underwriting and claim settlements with real time updates and minimal administrative requirements. (Abhishek Peter, 2024).

Literature Reviews: According to *McKinsey (2024)*, approximately 5 to 10 units of all insurance claims have fraudulent elements. The ledgers are untouched and cannot be tampered with making it easy to detect fraud, abuse of resources, and verify ownership, documentations and the history of transactions. One such KYC solution that showcases this potential is the blockchain based Trade which permits secure storage and re-use of one identity across many insurers

Case studies: The use of microinsurance in agriculture industry, also illustrate the future using block chain technology. Its ability to reduce costs and increase efficiency is demonstrated using verified meteorological data for automated

payments to farmers (McKinsey, 2024) which able to reshape both industries in our region

3. Cloud Storage and Computing

Cloud storage and computing are among the main affordable and flexible technology drivers that offer secure means of handling and improving data management processes. This is achieved through hosting companies or cloud storage providers who maintain the physical infrastructure and ensure the accessibility, protection, and functionality of the data in exchange for payment (Steve Ranger, 2022).

Literature Reviews: According to *Intuz,,(2023)* claims that cloud computing goes a long way to cut down IT infrastructure cost improvements other than just this however, the implementation of artificial intelligence (AI) and machine learning (ML). Such tools allow the insurers to improve the accuracy of risk assessment and increase the level of detection of fraudulent actions in the company. Moreover, study indicate that the modularity of the cloud system allows the insurance providers to respond to change in the marketplace and meet the requirements of the regulations.

Case studies: Recently the insurance industry amongst many others in our Arab region has been transitioning industries to cloud-based systems. Those players that resorted to such technologies presented better stability being able to maintain services through a crisis. By leveraging the use of remote operations, secured data, and fast processes, such as policy and claims issuance, everything ran smoothly and significantly faster than before.

Services like AWS, Microsoft Azure, and Google Cloud were also vital to those changes. These cloud resources help insurers upgrade their IT networks, develop new products, and work in regulated environments. Implementing efficient cloud systems, insurance companies can meet market needs in a timely manner and optimize internal processes.

4. Big Data

The revolution of big data analytics is the key to transformation in the areas of risk assessment biostatistics, underwriting, handling of claims and customer relations management in the insurance industry. It is made up of diverse data types obtained from multiple sources and is mostly generated in bulk and in varied forms. This data is subject to advanced analytics including machine learning and other predictive modelling technologies, which are now being widely deployed in many industries. Big data is expected to have key impact in areas like disease control, of diseases and crime and medical works since such areas can greatly benefit from predictive analytics and as a result, well-structured decision making (Corlosquet-Habart & Janssen, 2018).

Literature Reviews: According to *Chen et al (2015)'s* findings, policy-makers' access to big data allows for insurers to tap into vast amounts of structured and unstructured data hence creating better models and make decisions accurately. From their analysis, they established that, in claim prediction practitioners of insurance have made use of big data in predictive modelling which in turn has improved the underwriting and pricing strategy. Moreover, Binns (2018) mentions that big data enhances the functions of detecting fraud, noting that insurers use machine learning, inter alia, to detect abnormal patterns in claims and apply these trends to prevent defrauding practices.

Case studies: One of the main successful business models utilize the big data analysis is the collaboration of the Motor Vehicle Authority of the UAE and the insurance companies in accomplishing telematics programs. This model involves collection of information from the automobile to be used in pricing, where it is expected that such data will be useful in improving the models and risk evaluation used in pricing auto insurance policies. Understanding this pattern allows the insurers to understand their clients on a deeper level and adjust their prices based on the risk factors. It does relieve the burden on the underwriting process and allows for better pricing of policies which is beneficial in encouraging safer driving habits, lower overall claims costs, and benefiting insurers and policyholders equally (Shory, 2023).

5. Artificial Intelligence (AI) and Machine Learning (ML)

The recent technology of AI and ML are transforming insurance industry's by automating processes, generating more innovative ways of performing tasks and improving service delivery. They speed up the claims process, aid in fraud detection, and provide tailored customer service in real-time through automated claim support as well as risk assessment and underwriting processes. AI takes over human intelligence processes such as decision-making where humans must intervene at a very limited scope while big datasets analysis including IoT data streams are carried out by ML in anticipation of taking corrective measures against possible risk events. (Kumar, P., Taneja, S., Özen, E. and Singh, S. 2024)

Literature Reviews: According to *Arthur D. Little's* report on AI in insurance and PwC Middle East's analysis highlight that the industry transformed by AI and ML in the most essential industry functions: efficiency, precision, and customer care. To optimize the usage of AI, for instance, company's chief executives' main priority needs to be embedding AI into the organization's structure, attracting AI specialists, facilitating internal changes in ways of thinking, capitalizing on the trust of customers, and implementing several use cases to minimize risks and learn how to use it in the future.

Case studies: The latest integration of AI and ML technologies into the insurance industry in the Arab region in line with Vision 2030, has greatly enhanced the performance of insurance processes. Such improvements comprise Arabic chatbot

models and interactive personal assistants to boost up customer contact. The use of predictive models in fraud and weather analytics enhances efficiency and reduces risks to operations. (General Arab Insurance Federation newsletter, 2023)

In the UAE, incorporation of AI in the health insurance industry has been seen to bear the desired fruits. With digital health records being consolidated, there are better service provision and enhanced customer satisfaction. This example provides insights on how AI can create both operational efficiencies as well as enable tailored services in the context of digital transformation in the region.

Leveraging AI towards transform Arab region industries

Recently the adoption of emerging technologies including artificial intelligence has been an important component of the Arab's technological revolution, which is creating efficiency, instigating invention, and accelerating the growth of economy in various industries, with no exception of the insurance industry.

As McKinsey reports (2023), the ***Gulf Cooperation Council*** countries present a great opportunity of adding remarkable value, where AI alone is projected to contribute up to $150 billion to the regional economy. This potential is bolstered by the increasing integration of AI into business operations. In fact, 62% of respondents from GCC countries report utilizing AI in at least one business function within their organizations. As highlighted in below exhibit 2, AI has been adopted in various business industries in the GCC countries which give the countries an upper hand in AI integration when compared to the rest of the world. Importantly, the GCC countries are ranked third in the application of AI after North America and Europe with 22% of the enterprises using AI in several business activities.

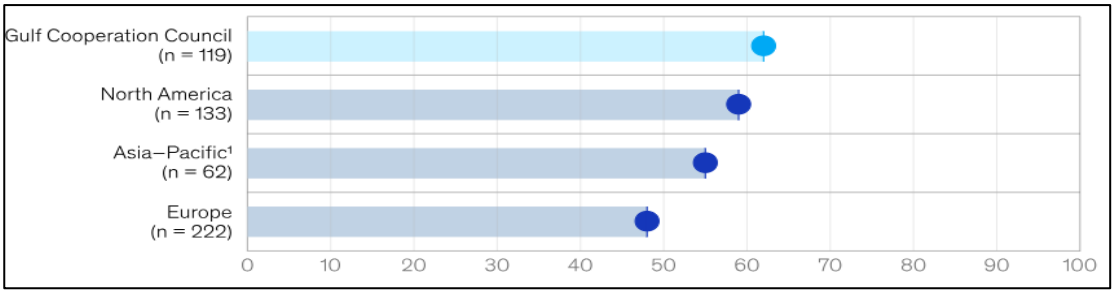


Exhibit 2: AI adoption in more than one business function

Source: McKinsey & Company ,2023

Additionally, PwC's report 2024 specifies that in the region of the Middle East, focused on the Gulf countries of the GCC, the incorporation of the usage of AI could contribute around 320 billion dollars to the GDP of the region by the year 2030, marking the region's resilience in adoption of AI technology. PwC observes that with the help of large amounts of data, artificial intelligence will strengthen businesses by optimizing activities, making better judgments, and improving

clients across industries such as insurance, healthcare, and energy as highlighted in Exhibit 3.

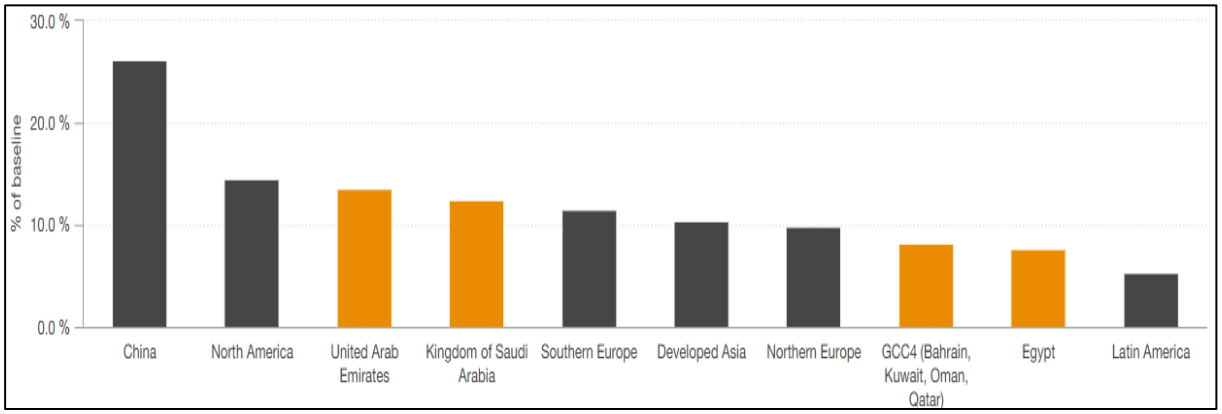


Exhibit 3: Contribution of AI to GDP by region ,2030

Source: PwC,2024

Furthermore., as detailed in the ***OECD report***, ***Egypt's AI initiatives*** are aimed at enhancing important national priorities as presented in Vision 2030. ***The Egyptian National Artificial Intelligence Strategy (NAIS)*** objectives on the other hand highlight utilization of AI in government processes, enhancing the economy, building capacity and engaging in international collaboration. Among the activities are committing to internationally established standards such as the OECD AI Principles, utilizing AI to solve pressing issues including health care, agriculture and natural resources management, and advancing Responsible AI through the Egyptian Charter for Responsible AI which lead Egypt to become a pioneer of AI regionally.

Meanwhile., as outlined in PwC's report on AI's potential impact in the Middle East, artificial intelligence has the potential to disrupt the major industries within the region by 2030. The report elaborates on what artificial intelligence is anticipated to contribute to the region's ***GDP*** and development as a growing stimulus to economically productive industries. It is however expected that 14% of the contribution of AI to the Middle East's gross domestic product GDP by industry will be from financial, professional and administrative services including the insurance industry.

Table No.1: Contribution of AI to industries in 2030

Industry	Absolute contribution in 2030 (US$ billions)	Contribution of AI to Middle East GDP by industry
Construction and Manufacturing	$99	12%
Energy, Utilities & Resources	$78	6%
Public sector, including health and education	$59	19%
Financial, Professional, Administrative Services	$38	14%

Retail, Wholesale Trade, Consumer Goods, Accommodation & Food Services	$23	19%
Transport and Logistics	$12	15%
Technology, Media, Telecommunications	$10	14%

Such distribution shows that there is an increasing emphasis on technological advancements and the application of AI which is expected to disrupt the industries in the Arab region. The creation and implementation of AI solutions in these industries shows an intention of higher operational efficiency, better customer service and more economic growth as targeted by Vision 2030 goals.

Exploring impact of technological drivers towards achieve SDG's

As the new emerging technological opportunities in the insurance industry towards provides innovative operational efficiency supervision practices, risk management product development and resource utilization. Such as deploying weather monitoring and predictive tools to assist in decision making which perform their role towards achieve the sustainability and SDG's achievement.

Furthermore., McKinsey highlights in 2020 that the Insurtech companies are becoming bolder in adopting new and emerging technology such us big data and machine learning (based on competition). Among the companies included in the report, this company stated, 20% of such companies lead in implementing these technologies over other models, as indicated in below exhibit No.4

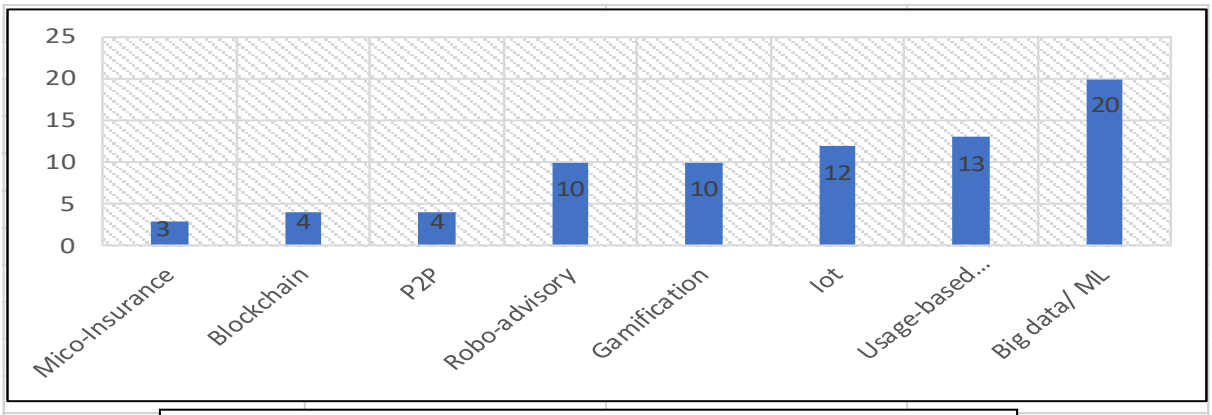


Exhibit 4: Insurtech adoption of new technology and concepts

Source: McKinsey & Company,2020

In a manner consistent with this tendency, McKinsey's 2021 survey of the use of automation in global insurance companies shows the existence of a certain change. The survey also showed that such engagement is increasing in areas such as underwriting, actuarial work, and even claims processing and finance. Within the next ten years, the levels of automation in these areas are estimated to increase quite noticeably from 10 percent to 55 percent as indicated below in exhibit No.5

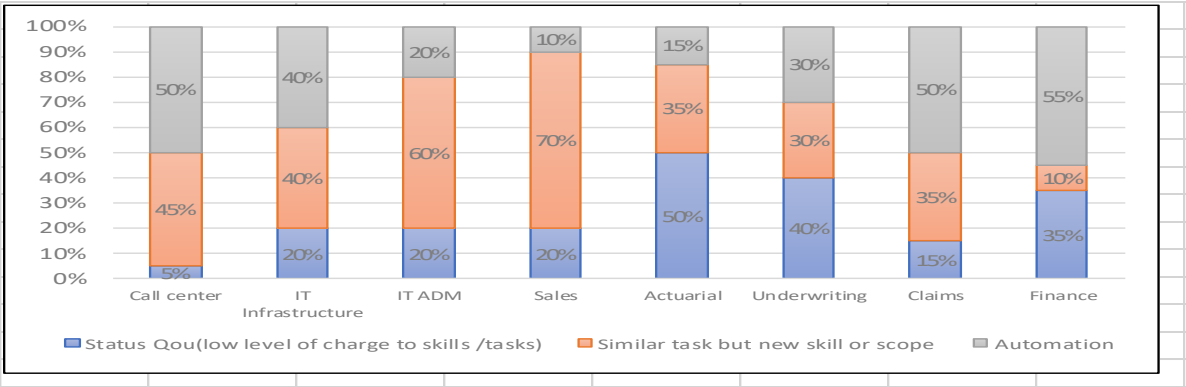


Exhibit 5: Automation of tasks in the insurance industry

Source: McKinsey & Company,2021

According to the above exhibit, some of the tasks which can range from 10% to 70% and for the claim's handles, however, will move them from process claim only to enhancing the customer experience. There might also be an overlap in the activities of underwriters/actuaries and professionals involved in data science and advanced analytics. It is estimated that about 30% of roles in underwriting might engage a higher degree of interaction with data scientists for improving the quality of quantitative tools and their automation which will lessen manual & routine interactions which enhance the insurance role towards achieve the SDG's.

Additionally, the adoption of technology drivers in insurance automation has the potential to significantly streamline operations by automating a range of tasks in the Arab markets. According to Exhibit No. 6, this technological shift could lead to the replacement of up to 25% of full-time positions in the industry by 2030. This highlights the critical and immediate need to integrate AI into operational processes to enhance efficiency and stay competitive in the evolving market.

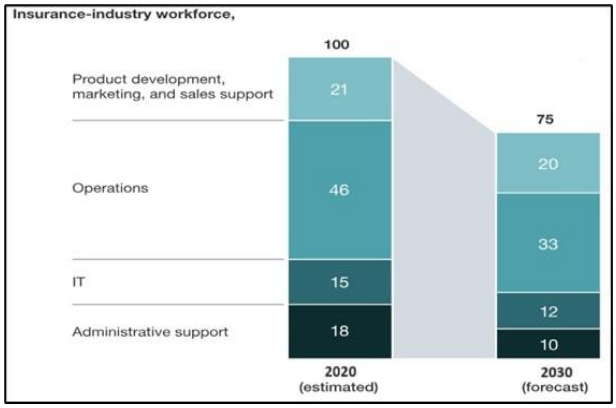


Exhibit 6: AI effect on Insurance Industry

Source: McKinsey & Company,2020

Therefore, these technological innovations make it possible for further development of the digital ecosystems which enhance productivity, customer satisfaction and risk management. In addition, they help in the transformation of the workforce through better recruitment, employee upskilling, and making better communication. AI enabled organizations assist HR planning and decision making at strategic level. This encompasses the use of new creative tools which are suitable for these market features language, Islamic Takaful, existing trend of digital transformation

Summary and Conclusion: it shown clear from the previous lines outlines some of the forthcoming trends regarding how innovative technologies reshaping all industries including the insurance industry, the artificial intelligence (AI) being the prime driver. AI is also causing the emergence of new business models as well as enhancing the efficiency of everyday and mundane functions. Additionally, AI's penetration in other industries translates into the economic development of the Arab countries. It is worth noting that the GCC's expenditure on AI and other high technologies is expected to amount to 14% of the GDP which will greatly impact the region's economic advancement in coherence with the outlined objectives of Vision 2030. This change points to the increasing role of AI toward address ESG's and achieve SDG's.

Eventually, the adoption of the digital transformation including utilize the AI is changing the whole economy with our region and, in this context the insurance industry provides a good common reference of an industry that seeks to implement new business models, stimulants of innovation, contributing further to the economic transformation and able to emerge as a crucial arm of SDGs and progressively enhance industry performance and contribute towards the green economy so as achieve the goals of vision 2030.

Chapter Two

Emerging Technology's Impact on insurance companies

In the previous chapter, the researcher explores the initiatives undertaken within the frameworks of Vision 2030 by Arab governments to address the emergent risks as well as how such initiatives correspond with the Sustainable Development Goals (SDGs). Consequently, it is emphasized that the insurance industry is one of the critical areas that contribute to the enhancement of Environmental, Social, and Governance (ESG) principles. The insurance industry also partners with other industries in the development of new business models that are consistent with the wider Vision 2030 strategies.

Additionally, the insurance industry and other incorporated industries go forward utilize the digital transformation and technology adoption to acting as the core of innovation for the new innovative business models.

Information and emerging technology advances are reinventing operational and organizational approaches while complementing the massive deployment of artificial intelligence technologies embraced by Arab governments. As such investments surpass those in numerous other regions, they are recognized as a region caught in a progressive AI trap. The Arab world hopes to accomplish such aims by getting AI, which deposits tremendous value in service performance, GDP gain, and achieved SDGs all supporting sustainability and innovation, in accordance with Vision 2030's core objectives.

The integration of the emerging technology including AI is further emphasized by efforts such as in ***Egypt's*** Country Programme ***"Innovation and Digital Transformation"***, which is aimed at upholding Egypt's International standards under the Organisation for ***Economic Co-operation and Development (OECD)*** through capitalize the AI in the Egyptian government which considered is significant step towards achieve of Egypt Vision 2030 initiatives towards.

Some of the industries that have witnessed AI 's adoption include insurance, and this has had an impact in transformation processes. In particular, the use of ***artificial intelligence enhancements*** such as predictive modelling and automated claims filing and processing minimizes the conventional how it's done' methods and enhances client satisfaction. Additionally, the insurance industry has increasingly applied new innovate models which have led to the elimination of routine tasks, thus increasing efficiency and productivity.

This integration of new technology with related policies therefore shows the importance of AI and associated emerging technologies towards the attainment of key Arab Vision 2030 objectives, both economic and social. Overall, these very initiatives show that change is coming direction towards sustainability, innovation and digital transformation led future.

Meanwhile, the use of AI technology and other modern technologies ***opens a new layer of risks associated with their usage within the insurance companies.*** Some options have a bearing on the dynamics of the performance of insurers who are main players of innovations in the industry. This is usually the case because such *impacts are often analysed within the framework of insurance company's KPI's,* an aspect which is already well documented in literature.

Therefore, the researcher will expound on these themes wherein, ***the risks of the incorporation of recent emerging technologies in the insurance companies will be assessed as well as its effects on KPIs.***

Section One: Emerging technology risks and its impact This sub-section considers the risk posed by the emergence of new technologies on insurance companies as measured by key performance indices (KPIs) such as financial performance, operational efficiency, reputational integrity, and regulatory compliance. The most salient risks are client privacy, cyber-attacks, fast evolving technology, regulatory changes and talent shortages. Such risks can be effectively managed by the usage of KPIs of customer satisfaction, claims settlement period and growth of the business by focusing on the expansion of services that are expected to yield maximum returns.

Section Two: Literature Review and Case Studies This section presents a literature reviews on multiple and specific issues in relations to this technological advancement and its challenges. Case studies of global and Arab insurance experiences will be addressed. Several of the studies, books and articles were reviewed to address the best practice and reforms that can help the insurers in embracing technology innovations but while curtailing the peril that comes with the innovations.

Section One

Emerging technology risks and its impact

Nowadays the progress in new emerging technologies has brought about significant positive and disruptive changes in our lives and various industries globally and in our Arab region with the most affected being the insurance industry. As illustrated in the previous chapter, many of these technological innovations have come about due to enhanced ***huge investments*** and enabling factors that have increased the pace of digital transformation and creation of new innovated and integrated business models. These have helped to promote financial and social inclusion while boosting awareness and penetration of insurance and enhancing sustainability across the industries.

However, despite the advantages of adopting innovative tools, ***there are inherent risks associated with their use including cyber threats, data privacy issues, flaws in algorithms and systems, regulatory compliance, and rapid changes in technology.*** However, overcoming the challenges posed by such issues necessitates a carefully defined and strategic approach that focuses on trust, operational resilience, and sustainable innovation.

In our Arab's insurance market case, the push for digital transformation is being championed by initiative of Vision 2030 which making the adoption of emerging technologies a matter of operational demand rather than an opportunity. The provision of those tools has also changed how critical processes such as risk assessment, claims management and customer interactions though innovate platforms such as or application and chatbots. Despite these advancements, the insurance industry is still faced with issues such as ***interoperability problems and compliance with the regulations*** which pose significant challenges and threaten the operational stability and reliability.

This chapter explores the ***key technological threats*** that emerge the insurance industry due to the incorporation of newer technologies. It evaluates their effects on the essentials of the business; underwriting, claims and customer service, also considers their overall impact on the firm's Key Performance Indicators ***(KPIs)*** such as financial performance, operational efficiency, and reputational integrity which will be explored in the next lines.

Risks associated with emerging technologies

According to the findings of the ***Global Risks Report 2024***, interrelated technology-based risks which encompass cybersecurity threats, misinformation, and the unintended consequences of AI technologies, are significantly reshaping the risk landscape, are redefining the risk environment. The risks are illustrated in Exhibit No. 7 and imply that insurers' attitude towards risk assessment needs to transform to go in line with transformational changes in the technological landscape.

The exhibit shows that the short-term risks related to misinformation and cybersecurity concerns are at the top of expectations; these risks will however remain important within the long-term. Moreover, the report affirms of the negative impacts of AI technologies, which will be felt in the coming decade.

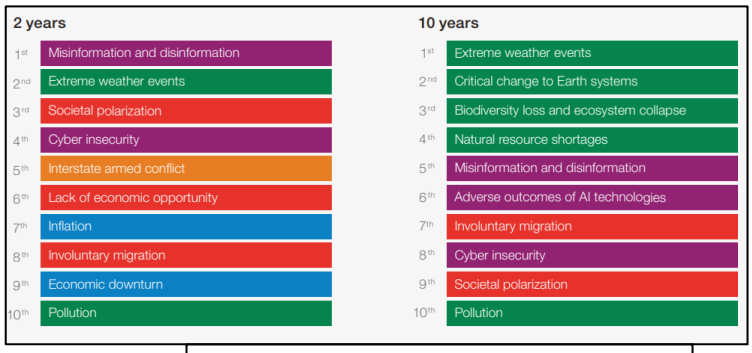


Exhibit 7: Global risks ranking

Source: WEF's Global Risks 2023-24

Additionally, as Hélène Chauveau, 2024 highlights the increasing importance of understanding and address the emerging technology risks due to grow with the expansion of the digital age. These risks can be controlled with a holistic approach as well as further improvement of the existing knowledge base. The merger of AI and the IoT opens new breaches, specifically in cyber security, as demonstrated in Exhibit No. 8, demonstrating the present risk environment. As modern emerging technologies develops associated with risks as follows:

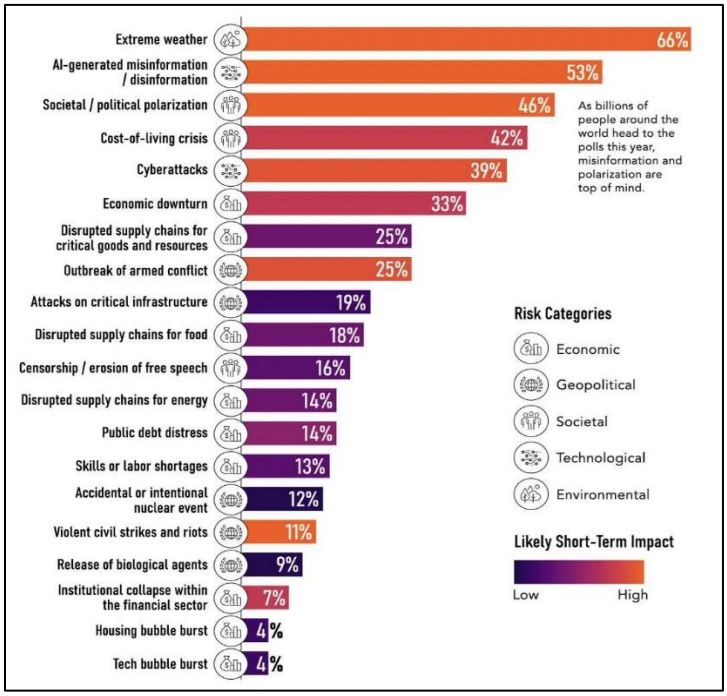


Exhibit 8: Current global risks landscape

Source: WEF's Global Risks 2023-24

1. Regulatory and Compliance Risks

Due to that the insurance industry becoming more competitive as it adopts new technologies and new innovate business models, which are creating new complex regulatory challenges and expanded compliance gaps. The speed at which new technologies are adopted is incomparable to the development of a proper regulatory framework over them, thus leading to serious issues of non-compliance of domestic and international regulations throughout the operations of insurance companies. Additionally ensuring compliance with the provisions of AI, data privacy, and blockchain applications is one of the main challenging for the insurance company to algin with the regulations. The challenge is compounded

for some Arab markets due to the existing level of regulatory uncertainty rather than promotes, innovation and increases the legal and financial risks associated with doing business in such markets. Therefore, regulators in the Arab world need to build the frameworks that are innovative and flexible to catch up with the technological advancements. (Deloitte,2023)

For instance, one of the main challenges today is the concerns regarding legality and enforceability of blockchain technology in insurance that handles contract and claims management. (Insurance Federation of Egypt,2021) For instance, AI-enabled systems being used in underwriting also give some bioethical issues and jurisdictional issues due to algorithm obfuscation or unexplainable regulatory output.

Such scenario may cause potential clashes with embedded global and local regulations in a society which makes regulating entities more complex especially pose a major threat to regulators when utilization of new advanced technologies in the insurance industry.

2. Data Privacy and Security Risks

Due to huge dependency of the of digital tools within the insurance's operation has resulted in an exponential increase in the amount of personal and sensitive data that insurers handle. The collection, storage, and processing of such a large quantity of data poses considerable threats to data privacy and cyber security. Cyberattacks, data breaches, and unauthorized access to consumer can erode trust, hamper activities, trigger tough enforcement actions and lead to regulatory penalties.

Furthermore, according to a survey conducted by *MAPL World in March 2023*, as mentioned previously, revealed that nearly 60% of the surveyed organizations faced challenges due to the inappropriate security measures.

According to Exhibit No. 9 from the Allianz Risk Barometer 2024, cyber risks have been identified as the top concern for businesses in terms of causing interruptions. As a result, the insurance industry must adapt to effectively address these significant challenges posed by cyber risks.

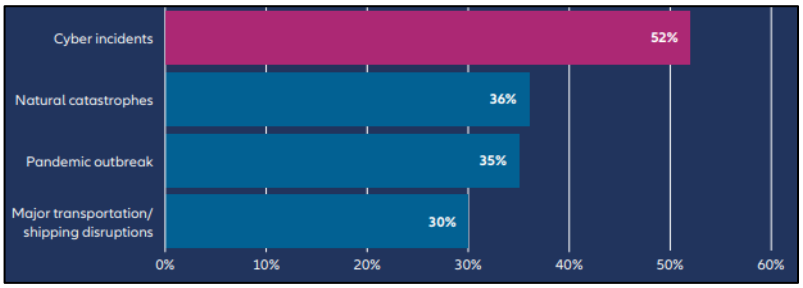


Exhibit 9: Top risks that cause consequential losses

Source: Allianz Risk Barometer 2024

3. Insufficient technology infrastructure and investment challenges

Data underscores, inadequacy of technological infrastructure and cost inefficiencies which impacting negatively towards address technology in the insurance industry. Such insufficient infrastructure technology which impairs growth, integration and creativity, and subsequently diminishes the insurers efficiency in managing the challenges posed by market shifts. IT system's upgrading is indeed a requirement, but it does however involve huge investments particularly in approach new technology, replacement of hardware, acquisition of software and training of employees. Such costs are especially problematic for small insurers as they constrain their ability to compete effectively in the insurance market.

According to *McKinsey*, that the modernizing of the current infrastructure often requires addressing inefficiencies in legacy systems, such as *"spaghetti integration"* to address the operational complexity and costs. However, the changing system components and automating them will provide great profitability in the future. Researching data and strategic planning when moving to the cloud-based system helps provide an opportunity to fit IT systems with business goals thus increasing effectiveness and socio-economic efficiency (McKinsey & Company 2023, DXC Technology 2023).

Moreover., the outdated infrastructure led insurers to increased risks such as cybersecurity attacks. The trust of customers is likely to be robbed alongside sensitive information and customers may not be loyal to the organization which might mean a reduction in written premiums. Therefore, the address of the adequate structure, including utilize the AI and other new emerging technology (World Economic Forum, 2024) leading to industry and insurer to stop further suffering of the opportunities losses.

Eventually investing in upgrading technology infrastructure is likely be high, which explains why some insurers resist towards change their strategies and processes to be more competitive. The collective and the ability of the insurers to anticipate and respond is most vital for their survival in a more competitive market with rapid changes.

4. AI algorithm challenges

The recent technological drivers have introduced new risks and complexities. One of the main potential risks is AI's capabilities in facilitating ***fraudulent activities***. However, the AI systems are very advanced, but they can be fooled and even misled by someone with malicious intent using adversarial attacks in order to simply manipulate the data input for the purposes of deceiving the AI algorithm for instance committing financial fraud. Which shown clear on the claims management where automated systems may hide the fraudulent acts making it

difficult for manual intervention to uncover inconsistencies. (Amerirad, B., Cattaneo, M., Kenett, R.S. and Luciano, E., 2023)

Additionally, AI integration across insurance platforms creates ***interconnectivity risks***. These technologies are usually made up of networks of different systems that are interconnected, and the relationships of these systems create plenty of risks. A failure in one section of the system's network impacts on the other interconnected systems bringing operations to a halt and unauthorized access to information and even advanced systems. This is made worse with the ever-increased use of cloud-based applications and third-party services making it hard to safeguard the confidentiality and integrity of data. (Yong, W., 2023)

Moreover., the ***Algorithmic Bias*** in AI models is another risk that requires urgent action. These biases result from AI algorithms being trained on data sets that are not representative or are biased thus the end results are decisions that can be viewed as unfair or discriminatory. Therefore, led to anti-competitive pricing policies, exclusions or the denial of claims, with the full impact being felt by a few. Cases exist where certain demographics for example, are disadvantaged because of the structural properties of the algorithm, some others show the effects of AI systems where individuals are prejudiced against because of poor quality data supplied to systems. (Huang, F., 2022)

5. Risk Misclassification

The misclassification or underestimation of risks along with the utilization of new emerging technologies that are incorrectly placed under traditional risk categories. For instance, get miscalculated when new machines are admitted that interfere with the existing systems, creating discrepancies which led to gaps in underwriting and risk assessments. These discrepancies can lead to modification in claims management, reserves, and rate setting models, violation of the insurer's net worth, resulting in financial loss. (Risk & Insurance, 2024) Additionally, further concerns include the in accurate risk assessments, that leads in ineffectively pricing some while charging actively for others, leaving the insurer with no claims as there is no backing for them.

Moreover., insurers are also unable to create tailormade coverage solutions or business models because they do not have sufficient input data into some risks and this leaves policyholders unprotected against newly posed issues. For instance, do not always contextualize well new types of risks such as those posed by cyber threats or climate change or even new technology developments. This failure among insurers to identify different types of risk next, may expose each one of them to the different risks associated with under provision of insurance, leading to an array of financial and reputation losses. (KPMG International, 2016)

6. Skills gap and talent shortage

Almost of insurers have struggled on hiring and retaining well trained staff who not only are skilled in the processes of applying the AI technologies but are also able to promote the ethical concerns around such innovations and understand the risks associated with them such as ethical issues, cybersecurity or biases in the decision-making algorithms. According to a survey conducted by *Ernst & Young in 2023*, 67% of insurance executives consider talent acquisition as a major challenge to technological progress in the industry. Such findings emphasize the critical need for a qualified workforce capable of not only exploiting AI technology but also understanding towards address their risks.

Influence of emerging technologies risks on the insurer's performance

Recently, the performance of worldwide insurers has been influenced by the current emerging technologies, with the threats involved, such as underwriting, claims, and customer services. In ***underwriting*** activities, the big data, AI, and machine learning, among other technologies have completely transformed risk assessment process and pricing methodologies by delivering greater accuracy and personalization. However, such advancements bring with them risks, such as algorithmic biases, which may result if the AI models are developed based on insufficient or imbalanced datasets, potentially leading to improper decision-making. Moreover, the use of big data raises security issues that need to be addressed, as insurers must guarantee the confidentiality of sensitive customer data and safeguard their proprietary.

Regarding the ***claims processing*** the current automation and use of digital tools bring an advantage of being able to resolve the claims more quickly and improving overall customer satisfaction. However, these innovations have their own risks which include making mistakes or committing fraud if the automated systems are not well set up or calibrated (Deloitte, 2021). Although the application of blockchain in preventing fraud is promising, it can also be subject to cyber criminals and therefore effective cyber security and rigorous testing of the system is necessary to reduce the operational vulnerabilities.

Regarding ***customer service***, AI-powered applications such as chatbots and self-service portals have transformed the way of handling customers services, ensuring improved engagement and a higher level of satisfaction (PwC, 2020). However, these technologies also create challenges, such as the possibility of faulty communication or providing wrong answers, which could irritate customers. Furthermore, the exposure of high volumes of data raises issues related to confidentiality, especially given the higher likelihood of data corruption. (KPMG, 2021)

These results were supported by the study that have been done by Stephen M. Cropper, a Managing Director in Accenture Strategy, Insurance, who directed a sample comprising a panel study of North American underwriters in 2021. It was found in the survey among of 434 participants that although the emerging technologies have a positive beneficial influence on the underwriting process, the cost associated with it is also high at 50%, as evidenced in Exhibit No. 10 below.

Moreover, the overall study also demonstrated that the average underwriter is now spending a significant amount of their time on other non-core tasks rather than the core unwriting activities towards respond of the current risks associated with the new technological advancements.

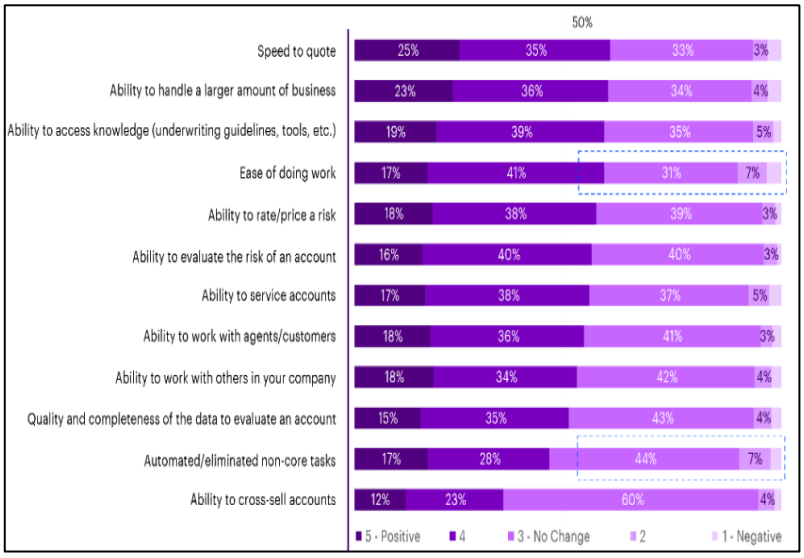


Exhibit 10: Technological effect on underwriting activities

Source: 2021, P&C underwriting survey

Additionally, the survey highlights he analysis of the workload for underwriters and makes comparisons regarding the change over the period of 2008 to 2021. It reveals that the increase in the overall workload that was experienced within the industry because of the utilization of new technologies was much less.

However, despite a reduction in the amount of work performed, activity that was geared towards the core tasks increased to 38 percent in 2021. This transition point represents the underwriters' adjustment process in dealing with the emerging technological tools and risks that are associated with them, as seen in Exhibit No. 11.

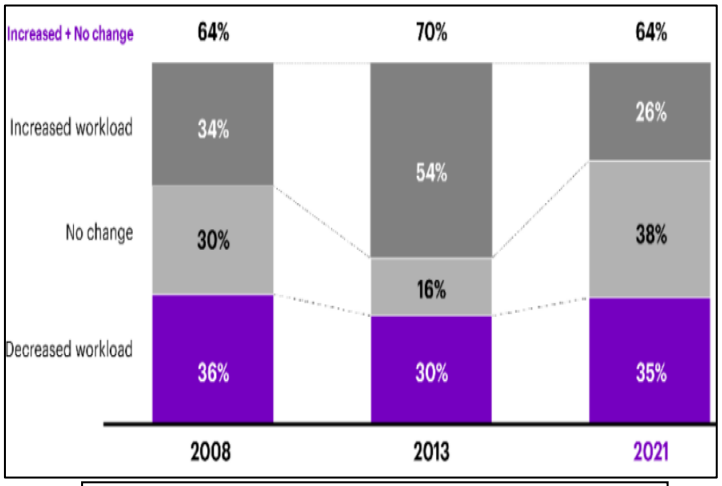


Exhibit 11: Technological effect on workload

Source: 2021, P&C underwriting survey

Impact of emerging technology risk on KPIs of insurance companies

However, such technologies advancement poses risks which greatly influence Key Performance Indicators (KPIs). The resulting effects of these risks on the Financial Performance, Operational Efficiency, Reputational Integrity, and Regulatory Compliance as follows:

1. *Financial Performance*

The Financial Performance of an insurance company which targets areas like revenue collection, claim settlement, and cost management, is crucial for the insurance business. Regulatory non-compliance and cybersecurity incidents put strong pressure on the business results. Such risks usually cause the rise of operational expenses related to non-compliance, fines, legal fees, and remediation measures. According to *Wall Street Journal (2024)* warns that non-compliance with evolving regulations may lead to very large financial penalties which reflect on the profit results. Furthermore, error AI risk evaluations may misclassify premiums and insufficient reserves, therefore reducing the profitability and competitiveness.

Moreover, add to these barriers, *Financial Times (2024)* reports that the failure to adequately investment infrastructure inhibits innovation and limits growth potential which will reflect on negative feedback of the speeds up the processing as well as decreases the accuracy of the activities thus effect of customer satisfaction bases.

2. *Operational Efficiency*

Operational efficiency is the most important aspect that allows seamless flows, improves customer engagement, and controls threats. Inadequate technology infrastructure and lack of workforce capabilities pose substantial challenges. As highlighted by *Financial Times (2024)* that in adequate technology systems are often constituents of delays in claims processing and underwriting. Such constraints are worsened by obsolete technologies and poorly funded innovation programs. Furthermore., *Deloitte (2024)* also observes that in some cases, low levels of accuracy of AI performed algorithms in most cases demands manual touches which interrupts automation and increases expenditure.

3. *Reputational Integrity*

One of the main assets of an insurance company is its reputation which helps to earn the confidence of a customer and where it stands in the market. Events such as a data breach or poor handling of sensitive customer data greatly diminish trust. According to *Deloitte (2024),* such abuses usually result in customer loss and a decline in market presence. Also, biases in AI algorithms or lapses in regulatory practices can spark considerable public anger and contempt.

Meanwhile., the *Wall Street Journal (2024)* notes, violating the rules of the regulatory framework affects brand equity which in turn decreases customer lifelong retention. Adhering to high standards of data privacy and being open about them is necessary for trust. In a competitive world whereby technology is the core, the use of sophisticated technologies within the frameworks of ethics will not only protect brand equity but also increase in competitive uniqueness.

4. Regulatory Compliance and Legal Exposure

The insurance industry is highly complex due to the continual regulatory changes. It is shown in the *Financial Times (2024)* that the inability to incorporate with the recent and updated changes brings about penalties, sanctions and harm of reputation. The existence of regulatory discrepancies across regional boundaries increases the cost of compliance and depletes financial and other resources.

Data and information breaches increase a company's legal exposure, liability and can result in hefty costs that disrupt a company's ongoing operational activities. A forward-looking approach which encompasses early consultation with regulators and installation of sufficiently strong compliance measures helps to achieve integrity and minimizing instant damage payments. As noted by Alvarez & Marsal (2024), businesses which seek to embrace advancement through technological means and are willing to consult regulators at the onset of the change are less likely to suffer from exposure and will be apt to retain operational resilience.

***Summary and Conclusion**:* it shown clear from the previous lines that the new and emerging technological advancements have brought in new classes of risks which are increasingly being acknowledged as some of the major challenges within the insurance industry and the performance of the insurance companies. These risks include regulatory and compliance issues, data privacy and security risks. Some key challenges to this ambition are insufficient technological infrastructure and investment, challenges in the AI algorithms, risk misclassification, skills gap and talent shortage. In addition, these technology risks have an adverse effect on the most important key performance indicators (KPIs) of the insurance industry for instance financial performance, operational efficiency, reputational integrity and regulatory compliance.

Therefore, the researcher explores in the next section the literature reviews and case studies to reach out the proposed new reforms and strategies aimed at promoting the role of insurance in the realization of the Vision 2030 and achieve SDGs.

Section Two

Literature Review and Case Studies

In this section the researcher goes through the literature review and addressing various and specific issues related to the new emerging advancement technologies, its risks, and their negative impacts on the key performance indicator of the insurance industry. Moreover, this section also contains case studies increasing the focus on markets and companies and taking into account the circumstance of each market.

The researcher focuses on the top three markets of the research's subject for both literature reviews and case studies including mention the global perspective. These analyses are elaborated upon in the subsequent lines.

Literature review on the impacts of risks associated with new technologies

The literature review discusses the transformation that technology has brought into the insurance market, paying particular focus for the layers of the risks and challenges introduced such innovations. The research conducted by ***(Afrifa,2018)*** has been highlighting the mobile commerce aspects as an improvement in life insurance service provision. This early exploration places mobile distribution and proper data information systems as the order of business enhancement but also points to other earnings threatening factors risks like credit, environmental and liquidity risks. The increased risk tolerance coupled with movement away from traditional re-insurance models serves to further this argument.

In this light, **(*S. Adeyele & N. Maiturare ,2017)*** indicate how the insurance sector needs to have serious management of risks in the context of sustainable development. They also advocate the development of product offerings and raising awareness as to avoid unnecessary losses that might arise from catastrophes. This view has already been receiving considerable support as it has been noted that the insurance industry has the ability to promote the sustainability in the market, economy and its activities when doing effective management of risks.

In the Saudi Arabian context, ***(Alatawy, 2017)*** examines the barriers to e-health insurance implementation. Discussing the potential benefits, he explains that there are drawbacks. For example, lack of awareness and limited resources constrain the progress of simplifying and improving health insurance services. This emphasizes the significance of the modernization of insurance providing complex services and focusing on the ways to address the limitations of the growth of new technologies for the health insurance lines.

The notion of disruptive technologies finds deeper explanation through ***(Ab. Rahman et al., 2017)***, who consider the impact of new technologies on the existing operating systems. Their findings imply that cooperation among different

players is crucial to the realisation of these innovations together with mitigation of the threats posed to the supply chains and trade.

In his discourse, ***(Mungo ,2019)*** examines the connection between innovation capability and competitiveness in insurance companies. The study shows that improved technologies are fundamental in enhancing productivity and quality of service offered to customers, thus reiterating the fact that the insurance entrepreneurial environment is continuously changing and such changes need to be addressed by the industry including the address of its risks.

(Sadat Fatemi & Sabbaghian ,2019) explore how information technology alters risk management practices arguing that every technological breakthrough introduces new risks but also affords innovate means of mitigating those risks. This duality emphasizes the need for adequate risk management mechanisms that will address the new and the old threats.

(Mullins et al,2021) details the ethical obligations which accompany the usage of big data and artificial intelligence in insurance industry. They emphatically point to the imbalance in information and context and urge that guidelines policies be put in place in particular with the insurance industry. They thus underscore the need for more dedicated efforts to set policy and ethical benchmarks for use of information technology in the insurance sector.

(Malavasi et al. ,2021) being with the technologies insurance cover against cyber threats that are penetrating industry at an ever-increasing rate. They offer insights around the fight against cyber-risk and highlight the need for the development of smart ways to understand and manage this type of risk which emphasizes the emergence of products that would be constructed specifically for cyber insurance cover.

According to ***(Tsohou et al,2023)*** the cyber insurance market is one that requires an analysis of current trends as well as future potential in relation to its needs. Cybersecurity investments by organizations may prove to increase the demand for cyber insurance. It makes perfect sense organizations would be concerned about the process of underwriting and what sort of risks would even be insurable.

Additionally, the studies done by ***(Wang et al.,2023)*** and ***(Ge & Zhu ,2023)*** advance the discussion about the role of artificial intelligence across industries, including healthcare and FinTech. They highlighted the critical need to approach tailormade insurance policies that respond with the current liability and cybersecurity risks associated with AI technologies contingently upon initiatives to mitigate them using digital resources.

(Javaheri et al., 2023) investigate the overlap between cybersecurity and financial technology and underline the importance of regulatory technology in risk management. Their conclusions indicate that the insurers should evolve in

response to the changing regulation environment by address the new technology tools.

On this note, ***(M Mubaraka et al, 2018)*** within their research highlight the strategic issues the insurance industry in East Africa encounters because of poor adoption of information and communication technology within their suitable framework. Their study proposes the creation of an E-insurance platform that seeks to promote and facilitate the public thereby eliminating the challenges to development and compliance. This trend is consistent with the trend broader uncovered by ***(Ofunya Afande, 2015)*** wherein she observes the impact that globalization has had on the insurance market, explaining that it has been brought by the technological development and the changes in the nature of the consumers.

Literature review on the adverse Impact of technology risks on KPIs of insurance companies

According to literature regarding the impact of adverse effects on KPIs of the insures, there as exist a complex issue that influence the financial performance, operational efficiency, reputational integrity, regulatory compliance and legal exposure of a company in equal measure. A Study by ***(B. Angima and Mwangi,2017)*** stresses on the fact that proper management of the automated technology system of the claims handling and underwriting process has significant value to the profitability of a company in the property and casualty insurance lines. Their findings also indicate that a loss ratio of more than hundred percent will lead to financial underperformance which warrants the need for strong management of the insurance firms to less the losses incurred within the underwriting department.

Regarding the insurance market in Saudi Arabia, ***(Ali & Rumzi Tausif, 2018)*** contribute to the disclosure by analysing whether there is a link between the service quality provided and the financial performance of the insurance companies in terms of profit. Their study confirms that there is a large link between the service that clients get and their satisfaction which in other terms can be said to translate to profits for the insurance companies. This has a bearing in the Arab countries as well where the customers perception of service is to a larger extent determines efficiency and reputational integrity.

(Karami & M. Pendergraft, 2018) aid in further supporting this argument through their exploring the implication of consumer responses on businesses revenues within the insurance auto sector. As these individuals conducted an assessment on the online reviews, they found out that negative customer experiences tend to increase the operational costs which in turn, decreases the financial performance of the firm and thus makes the case that firms doing business in the current era need to be more proactive about reputation management.

(Shawar, 2019) broadens the scope to include the indicators that influence financial performance in the context of the Pakistani insurance sector that have affected by the new modern technology. It is clear that management strategies, markets and external conditions are critical in explaining the finance of the insurers, which concurs with the difficulties in the industry in the context of various regions.

In the context of non-life insurance sector, ***(Ali et al., 2019)*** employ the CARAMELS framework to categorise factors affecting the financial soundness of firms. On their part, such findings explain why management competence and leverage are so important for the firm's financial growth performance, implying competitive aspects are crucial for some insurance firms in non-monopolistic market environments.

Additionally in the study, ***(Tilu Maseki et al., 2019)*** add a different perspective by dealing with the performance of insurance companies in Kenya's market by identifying other problems which have resulted in poor profitability ratios and negative sentiments towards their clients who not knowing the use of technology. This is particularly posing challenges on their financial performance and the ability of the market to remain stable.

As for ***(Pfeifer & Langen, 2021)*** their views do on the manner of dealing with and performing insurance business under the context of sustainability that is quite pertinent, they explain how climate change introduces new risks and challenges that may affect performance and processes within the organization. Thus, according to them, the market does not remain constant, and the firms have to evolve according to the changes and the market expectations in order to continue being in business.

In conclusion, it is ***(Azzabi & Lahrichi, 2023)*** who comprise the general perspective of the existing body of literature by emphasizing his phrases related to the importance and relevance of KPIs in the markets of the Middle East and the worldwide. Their assessment adds value to the justification of further studies into the negative influence s on these variables to guide management of the indicators for the protection of the industry.

Summary and conclusion of the previous literature reviews:

The reviewed literature simultaneously shows the negative and positive aspects of the growth of new emerging technologies including its potential towards transform in the insurance industry. On one hand, new technologies such as mobile commerce, artificial intelligence (AI), and digital platforms have improved the way services are rendered, the way business is operated and offered new tools for the management of risk. On the other hand, they have introduced significant challenges such as increased threats to cybersecurity, moral hazards, reputational risk, and financial underperformance.

As with any disruption, their use raises a considerable number of risks for insurers, and these need to be managed by suitable regulatory reforms, ethical and risk management policies. Studies highlight that that effective risk management mechanisms such as improved financial performance and building customer confidence, enhance risk management measures, tailored new products and customer measures are essential. Similarly, ethical business practices or engagement and taking deliberate initiatives to meet the market needs in prospectively are of great significance.

Moreover, the adverse effect of technological risks on business KPIs also emphasizes the need for effective reforms and strategic planning. The findings suggest that to meet changes in consumer behaviour and climate including approach securities measures and regulatory enhancement including upgrading and investment of the infrastructure technology. Hence, collective action by all the stakeholders and investing in the skills needed to enhance technology enabling will be critical for success.

In conclusion, it is clear from literature the need for enhance the risk management towards respond the recent emerging technological including regulatory reforms, risks mitigation, training the talent employees and upgrading the infrastructure technology. In broad terms, resolving these questions will allow the insurance industry to fully utilize the disruptive power of innovation, while at the same time eliminate its risks, which will be a competitive and sustainable future.

Case Studies

In recent years, the insurance companies worldwide, including those in the Arab region, have increasingly adopted advanced technologies to enhance operational performance and efficiency of their customer satisfaction. While these innovations enhance the business handling process and approach new business models, they also introduce some other risks such as cybersecurity breaches, algorithmic biases and data privacy concerns which may adverse effect the KPI's as mentioned earlier by the researcher explores including the literature reviews. Furthermore, given that insurance companies are attempting to achieve their visions while also enhancing their contribution to the SDGs and Vision 2030, there is now more pressure on improving KPIs such as revenue growth, customer retention, and overall operational performance to respond those risks.

In the following section, the researchers explore the global and Arab regional experiences with emerging technological risks within the insurance industry, including recent developments and investments made, regulatory reforms, and suitable strategies to manage these risks.

Global Experience

The recent expansion of digital technology and the increased use of new innovate technologies tools such as artificial intelligence *AI* has heightened the increase

exposure of the insurance industry to technological risks. The cyberattack ranks as one of the most important challenges facing the industry according to the *Allianz Risk Barometer 2024*, cyber incidents adhere in the first place as the most harmful to businesses worldwide. This ranking highlights the universal trend of increasing cyberattacks, which poses financial challenges losses, reputational risks and operational interruptions for insurers.

In 2024, a *flawed CrowdStrike Falcon Scan update*, led to an all-encompassing IT shutdown across multiple industries, including insurance. According to the Egyptian insurance federation (Press Release No. 343) stated it to be a disturbance of operations, delayed of claims processing, and a trust eroding incident. The overlaps in travel and hotel industries disrupted lines of business such as travel insurance, and aviation and hospitality generated business disruption and failed to serve the public utilities.

Although the *AI* and machine learning ML have automated several activities within the insurance industry, they have brought about challenges such as biased algorithms or data privacy concern as actual shown in examples that the AI underwriting tools have been biased and discriminated against individuals from certain minority communities by charging high premiums because of bad data or flawed training models. Relatively better have been the cases where privacy concerns emerged in the use of customer data without permission for predictive purposes threatening the trust and regulatory penalties.

Such instances highlight the urgent requirements for ethical AI governance and data privacy measures. The *World Economic Forum 2024* remarked that biased AI models can lead to such features like unreasonable pricing or anti-discrimination which violates compliance and customer loyalty. Such features cause detrimental effects to KPIs. Therefore, the insurance companies try to be mitigating these risks through dedicating resources for ethical AI frameworks in order to promote transparency and fairness as effective methods of responding to technological risks, ultimately aiming to achieve the SDGs.

Cybersecurity remains a big concern during this digital time due to the recent dependency on technology has grown to such an extent a part of an interlinked system with the aid of cloud and infrastructure making all of them increasingly vulnerable to cyber-attacks. All of this implies that insurers who own sensitive data for innumerable customers are in increased threats for breaches and ransomware attacks. Adverse events like worldwide technology blackout in 2024 reveal some of the technical issues that need fixing. There is therefore an increasing demand for advanced techniques to protect data integrity and ensure that operations continue running.

Inconsistency regulations across various jurisdictions complicates international business further. To illustrate, the *General Data Protection Regulation (GDPR) of the European Union* is a strict enforcer of data protection measures *European*

Commission, 2021. On the other hand, more lenient standards in different parts of the world increase compliance costs and operational inefficiency. The recent reforms of regulatory frameworks are essential for seamless operations and global conformity. To demonstrate, disparities between GDPR of European Union and less demanding regulations elsewhere may be problematic to multinationals insurance firms thus raising compliance costs and lowering operational efficiencies. Furthermore, difficulties are faced by insurers operating in diverse data privacy law regions in managing cross-border data transfers as well as maintaining consistent cybersecurity standards. Hence, these divergences have underscored the need for concerted international regulatory interventions for minimizing disruptions and facilitating a more cohesive global insurance market.

Experiences of Leading Global Companies

1. AXA

AXA is a leader in blending artificial intelligence and blockchain technologies that makes claims processing and underwriting more efficient. AXA Future Risks Report, 2024 ranks cyber risks as third most significant global challenges while AI related risks are fourth in the listing. AXA has adopted AI ethics frameworks to address algorithmic bias and embraced blockchain for secure data management. Through these measures, customer trust has improved significantly alongside other KPIs like claims accuracy and operational efficiency. Additionally, to address the technological risks AXA offers employee training programs on cybersecurity as well as contributing towards public campaigns aimed at sensitizing people about the same; funding research initiatives in universities to reduce its effects on society. Consequently, this has led to various concrete results for instance organizations' readiness to face any cyber threats and enhanced knowledge of digital security by masses. By creating an atmosphere of cybersecurity consciousness and investing in research, AXA strengthened both its own defences and its standing as a pacesetter in grappling with technological issues within the insurance industry.

2. Allianz

Allianz utilizes the power of technology and analytics to foster better connections with their clients. After sustaining the 2023 ransomware attack, Allianz turned to zero-trust architectures in conjunction with industry consortia to share threat intelligence and bolster their cybersecurity. As mentioned in the Allianz Risk Barometer (2024), cyber incidents were ranked as the number one global risk which has encouraged Allianz to also incorporate advanced detection systems alongside more skilled cyber personnel.

3. Ping An

Ping An is renowned for its development of custom-tailored health insurance products with a twist, that is through their advance technology of artificial

intelligence and extensive data analysis. Due to a data breach that occurred in 2022, the company was able to establish an encryption protocol, barrier authentication as well as a separate cyber defence team. It was developed further on the 1st of March 2024 when Ping An issued a report that implemented tighter security regulations for their data further helping with customer confidence of their data security.

Arab Experience

There are significant efforts from Arab countries to adopt advanced technologies in the insurance industry. This awareness is reflected by the introduction of the digital supervisory platform by the UAE, as well as Egypt and Saudi Arabia's Vision 2030 regulatory reforms. Customer engagement optimization and claims process improvement are also part of market requirements that fuelled a rapid change. Such companies as ADNIC in the UAE, Tawuniya in Saudi Arabia and GIG Egypt in Egypt. For instance, have started to apply AI and blockchain to responds such expectations. This is in line with Vision 2030 agendas which were endorsed by Arab countries towards respond the risks that associated with the recent initiatives of innovate emerging technology drivers.

1. United Arab Emirates (UAE)

The UAE insurance industry has recorded impressive growth in in the address of new technologies, particularly the investment into blockchain and the creation of a digital supervisory platform. These technological drivers support the insurtech vision that the UAE government is championing towards 2030.

The UAE case presents remarkable progress in insurtech, particularly in the areas of smart contracts, AI-based solutions, blockchain technology and the potential of approach robotics, as per the annual report findings of *Emirates Insurance Association* and statistical report prepared by the *Central Bank of UAE* for the year 2022. There has been more of strategic alliances, and the availability of international skills cum expertise in readiness for setting the region's standards.

One of the success stories in the UAE that is worth mentioning is the ***Abu Dhabi National Insurance Company (ADNIC)***. *ADNIC* has made use of innovative solutions with the aim to improving the customer experience and service delivery. A good example is the company's virtual tool - chatbot - 'Saeed'. 'Saeed' assists customers throughout the entire process such as guiding them in submitting medical claims, home and medical insurance proposals, credit shield and travel claims forms, etc. *ADNIC* also enhances accessibility to medical services through the business account on WhatsApp by posting QR codes for medical networks.

ADNIC has also adopted blockchain technology to enhance efficiency of operations through Addenda, a Blockchain powered digital tool. This platform allows insurers to effortlessly close off motor recovery receivable ledger accounts which previously took more time and effort to get these tasks done.

Furthermore, ADNIC stated in their Press Release No. 14 of December 2022 with the title ADNIC Company Prepares for The Future In 5 Areas, that they have also progressed in introducing secure cloud computing services which have been helpful in mitigating cyber-attacks and secure their data which strengthening the overall resiliency of the organization. They have also placed emphasis on empowering their staff allowing them to seize opportunities and appropriately mitigate and manage technological risks.

2. Saudi Arabia

The Saudi insurance industry is experiencing rapid change driven by technological figures, regulatory structures, and reforms which all seek to support the Kingdom's Vision 2030. Under the guidance of the *Saudi Arabian Monetary Authority (SAMA)*, the implementation of AI, blockchain and data analytics has improved the operating performance of the business, enhanced the customer experience, and helped to meet required standards. The use of AI technology facilitates the operation and settlement of claims, pricing and risk evaluation among others. Additionally, blockchain uses aids encryption in enhancing data security. The Regulatory Technology (RegTech) automates the 'compliance workplace', complies with the ever-changing set of rules and regulations and improves accuracy in reporting. The financial crime suite by Eastnets is an example of an advanced KYC and AML solution that uses AI to detect fraudsters and simplify the process of confirming the identity of its clients. The insurer has been addressing the rising cyber threats with the use of determined cyber protection tools powered by Artificial Intelligence, and endpoint security (Mustafa Melhem, 2024).

Tawuniya, the leading insurance company in Saudi Arabia, has joined forces with SAS in embedding a high-tech, AI based Insurance Fraud Management system into its health insurance industry. This initiative is focusing on strengthening the history of Tawuniya of combating fraudulent activities in the industry e.g. filing for false claims (Forbes Middle East,2020). This partnership will help in analysing the SAS's management and assist Tawuniya in optimizing the speed as well the accuracy in settling out the claims which will help in cutting down losses made due to fraud and furthermore improve client satisfaction. It is also in tandem with the Vision 2030 that has been laid by the Kingdom of Saudi Arabia that aims to bolster the growth and sustainability of the insurance industry. The operational goals of Tawuniya's Strategy 2025 are closely aligned to the set objectives of the Kingdom's Vision 2030. Within Tawuniya, such plans as health, and motor insurance schemes have been intended to reach the masses through making it a reasonable price and broadly targeting them. These undertakings focus on the mitigation of the threats brought about by innovations such as fraud or cyberattacks detection and are consistent with the goals set out in Vision 2030.

3. Egypt

Egypt's insurance market has implemented a few key significant developments including reforms aimed at increasing technological resilience by taking advantage of digital platforms and other advanced technological tools. This is aimed at enhancing efficiency, deepening market coverage and enhancing customer experience which includes greater customer acquisition and engagement as well as collaboration with various stakeholders within and outside the financial services industry. This development is in tandem with the vision of the Egyptian President Abdel Fattah El-Sisi who is focused on issues of 'financial inclusion and SME's sector support', as well as the use of digital payment systems and cyber security. Among the remarkable achievements is the construction of high-level data hosting centre for the located in the New Administrative Capital which is rated as one of the best of its kind in the region and in Africa.

These are also further enhanced by the deployment of various strategies aimed at weakening the security measures, supporting innovation, encouraging cooperation, and maximizing the level of compliance with regulations. An important milestone is the enactment of Law No 155 of 2024 which mandates every insurance company to obtain cyber insurance coverage. This law also attaches the minimum data protection requirements and responsiveness measures for sensitive data, to ensure that there are penalties against failure to comply with the measures.

GIG Insurance - Egypt is considered one of the leading players in the private sector in the Egyptian insurance market, offering tailored products such as SME solutions that leverage advanced technological tools like platforms and mobile applications. The integration of digital payment solutions, including partnerships with fintech companies, electronic payment companies and banks, has further streamlined transactions and improved customer satisfaction.

The company has introduced real-time monitoring tools, developed user-friendly mobile applications with built-in security features, and prioritized staff training on digital risks and data protection. These initiatives have improved market penetration and resilience.

Additionally, GIG Egypt provides tailor-made products for clients to cover cyber risks and actively participates in ICT events. In November 2024, GIG Egypt participated in workshops and activities to raise awareness of cyber and technological risks, demonstrating its commitment to fostering a secure and innovative insurance environment.

In conclusion, it is clear from the global and regional successful case studies that the new emerging technologies plays revolutionary for the insurance industry but also brings a host of challenges including cybersecurity, algorithm problems, and lack of common regulatory frameworks. These factors can undermine trust in the customer base, disrupt operations, and elevate compliance, AI ethics frameworks, cybersecurity measures, and regulation reforms are addressed.

Addressing a proactive approach to these issues will enable the Arab regional insurance industry to improve on its operational efficiency, ensure customers' confidence and further support larger economic and societal objectives. Moreover, the global and regional experiences have demonstrated that these risks can only be managed by having full frameworks of handling these risks including cyber security measures and harmonized regulations. To achieve these goals, the insurance industry needs to continue building innovation and resilience to strengthen its role and actively contribute to the government's Vision 2030.

Chapter Three

Enhancement of the Insurance's infrastructure technology

Throughout the previous chapters, the researcher has conducted a deep analysis of how the insurance industry contributes towards achieve the goals of Vision 2030 with an emphasis on their alignment with SDGs and integration of ESG principles. This review has brought out the central role played by emerging technological advances and cross-industry partnerships to innovate new creative business models. These models are altering the nature of activities through superior performance outcomes driven by innovative processes. Remarkable investments made by the AI algorithms, machine learning, among others have been major players in reshaping the Arab regional economies. These are groundbreaking developments that will have transformative effects by 2030 thus driving improved companies' performances besides enhancing GDP growth.

However, the integration of recent emerging technologies brings with it multiple challenges which include regulatory and compliance issues, data privacy and security risks, insufficient technological infrastructure, AI algorithms that are biased, misclassification of risk and shortage of skilled talent. Additionally explores different aspects of these risks on insurers' performance with special reference to their implications for KPIs including financial performance, operational efficiency, reputational integrity and regulatory compliance. This review is based on recent research literature reviews as well as addressing the successful global and Arab regional case studies. It also reports on proactive government level policy measures taken by governments, industry leaders and stakeholders in reducing technology risks in line with overall innovation of the regional economies to achieve the goals of the SDGs and Vision 2030.

Case studies from global and Arab insurance economies and insurance companies provide insights into recent mitigation efforts and regulatory reforms addressing technological risks. These initiatives demonstrate the potential of emerging technologies to enhance efficiency, transparency, and competitiveness while identifying vulnerabilities that require effective management to ensure sustainable growth.

This chapter emphasizes the need of undertaking wholesale reforms and making the necessary investments into AI technologies and talent in order to effectively tackle the outlined risks. Simultaneously, it shows no limits for using technology to transform the insurance industry. Additionally, also stresses the necessity of comprehensive strategic planning, immense resourcing structures, and enhance the capabilities to maximize the benefits of technological advancements while mitigating associated risks.

Moreover, this section delves into the importance of customer engagement and extend the culture of technology, and its risks associated within the public through adoption of certain initiatives and taking part in industry events.

This researcher will further explore the adoption of investment in infrastructure technologies, the regulatory reforms and national programs of cybersecurity measures, suitable insurance coverage, and the approaches of new innovate risk assessment and risk mitigation models. In this regard, the chapter outlines important recommendations and reforms for how the Arab insurance industry would effectively address and respond to the risks posed by emerging technologies. Such strategies aim at harnessing opportunities which will assist the industry towards contribute the Vision 2030 goals set by their respective governments and promote the sustainability agenda.

This chapter is divided into two sections as stated here below:

> ***Section One: New proposed reforms and strategies*** in this section, the new reforms and strategic recommendations which help the insurance industry capitalize on the technological risks and their adverse KPI's towards achieve Vision 2030.
>
> ***Section Two: How the address of the emerging technology risks contributes towards achieve the goals vison 2030 and green economy?*** This section looks at how the management of risks of developing technologies can help realize goals of Vision 2030 and promote green economy. The scope includes programs and models that are in line with identified SDGs, and which incorporate ESG to build a more resilient and enhance the future outlook of the sustainable insurance industry.

Section One

New proposed reforms and strategies

As the new emerging technologies introduce significant new risks which hinder the performance, the potential growth and their adverse effects on the KPIs of the insurance industry worldwide and in the Arab regional region and its economics.

This section proceeds to offer the proposed recommendations and reforms aimed at addressing the technological risks specifically for the Arab insurance markets. The designed for action reforms are expected to allow insurance companies and other stakeholders to be able to benefit up to their full potential from the technology opportunities posed. Some of the areas that needs to be addressed include formulation of comprehensive and effective regulatory reforms, creation of public private partnerships, investment in talent workforce, conducting thorough risk assessments, adopting sustainable green solutions, strengthening cybersecurity measures, investing in the advanced technologies in order to effectively reduce risks and offer new innovate insurance programs to cover such risks. Strict data security protocols are crucial towards ensure the compliance of the global and Arab standards of customer's data protection as well as investing in green technologies.

Moreover, the addressing of proactive strategies such as risk awareness campaigns, and collaboration at an international level are suggested so that insurers can manage and mitigate technological risks and the introduction of new technologies and achieve more easily innovate new approaches and sustainability within the Arab insurance industry.

Proposed reforms and recommendations for leveraging technological risks

As discussed earlier, the researcher provides in the following lines a set of technologies recommendations and reforms for the potential risks that were previously mentioned. The researcher measures recommended include reforms of regulations, strengthening the public and private partnerships, investing in competent and talented human capital, conducting thorough risk assessments, implementing environmentally and ecologically friendly practice, sustainable solutions, improving the cybersecurity of various organizations or users, and investing in technologies. All the measures outlined above are expected to help in dealing with the underlying challenges efficiently by mitigating risks and creating new insurance programs. The suggested reforms are described as follows:

1. ***Regulatory frameworks***

To ensure the responsible implementation of the new emerging technologies in Arab insurance industry, it's worth to establish strong regulatory frameworks that can adapt to technological advancements and recent revolution. These frameworks are expected providing a comprehensive foundation for managing all

forms of technological risks as well as stimulating innovations. There is a need to strengthen ***Data Protection and Privacy Laws*** to secure individuals' personal information. They must adhere to strict data protection standards so as to foster confidence in digital platforms which are increasingly being depended on by insurers and also comply with global best practices.

For instance, the Financial Regulatory Authority (FRA) in Egypt has adopted its regulation through the issuance of Law No. 155 of 2024. This law encompasses various ways to enable technology use and adapt to new situations that affect stakeholders in the industry both financial and non-financial. It also stipulates the least conditions for securing data efficiently and protecting it effectively. (Alaa Elzoheiry, 2024)

Furthermore., the United Arab Emirates resolved this issue by adopting Federal Decree-Law No. 45 of 2021 on Personal Data Protection that applies throughout the country except for free zones like Dubai International Financial Centre (DIFC) and Abu Dhabi Global Market (ADGM), which have their own specifics laws governing data protection (ICLG, 2021).

Additionally, there also has to be a proper recognition of the ***Ethical Implications*** of advanced technologies in order to avoid unforeseen consequences. Developing industry-specific ethical guidelines would provide the foundation for how recent emerging technological be used for the underwriting, claims and pricing. The UAE is at the forefront of new technology with its Ministry of AI as well as the Saudi Data and Artificial intelligence authority (SDAIA) releasing non-binding AI Ethics Principles and Guidelines to guide public and private sectors on maintaining ethics in AI applications (Pinsent Masons, 2023). Firms should enhance accountability by establishing internal committees on ethics that will monitor the appropriate utilization of technology to enforce fairness through mechanisms that prevent algorithmic bias and discrimination.

Adopting the ***International Standards for technology interoperability and safety, processes*** will be streamlined and collaborations enhanced in the insurance industry. For instance, as data security ISO/IEC 27001 was implemented it has allowed secure data exchanges between insurers in UAE enabling an interconnected industry that is more resilient. The absence of technical interoperability standards will hinder any attempts to integrate digital tools into other companies and across jurisdictions. Local laws should be based on global practices thereby enabling international operations while also defining safety measures for emerging technologies to mitigate operational risks (OECD, 2020).

Furthermore., ***Conducting Regular Evaluations*** aimed at assessing them as well as updating them. By involving all relevant parties such as developers of technology; a policy can be refined thus maintaining its effectiveness while at the same time remaining relevant. Through these comprehensive regulatory reforms,

Arab insurance industry can effectively mitigate technological risks while encouraging innovation culture based on trust.

2. ***Partnerships between insurance companies and regulators***

The collaboration between regulators, governmental entities, insurance companies, and private sector stakeholders is essential for managing technological risks and driving innovation in the insurance industry. These partnerships are based on pooling resources, skills and knowledge needed to address complex problems and support an inclusive growth. For example, ***Insurwave*** is a notable instance of such collaboration which is blockchain-supported platform that has been created through the integration of Maersk, EY, Guardtime, Microsoft. The marine insurance industry can get benefits from Insurwave because it handles technological risks as well as improves its operational efficiency. (Digital Insurers ,2024)

One of the ways to achieve this is by creating ***Joint Platforms*** which will bring together government agencies and private insurers for developing mechanisms for mitigating emerging technology risks. For instance, ***Shared Infrastructures technology*** like secure data sharing platforms allow insurance companies to operate jointly while remaining compliant with data protection laws. The Financial Regulatory Authority (FRA) in Egypt has implemented an electronic shared platform that facilitates dispute resolution, inquiries, detection of fraudulent claims especially during quoting process.

Saudi Arabia's Vision 2030 emphasizes the importance of such partnerships in speeding up digital transformation across a range of sectors, including insurance. These projects promote sharing of ideas and innovation to provide strong responses to issues like cyber-attacks and prejudices in algorithms. Through such joint ventures, Saudi wants to be seen as a pioneer in incorporating new technologies into the insurance industry.

Governments can also encourage more innovation by offering incentives to private sector operators. Dubai Future Accelerators program by UAE connects private sector companies with government agencies in order to address urgent needs using advanced technology. Transferring this approach into insurance could help create state-of-the-art tools and frameworks that improve operational efficiency while reducing technological risks.

By fostering collaboration and capitalizing on the unique strengths of both sides, might pave the way for adoption of ethical technology practices. This strategy will ensure that the Arab insurance industry resilient, innovate towards vision 2030.

3. ***Developing workforce capabilities***

Education and training programs investment is crucial for the Arab workforce who should be prepared to cope with the recent technological changes and risks

that affect functioning of insurance industry. A workforce that can get ready for the future with required knowledge and skills is highly needed in order to integrate new technologies smoothly while effectively managing their risks.

Governmental bodies and regulators should cooperate in the ***creation of courses and certificates*** for artificial intelligence (AI), blockchain, cybersecurity. The focus of these programs should be on developing professionals with advanced knowledge in the complexities of today's insurance operations. For instance, UAE's National Program for Artificial Intelligence provides tailor-made training initiatives to boost AI capabilities across industries, among them being insurance.

Another priority is to ***increase digital literacy*** at all levels within society. When people understand better the emerging technologies, they are actively involved in transforming insurance industry technologically. The program dubbed *Digital Egypt Builders Program (DEBP)*, for example, one of the efforts by Egypt according to Ministry of Communications and Information Technology 2023 aims at creating a digitally skilled workforce that can drive innovation and address technology related problems.

Creating strong ***partnerships between academic and practical institutions and technology developers' companies*** is necessary to achieve sustainable workforce development. These associations may result in specialized curricula, internships, and hands-on training programs which are custom-made for changing demands of the insurance industry. By focusing on development of workforces the Arab insurance field will be able to maintain competitiveness; it will also remain innovative as well as resilient in today's rapidly advancing green technological environment.

4. Innovation and product development

Allocating adequate resources to fund innovation and product development activities is a vital step toward mitigating technical risks, including providing suitable tools to assess those risks on a real-time basis.

Therefore, the right decisions can be made accordingly, offering guidance on the vulnerabilities present in the insurance companies' technologies. For instance, risk assessment engines powered by AI technology help identify any potential risks, thereby addressing them appropriately.

Furthermore., to achieve these objectives, the partnerships with research institutions, technology providers and government agencies are of utmost importance. Such partnerships promote creation of cutting-edge innovations designed to meet the needs of the insurance market. Moreover, by facilitating innovation and new creative ideas, the Arab insurance market will emerge to be one of the technological innovators and environmentally sustainable advancements at a global level and manage the threats accruing from rapid progress.

5. Cybersecurity Measures

The improvement of the cyber security measures is considered one of the main reforms for leveraging technological risks which shown on the implement ***advanced encryption standards (AES)*** to protect sensitive data from any form of breach. Moreover, the creation of detailed business continuity plan which consider any potential cyber-attacks.

These measures shown case in the financial sector launched by ***Egypt's Central Bank*** in 2021 for specific cybersecurity framework for institutions in the country's financial sector which would foster good data encryption practices and compliance. Initiatives aimed at improving the insurance market's cybersecurity posture are emphasized in this framework, which also aims to enhance Egyptian financial entities' capabilities. (Central Bank of Egypt, 2023)

Additionally, the ***Cyber Pulse*** program which launched in the UAE by the Telecommunications and Digital Government Regulatory Authority initiated the to foster awareness and resilience within the financial and insurance industries as well as handle various cyber-attacks and rapid response to any impending attacks which achieve the increase the trust in the insurance industry within the UAE's people. (Emirates News Agency, 2022)

6. Investment in new insurance coverage solutions

Recently, there is a critical need for the Arab insurance markets to expand insurance coverage products targeting emerging risks, which pose a threat to businesses and individuals at suitable prices. Therefore, insurance companies should cooperate with local regulators, federations, and reinsurance markets to create targeted products that could help soften the impact of such risks. This includes *cyber risk, digital liability, and business interruption insurance due to cyber risks.*

A crucial aspect of this strategy is the adoption of the *Enterprise Risk Management (ERM)* practice within the insurance operations. ERM practice allows insurance companies to approach risk mitigation strategy including the identification, assessing and managing risks which ensuring that all technological, financial and operational risks are dealt with effectively. The leveraging of the ERM by the Arab insurance companies allow to address the potential emerging threats, increase efficiency in resource allocation and improve higher-level organizational decision-making practices. (Deloitte, 2021).

Strategies towards implement the proposed reforms and recommendations

In order to ensure the achievement of the reforms and recommendations for leveraging technological risks which explored by the researcher in the previous section, it is essential to take into consideration the existing frameworks that target the insurance operations in regard to the recent emerging risks. In these circumstances, some strategies and adaptive measures must be taken to manage these technological risks without stifling innovation and growth including collaboration of the stakeholders including but not limited the regulatory bodies, insurance federations, reinsurers, technological developer.

1. ***Risk awareness campaigns***

The awareness enhancement campaigns that promote risks posed by recent technology including its impact on KPIs are important in informing the various stakeholders such as the brokers, clients and services providers. Such campaigns can launch trustworthy technology by showcasing examples of successful uses of the technology globally and regionally. Recent campaigns in our Arab markets have focused on digital transformation and insurtech in different lines of business including highlighting common risks such as cyber threats and offering solutions how to avoid such risks. These campaigns can tailor to these objectives through participation of regulatory bodies, stakeholders, financial institutions, and technological developers

2. ***Incentives for ethical and secured innovation***

Incentivizing ethical innovation is crucial for fostering responsible technological progress. Encouraging transparency and equity in artificial intelligence (AI) practice and protecting client information will be stimulated by providing incentives to businesses and new startups firms that implement AI solutions. This approach resonates with the increased demand for secure, sustainable, and environmentally friendly technological inventions.

3. ***Scenario planning***

Scenario planning, including strategies within business continuity plans, may be extremely beneficial for businesses in addressing potential technological risks. Such disciplines are appropriate for the Arab insurance markets to understand the impact of technological disasters, such as data breaches or system failures, on their KPIs. Moreover, exploring the risks of using blockchain for transnational insurance claims could add another layer of preparedness. Therefore, risk mitigation plans would enhance efficiency and readiness in designing broader solutions applicable to more complex management challenges.

4. ***Global forum participation***

Joining the local and global forums provides Arab insurance companies in Arab markets the opportunity to stay ahead of emerging technological risks, including

developments achieved through international collaboration. These forums allow the sharing of ideas on modern technologies and risk management approaches. Such exchanges are beneficial as they ensure that relevant issues are addressed and introduce fresh ideas from local stakeholders. Moreover, it is also possible to form global task forces with international organizations to provide supervision of technological progress and promote best practices to mitigate the risks associated with these advancements.

5. Regulatory Adaptive Policies

The recent rapid progress in the technology landscape highlights the critical need for a flexible and adaptive regulatory framework capable of addressing new trends and challenges, such as AI ethics, the use of blockchain in insurance, and evolving customer preferences. Involving industry practitioners, academics, and technological specialists with global expertise will help prevent the development of untimely or irrelevant policies in response to the ever-evolving technical risk landscape.

Summary and Conclusion: it shown clear from the previous lines that the researcher explores the proposed and reforms towards address the risks posed by the new recent emerging technological advancement which including but limited the regulatory adaptive reforms of their framework and enhancement of the infrastructure technology that were proposed take into account international standards of consumer data protection and respective legislation, as well as recent developments in the field. In addition, implementing the reforms requires establishing partnerships with stakeholders. Meanwhile the creation of the talent workforce through awareness programs and tailored courses with the collaborations with the international universities, business firms and the self-developed technology developers' companies. Key focus areas are promoting entrepreneurship and product development by approach new innovate insurance programs and implementation of ERM plans and developing necessary protection systems to overcome vulnerability issues of data.

By adopting these reforms based on these strategies, the Arab insurance markets will be well-positioned to mitigate technological risks while seizing opportunities for growth and innovation.

Section Two

How the address of the emerging technology risks contributes towards achieve the goals vison 2030 and green economy?

The proposed recommendations and reforms aim to address the technological risks posed by recent advancements of emerging technologies through collaborations and partnerships among all stakeholders within the Arab insurance industry. These collaborative efforts will enable the insurance industry to align with the objectives set by Vision 2030, SDGs and incorporating the ESG within the industry and other industries, which forms the core focus of this final part of the chapter.

In this section, the researcher explores how Arab insurance companies can capitalize on technological risks, transforming them into opportunities to build green and resilient ecosystems and promote sustainable business models, thereby fulfilling Vision 2030 goals. The strategies and recent frameworks adopted will, in essence, allow the industry to deepen its contribution to the green economy while strengthening eco-friendly insurance models. This approach will enable the sector to optimize overall business results and increase its penetration into the GDP of Arab economies.

Eventually, the research also addresses the future outlook of the Arab insurance industry and its markets towards 2030, including the utilization of the of the emerging technology by enhancement of the sustainable insurance model in the collaboration with other industries which promoting growth of the proposed potential models of the next decade which ensure the industry's resilience and relevance in a rapidly evolving landscape.

How would the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?

The researcher in the following lines explores how the Arab insurance industry would capitalize the new technological risks to fulfills the goals of Vision 2030. By engaging the stakeholders and implement the innovate strategies towards tackle recent challenges and seize new opportunities to foster sustainable green growth. The following highlight the key approaches to achieving those objectives:

1. ***Building resilient ecosystems***

A joint insurance pool and other collaborative risk-sharing models are effective solution of the risks transfer mechanism for risks associated with mega infrastructure investments or cutting-edge technology. These partnerships also limit the huge loss for the stakeholders who holding excessive liability which is undue and adverse to the technological risks. These models are involving insurance's partnerships, government structures and private business companies to share the cost of a loss. (Fareed Lutfi,2023)

For example, in Egypt the FRA had approved the compulsory insurance pools such as the establishment of a pool for travellers abroad, and for employment outside the country, besides professional liability of the highway accidents, railways and subways, and other compulsory insurances to ensure the public's safety which proposed for the cyber risks

Additionally, the insurance companies collaborate with recent sustainable national projects for the risk management such as NEOM in Saudi Arabia, the New Suez Canal and the Benban's solar plants in Egypt as well as the Masdar City in the UAE under the Vision 2030's. The Arab insurance industry utilize advanced technological tools for handling their operations of those project such as analytics to understand, model and control diverse losses.

2. ***Innovative product lines***

There is a critical need to create customized insurance products addressing the recent emerging technologies such as Artificial Intelligence, Internet of Things (IoT), and Blockchain including suitable precaution for their adverse impact on the KPIs. Such innovation presents practical risk management solutions which together with governance approach will be the key factor in attracting global investors and developing technology ecosystems for developing emerging markets.

3. ***Technology-driven market expansion***

The utilization of the technology within the Arab insurance industry is improving the integrity of the industry with the society in which insurance is made accessible for everyone including the underserved populations which shown clear in the *financial inclusion model*. Such inclusion contributes to economic development as it means individuals and businesses are provided with financial security and recover any potential losses and support the economy even further.

For instance, in Egypt, a few digital platforms have emerged to enable the development of the innovated models such as microfinance, microinsurance and bancassurance models which reflecting the collaboration between all parties involved to provide coverage through digital platforms.

Additionally, as for the UAE the country has been proactive in the use of blockchain in insurance cross border transactions in particular logistics and supply chain. This development promotes international business and economic development.

4. ***Enhancement of the sustainable insurance model***

Aligning insurance practices to ensure alignment with the principles of ESG for such principles are key in fostering responsible investment, addressing all stakeholder needs, and creating a climate resilient world with utilization of the emerging technologies.

Therefore, insurers are working towards the development of green insurance products that are best suited for renewable energy sources and climate adverse impact. Their approach towards underwriting is socially considerate which ensures the focusing on the UN SDGs of fostering environmental, economic and social welfare.

Shaping the future outlook of the Arab sustainable insurance market by addressing emerging technology and its associated risks towards 2030

The future outlook of the Arab insurance industry over the next decade is highly promising, with numerous opportunities driven by recent initiatives that have either been launched or are underway, as well as major changes to regional frameworks to accommodate new emerging technologies and artificial intelligence (AI) including its risks associated. The key stakeholders within the Arab insurance markets, which include insurance companies, federations, regulators, and central banks particularly within the three markets under the research scope are aligning their efforts to effectively fulfil their role in addressing the Sustainable Development Goals (SDGs) and integrating Environmental, Social, and Governance (ESG) considerations into their operations and integration with other businesses and industries.

This alignment strengthens their strategies and capabilities to address recent and potential emerging risks, enhance their business results, achieve their social responsibilities, and contribute to the realization of government visions for 2030, as outlined below.

1. ***Advancing the integration of financial sustainable model***

The integration of the Arab insurance industry with other industries within the new digital ecosystem, such as central banks, payment facilitators, and technology startups, as well as continuing with the integration with the energy, construction, health, and agricultural industries, is important for building a sustainable model within Arab economies. This is in consonance with the 2030 Vision and makes it necessary to formulate radically new solutions and business models that fully depend on recent emerging technologies and address the risks associated with them.

Furthermore, Table No. 2 below illustrates sustainable practices in the Arab region related to the collaborative efforts by the insurance industry with other financial industries, as captured in the *United Nations Environment Programme and the Geneva Association's 2022 report*. The aforementioned report shows the focus placed on sustainability, emphasizing the issue of sustainable models in the Arab region.

Table No.2: Sustainable Practices in selected countries in the Arab region

Item	UAE	Egypt	Jordan	Morocco	Bahrain	Saudi Arabia
Sustainable Development/ Green Growth Agenda	✓	✓	✓	✓	✓	✓
Sustainable Finance Framework	✓	✓	✓	✓	✓	
Sustainable Insurance Framework	✓	✓	✓	✓	✓	
ESG Guidelines	✓	✓	✓	✓	✓	
Sustainability/ESG Reporting	✓	✓	✓	✓	✓	
Financial Market Innovations: Green Bonds/conventional sukuks	✓	✓	✓	✓		✓
Insurance Market Innovations: environmentally friendly products	✓	✓				
Sustainable Finance /Insurance Awareness and Education Initiatives	✓	✓	✓	✓		
Supportive Regulatory Framework	✓	✓	✓	✓	✓	✓

The above table highlights the recent and potential sustainable practices adopted by different countries in the Arab region, including the countries within the scope of this research. It shows a remarkable tendency to promote and enhance the sustainable model within both the financial and non-financial industries. Even though there is clear movement towards sustainable practices in the insurance industry, it lags most other industries as of 2021. Their ongoing efforts to enhance integration with key industries are crucial for achieving Vision 2030.

Exhibit No. 12, titled "Ecosystem: An Outlook for The Next Decade (2022-2030)," was put together by Intellias – Global Technology Partner in 2022. This exhibit illustrates the inclusion of both financial and non-financial institutions, including the insurance industry, to create new added value and enhance sustainability models across industries.

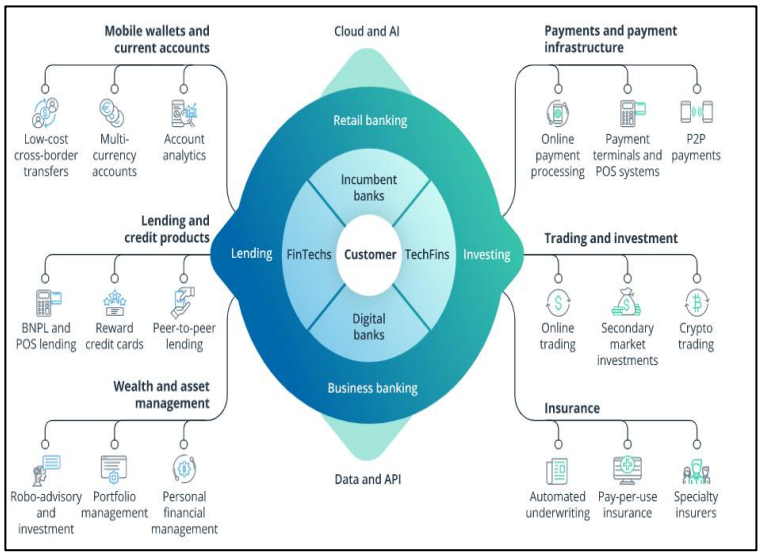


Exhibit 14: Ecosystem_ An Outlook for the Next Decade (2022–2030)

Source: Intellias_ Global Technology Partner,2022

2. *New creative business models and reinsurance solutions*

In the next decade, the Arab insurance markets will adopt new business models based on AI and data innovations, while focusing on sustainable models and

responding to any emerging risks. This will help improve risk assessment, enhance customer experiences, and increase operational efficiency. A few potential models in the Arab region include ***peer-to-peer (P2P) insurance***, where individuals share risks and are offered personalized coverage, and demand-surging insurance or ***usage-based insurance***, which lowers premiums proportional to usage and can be handled through secured infrastructure technology.

Developing these models is gaining traction with ***parametric insurance***, which diverges from traditional insurance by providing predetermined payouts or certificates and bonds based on weather triggers, rather than monetary compensation based on actual damages. In doing so, it enables the advancement of technological infrastructure used to keep track of the triggers, such as natural disasters or weather events. For policyholders, this allows for speedier payouts, higher transparency, and greater control when it comes to coverage design. The same applies to insurance expenses, where greater control is given to businesses and residents during low-risk periods. This model is especially effective in disaster recovery and agricultural insurance, where tailored parameters, like rainfall levels or earthquake magnitude, are set for payout triggers (World Bank Group, 2018; Ashley Hancock, 2023).

Additionally, the new emerging technologies give rise to the integration of insurance and banking through digitalization, presenting new opportunities. Banks may issue certificates or bonds to fill reinsurance capacity gaps, utilizing ***Alternative Risk Transfer*** techniques that convert insurable risks into investment instruments. This integration will enhance operational efficiency and drive innovation across both financial and non-financial industries, which is a recent trend in other surrounding markets (World Economic Forum, 2021).

3. Climate change adaption including address 2050 goal net zero carbon emission

The Arab insurance markets, by leveraging new technologies and AI tools in climate-related risk mitigation, can effectively address risks arising from natural disasters, unpredictable weather, and climate change. This is feasible with the use of these advanced technologies. Moreover, AI offers integrations of weather data, predictive analytics models, and historical records of accumulated losses to formulate strategies for understanding and managing climate change-related risks. Consequently, insurers can focus more on offering diversified insurance solutions that are best suited for policyholders, providing protection from climate-related concerns. Additionally, personalized risk mitigation strategies can be incorporated into business models through advancements in technology.

Therefore, this allows the Arab insurance industry to take a significant step forward toward achieving the global goal of net-zero carbon emissions by 2050. Alongside other industries, the insurance industry can work toward formulating

policies that focus on the changes needed to establish sustainable practices. Moreover, the use of innovative products to facilitate investors' shift toward green investments, while supporting renewable energy initiatives, can drastically improve efforts made by the Arab insurance industry. Adopting these actions can motivate businesses to switch toward low-carbon operations, which would help reduce climate risks and aid in establishing a low-carbon economy by 2050 (Swiss Re, 2023).

4. Address the national programs for data security and privacy

The Arab insurance industry has been increasingly prioritizing the protection of personal information and privacy by actively participating in recently launched national programs for data security and privacy. These programs have the potential to significantly impact Arab markets, including those within the scope of this research.

The goal of these programs is to establish strong safeguards for sensitive information in Arab economies, including the insurance market. Such initiatives will enhance operational models, build client confidence, and foster the creation and adoption of new models.

Regulators will play a key role in implementing these measures to strengthen the protection of personal information and privacy. These efforts are expected to significantly impact Arab markets, particularly in advancing data security and privacy initiatives.

Consequently, these measures will increase customer engagement, awareness, and confidence, which will, in turn, enhance the stability and growth of the economic ecosystem. By accomplishing these objectives, the Arab insurance industry will take meaningful steps toward achieving the targets of Vision 2030, particularly in sustainable development and technological advancement.

Summary and Conclusion: The researcher explores in this section how the Arab insurance industry would capitalize on emerging technology risks to achieve Vision 2030? The shaping of the future outlook of the Arab sustainable insurance market by addressing emerging technology and its associated risks towards 2030 examines the role of technological advancements in fostering a resilient ecosystem, driving technology-based expansion, and reinforcing both existing and emerging sustainable models.

Accordingly, the Arab insurance industry succeeds in its role in achieving Vision 2030 and the green economy.

This evolution is expected to drive the development of innovative business models and alternative reinsurance solutions, facilitate progress toward the 2050 net-zero carbon emissions target, and strengthen national programs for data security and privacy, which influence the shape the future of insurance in the region.

Research Methodology

This research follows an ***Analytical-Descriptiv***e approach in reviews the articles, books, academic research and survey questionnaires are analysed in order to address the core of the research questions of *how would the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?* As well as the *Shaping the future outlook of the Arab sustainable insurance market by addressing emerging technology and its associated risks towards 2030* by addressed the following questions *how can emerging technology risks influence insurers' performance and KPIs? and how can reforms and recommendations mitigate technological risks in the insurance sector?*

The research collects data from a diverse sample of the Arab insurance industry's stakeholders to the analyses their input and reach the reforms and the recommendations on how the Arab insurance industry can contribute to fostering green economies within their respective markets.

For effective analysis of the data, the research work is conducted using ***SPSS Statistics Program*** which was used to analyse the data from the 30-questions survey. The survey was administrated to a random sample of employees in regulatory bodies, insurance and reinsurance companies, banks, social/governmental organizations at all different job levels was contacted to respond to the structured survey. The results of the analysis are expected to add value of the Arab insurance industry regarding the research questions which align of the SDGs and Vision 2030.

Characteristics of the sample population (Personal data)

Approximately 782 survey questionnaires were sent out for completion through online Google Form link or a QR Code. The targeted participants were employees of the regulatory bodies, insurance and reinsurance companies, banks, social/governmental organizations at all different job levels. However, a considerable number of responses were not collected due to concern regarding any potential cyber hacking attacks leading many of them prefer paper-based forms. Upon analysis of the collected responses, a total of 627 samples were gathered. Out of these, 127 samples were removed as they did not contain the all-relevant questions leading to 500 usable questionnaires for analysis. Additional information was also collected regarding the participant's personal information such as gender, age, educational level, experience years and party affiliation.

Proportional to description put forth by the participants, this demographic information was helpful in providing a clear profile of the participants input and enabling more accurate interpretation of the survey results

Table No.3: Sample demographic characteristics

Variable	Level/Category	Frequency	Percentage %
Gender	Male	330	66%
	Female	170	34%
	Total	500	100%
Age	Less than 25 years old	17	3%
	25 years to less than 35 years	127	25%
	35 years to less than 45 years	196	39%
	45 years and over	160	32%
	Total	500	100%
Educational level	Diploma or less	29	6%
	Bachelor's	282	56%
	Master's	131	26%
	Ph.D	58	12%
	Total	500	100%
Experience Years	Less than 5 years	36	7%
	6-10 years	130	26%
	11-15 years old	117	23%
	16 years and over	217	43%
	Total	500	100%
Party Affiliation	Insurance/Reinsurance	177	35%
	Regulatory Authority	94	19%
	Information Technology Developer	74	15%
	Social/Governmental Organizations	69	14%
	Banking	55	11%
	Other	31	6%
	Total	500	100%

According to the percentage distribution of the participants shows 66% were males, while 34% were females meaning that most of the participants were males.

Regarding the age groups, the greatest percentage is 39%, this includes participants belong to the category of 35 to less than 45 years old. This was followed by the category of 45 years and over at 25%. The age group of 25 years to less than 35 years covered had 25% of participants while the category of less than 25 years had the least percentage at 3%.

In term of the educational levels, most of the participants were holders of bachelor's degrees at 56%, followed by holders of master's degrees at 26%, and lastly PhD's at 12%. The smallest percentage were people with diploma or less which made only 6% of the sample.

Experience levels among the participants, the largest group (43%) was the one with 16 years and over of experience, followed by 26% of them having between 6 to 10 years of experience, and 23% of them having 11-15 years old experience. The smallest group (7%) had less than 5 years of experience.

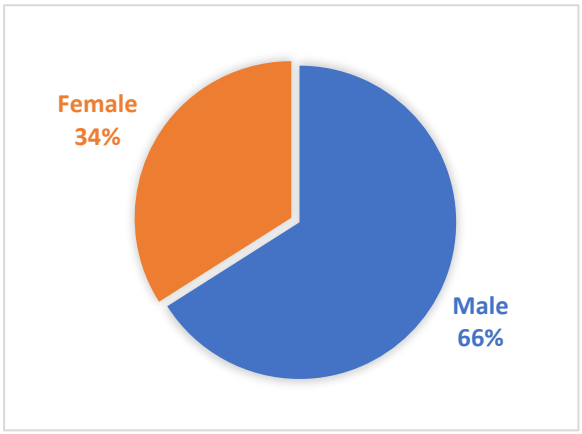
Lastly, regarding the party affiliation data, shows that the Insurance/Reinsurance category had the largest percentage representing 35% of the sample. This was

followed by the Regulatory Authority category which had 19% of the sample, and the Information Technology Developers category which had 15% of the sample. The Social/Governmental Organizations had an 14% of the participation share, the Banking category had 11%, while the other category had the least participation at 6%.

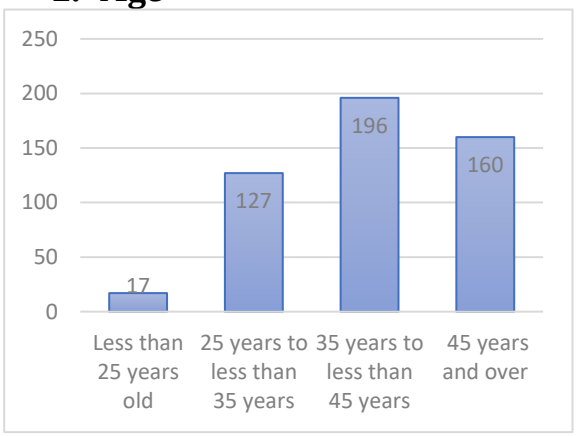
This breakdown provides a better understanding of the research sample in terms of diversity across the gender, age, education, work experience, and party affiliation.

The below diagrams No.13 shown the demographic characteristics of the research:

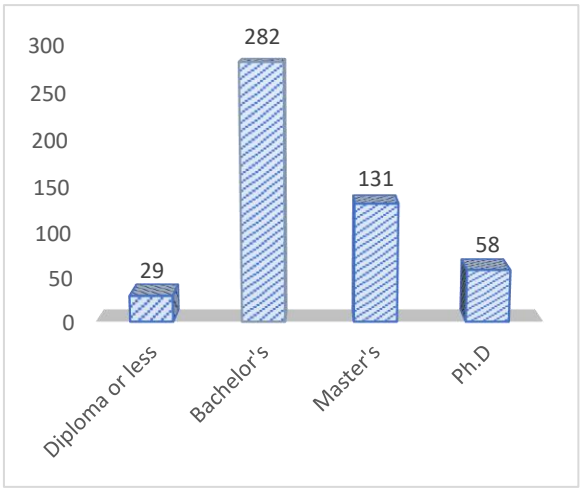
1. Gender



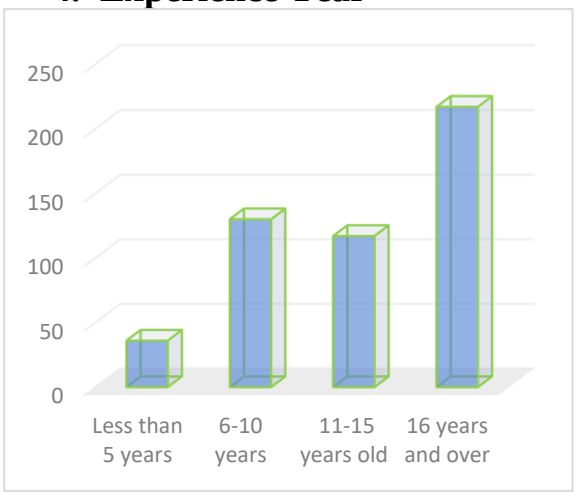
2. Age



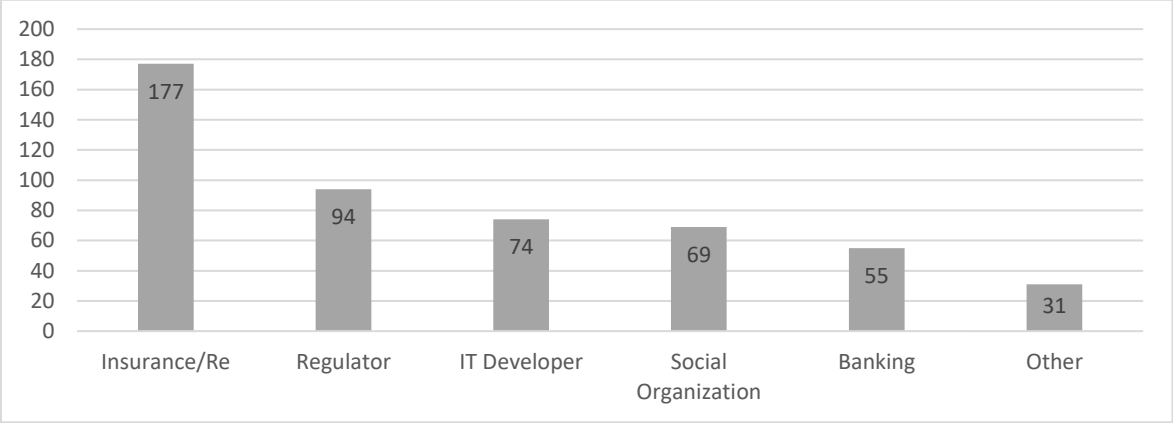
3. Educational Level



4. Experience Year



5. Party Affiliation



Survey questionnaire structure

The survey questionnaire was built by the researcher according to the objectives and research's questions which consists of the following three parts:

First Part: The information includes personal data of the sample according to demographic characteristics as follows (gender, age, educational level, number of years of experience, Party Affiliation).

Second Part: This part includes questions covering the variables of the research, with around 30 questions split into 11 sections. These sections include:

1. How can sustainable insurance respond to address Sustainable Development Goals (SDGs)?
2. How can the Principles for Sustainable Insurance (PSI) play a role in incorporating ESG factors?
3. How can sustainability-focused insurance form partnerships with other industries (e.g., energy, agriculture, healthcare, construction)? the green economy leading up to 2030 driven by AI revolution?
4. How can new Arab emerging insurance business models drive sustainability?
5. How can key sustainable green technology drivers be leveraged?
6. How can AI transform industries in the Arab region to achieve sustainability goals?
7. How can risks associated with emerging technologies in the insurance sector be addressed?
8. How can emerging technology risks influence insurers' performance and KPIs?
9. How can reforms and recommendations mitigate technological risks in the insurance sector?
10. How can the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?
11. How can strategies shape the future outlook of the Arab sustainable insurance market?

Third Part: This part involved interviews with top-level of executives from various stakeholders of the Arab insurance industry which includes insurance/reinsurance, regulators, IT developers, and social organizations regarding address the research questions of *How would the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030? As well as the Shaping the future outlook of the Arab sustainable insurance market by addressing emerging technology and its associated risks towards 2030*. It covered around 11 questions that had been conducted through phone conversations, meetings, or virtual meetings. These conversations couldn't be entered into the statistical model, and they sufficed to fill out the questionnaire form by themselves.

Survey questionnaire result

The following table No. (4), include the grand total of the questionnaire results for repetition and percentage are included to clarify the analysis of the responses on each paragraph as follows:

Table No.4: Analysing the responses to each questionnaire paragraph.

No.	Question	Repetition/ Percentage	Options				
			Totally agree 100%	Agree 75%	Neutral 50%	Not agree 25%	Not agree at all 0%
How can sustainable insurance respond to address Sustainable Development Goals (SDGs)?							
Q1	Do you agree that sustainable insurance practices align with addressing SDGs?	Repetition	49	286	135	17	13
		Percentage	10%	57%	27%	3%	3%
How can the Principles for Sustainable Insurance (PSI) play a role in incorporating ESG factors?							
Q2	Do you agree that the PSI effectively drive ESG integration in insurance practices?	Repetition	51	374	41	20	14
		Percentage	10%	75%	8%	4%	3%
How can sustainability-focused insurance form partnerships with other industries (e.g., energy, agriculture, healthcare, construction)? the green economy leading up to 2030 driven by AI revolution?							
Q3	Do you agree that collaboration between insurance and the energy industry promote sustainability?	Repetition	60	373	36	17	14
		Percentage	12%	75%	7%	3%	3%
Q4	Do you agree that insurance encourages sustainable	Repetition	139	288	45	15	13
		Percentage	28%	58%	9%	3%	3%

	agriculture through tailored policies?						
Q5	Do you agree that collaboration opportunities with healthcare and construction industries can be maximized?	Repetition	144	283	46	13	14
		Percentage	29%	57%	9%	3%	3%
How can new Arab emerging insurance business models drive sustainability?							
Q6	Do you agree that financial inclusion can be enhanced through new insurance models?	Repetition	150	281	33	23	13
		Percentage	30%	56%	7%	5%	3%
Q7	Do you agree that emerging green insurance policies address environmental risks?	Repetition	43	384	43	16	14
		Percentage	9%	77%	9%	3%	3%
Q8	Do you agree that social inclusion and insurance awareness can be improved?	Repetition	46	387	39	12	16
		Percentage	9%	77%	8%	2%	3%
How can key sustainable green technology drivers be leveraged?							
Q9	Do you agree that IoT, blockchain, and cloud computing transform the insurance sector?	Repetition	187	240	40	19	14
		Percentage	37%	48%	8%	4%	3%
Q10	Do you agree that AI and machine learning drive sustainability in the insurance industry?	Repetition	246	187	37	13	17
		Percentage	49%	37%	7%	3%	3%
Q11	Do you agree that big data can be used for more sustainable insurance practices?	Repetition	137	198	137	12	16
		Percentage	27%	40%	27%	2%	3%
How can AI transform industries in the Arab region to achieve sustainability goals?							
Q12	Do you agree that AI applications can transform the insurance and other industries?	Repetition	240	184	40	19	17
		Percentage	48%	37%	8%	4%	3%
Q13	Do you agree that AI contributes to achieving SDGs in the Arab region?	Repetition	270	160	42	11	17
		Percentage	54%	32%	8%	2%	3%

How can risks associated with emerging technologies in the insurance sector be addressed?							
Q14	Do you agree that regulatory and compliance risks impact technology adoption?	Repetition	142	290	42	11	15
		Percentage	28%	58%	8%	2%	3%
Q15	Do you agree that data privacy and security challenges in emerging technologies can be managed?	Repetition	135	202	134	14	15
		Percentage	27%	40%	27%	3%	3%
Q16	Do you agree that insufficient infrastructure and investment challenges can be overcome?	Repetition	142	288	39	17	14
		Percentage	28%	58%	8%	3%	3%
How can emerging technology risks influence insurers' performance and KPIs?							
Q17	Do you agree that financial performance and operational efficiency are affected by technological risks?	Repetition	241	187	42	13	17
		Percentage	48%	37%	8%	3%	3%
Q18	Do you agree that these risks impact reputational integrity?	Repetition	52	340	80	14	14
		Percentage	10%	68%	16%	3%	3%
Q19	Do you agree that regulatory compliance and legal exposure are influenced by technological risks?	Repetition	141	251	78	16	14
		Percentage	28%	50%	16%	3%	3%
How can reforms and recommendations mitigate technological risks in the insurance sector?							
Q20	Do you agree that regulatory frameworks can adapt to emerging technological risks?	Repetition	49	334	88	15	14
		Percentage	10%	67%	18%	3%	3%
Q21	Do you agree that partnerships between insurance companies and regulators address these risks?	Repetition	141	150	182	12	15
		Percentage	28%	30%	36%	2%	3%

Q22	Do you agree that workforce capabilities can be developed to manage technological challenges?	Repetition	149	237	89	12	13
		Percentage	30%	47%	18%	2%	3%
Q23	Do you agree that innovations in product development and cybersecurity measures can be fostered?	Repetition	143	244	82	16	15
		Percentage	29%	49%	16%	3%	3%
How can the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?							
Q24	Do you agree that innovative product lines and business models drive sustainability?	Repetition	47	341	82	12	18
		Percentage	9%	68%	16%	2%	4%
Q25	Do you agree that technology-driven market expansion supports Vision 2030?	Repetition	153	230	86	17	14
		Percentage	31%	46%	17%	3%	3%
Q26	Do you agree that resilience and ecosystem-building ensure long-term success?	Repetition	143	244	82	15	16
		Percentage	29%	49%	16%	3%	3%
How can strategies shape the future outlook of the Arab sustainable insurance market?							
Q27	Do you agree that emerging technology risks and opportunities can be addressed effectively?	Repetition	149	237	81	16	17
		Percentage	30%	47%	16%	3%	3%
Q28	Do you agree that reforms enhance social inclusion and sustainability?	Repetition	141	253	76	16	14
		Percentage	28%	51%	15%	3%	3%
29	Do you agree that climate change goals, such as achieving net-zero carbon emissions by 2050, can be integrated into the insurance sector?	Repetition	54	237	178	16	15
		Percentage	11%	47%	36%	3%	3%

30	Do you agree that national programs for data security and privacy shape the future of sustainable insurance?	Repetition	129	259	77	21	14
		Percentage	26%	52%	15%	4%	3%

According to the previous table, most of the participant response rated their answers as *Agree 75%, Totally agree 100% and Neutral 50%* across the 11 sections which is largely in line with the researcher's vision.

However, some variances have emerged regarding the following questions shows the little importance of the following which are varied according to the educational level, the experience level, and gender.

- *Q1:* Do you agree that sustainable insurance practices align with addressing SDGs?
- *Q11:* Do you agree that big data can be used for more sustainable insurance practices?
- *Q15:* Do you agree that data privacy and security challenges in emerging technologies can be managed?
- *Q21:* Do you agree that partnerships between insurance companies and regulators address these risks?
- *Q29:* Do you agree that climate change goals, such as achieving net-zero carbon emissions by 2050, can be integrated into the insurance sector?

Stability Testing

The stability test was confirmed by applying it to an exploratory sample outside the research sample using the *Cronbach's Alpha method and Test Reliability*. This method involves calculating the Cronbach Alpha coefficient to verify the internal consistency of the questionnaire's questions, which serves as a measurement tool. The Cronbach Alpha coefficient ranges between 0 and 1, and a value of 0.60 or above is considered acceptable (Sekaran, U. and Bougie, R. 2013). The test results are shown in the below table No. 5

Table (5) Internal consistency stability coefficients_Cronbach's Alpha

No	Question	No. of items	Cronbach's Alpha
1	How can sustainable insurance respond to address Sustainable Development Goals (SDGs)?	2	67.13%
2	How can the Principles for Sustainable Insurance (PSI) play a role in incorporating ESG factors?		
3	How can sustainability-focused insurance form partnerships with other industries (e.g., energy, agriculture, healthcare, construction)? the green economy leading up to 2030 driven by AI revolution?	3	79.13%

4	How can new Arab emerging insurance business models drive sustainability?	3	80.60%
5	How can key sustainable green technology drivers be leveraged?	3	65.35%
6	How can AI transform industries in the Arab region to achieve sustainability goals?	2	84.19%
7	How can risks associated with emerging technologies in the insurance sector be addressed?	3	88.88%
8	How can emerging technology risks influence insurers' performance and KPIs?	3	78.19%
9	How can reforms and recommendations mitigate technological risks in the insurance sector?	4	89.10%
10	How can the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?	3	80.36%
11	How can strategies shape the future outlook of the Arab sustainable insurance market?	4	82.88%
Total		30	79.58%

It noticed from the previous table that the stability coefficients for all phrases were greater than 60% which indicating internal consistency within the paragraphs of each field.

Furthermore, it is worth noting that the stability coefficient for the entire set of phrases was 79.58%. Based on this, the researcher concluded that there is internal consistency among the paragraphs within the field.

Therefore, conducting hypothesis testing with the questionnaire demonstrates its validity and significance.

Statistical methods description

For the purposes of the research, the following test were eventually conducted using the SPSS program.

Descriptive Statistics: through determining the opinions of the employees and individuals regarding research's questions based on the values of the arithmetic mean and standard deviation.

Analytical Statistics: A regression analysis (Kolmogorov-Smirnova, Shapiro-Wilk test), (Independent-Samples T test) and (One-Way ANOVA) were used to test the hypotheses of the research.

Arithmetic means and standard deviations of the questionnaire phrases

The researcher aims to address the key core of the research's question as mentioned before by utilization of the following sections which range from Q17 to Q23 as follows:

- *Sec.8:* How can emerging technology risks influence insurers' performance and KPIs?

- *Sec.9:* How can reforms and recommendations mitigate technological risks in the insurance sector?

Subsequently, a statistical analysis was conducted to calculate the arithmetic means, median, mode, variance, and standard deviations, as follows:

Table (6) Arithmetic means, Variance, Median and standard deviations

No.	Question	Mean	Median	Mode	Std. Deviation	Variance	Rank	Grade
Q1	Do you agree that sustainable insurance practices align with addressing SDGs?	2.32	2	2	0.799	0.638	2	High
Q2	Do you agree that the PSI effectively drive ESG integration in insurance practices?	2.14	2	2	0.759	0.576	8	High
Q3	Do you agree that collaboration between insurance and the energy industry promote sustainability?	2.1	2	2	0.755	0.57	12	Middle
Q4	Do you agree that insurance encourages sustainable agriculture through tailored policies?	1.95	2	2	0.849	0.721	21	Weak
Q5	Do you agree that collaboration opportunities with healthcare and construction industries can be maximized?	1.94	2	2	0.857	0.734	23	Weak
Q6	Do you agree that financial inclusion can be enhanced through new insurance models?	1.94	2	2	0.884	0.781	23	Weak
Q7	Do you agree that emerging green insurance policies address environmental risks?	2.15	2	2	0.729	0.531	7	High
Q8	Do you agree that social inclusion and insurance awareness can be improved?	2.13	2	2	0.734	0.538	11	Middle
Q9	Do you agree that IoT, blockchain, and cloud computing transform the insurance sector?	1.87	2	2	0.917	0.842	26	Weak

Q10	Do you agree that AI and machine learning drive sustainability in the insurance industry?	1.74	2	1	0.953	0.908	29	Weak
Q11	Do you agree that big data can be used for more sustainable insurance practices?	2.14	2	2	0.956	0.913	8	High
Q12	Do you agree that AI applications can transform the insurance and other industries?	1.78	2	1	0.985	0.971	27	Weak
Q13	Do you agree that AI contributes to achieving SDGs in the Arab region?	1.69	1	1	0.961	0.924	30	Weak
Q14	Do you agree that regulatory and compliance risks impact technology adoption?	1.93	2	2	0.85	0.723	25	Weak
Q15	Do you agree that data privacy and security challenges in emerging technologies can be managed?	2.14	2	2	0.949	0.901	8	High
Q16	Do you agree that insufficient infrastructure and investment challenges can be overcome?	1.95	2	2	0.865	0.749	21	Weak
Q17	Do you agree that financial performance and operational efficiency are affected by technological risks?	1.76	2	1	0.958	0.918	28	Weak
Q18	Do you agree that these risks impact reputational integrity?	2.2	2	2	0.769	0.591	6	High
Q19	Do you agree that regulatory compliance and legal exposure are influenced by technological risks?	2.02	2	2	0.905	0.819	17	Middle
Q20	Do you agree that regulatory frameworks can adapt to emerging technological risks?	2.22	2	2	0.773	0.598	4	High

Q21	Do you agree that partnerships between insurance companies and regulators address these risks?	2.22	2	3	0.983	0.966	4	High
Q22	Do you agree that workforce capabilities can be developed to manage technological challenges?	2.01	2	2	0.899	0.808	20	Middle
Q23	Do you agree that innovations in product development and cybersecurity measures can be fostered?	2.03	2	2	0.921	0.849	14	Middle
Q24	Do you agree that innovative product lines and business models drive sustainability?	2.23	2	2	0.793	0.628	3	High
Q25	Do you agree that technology-driven market expansion supports Vision 2030?	2.02	2	2	0.931	0.867	17	Middle
Q26	Do you agree that resilience and ecosystem-building ensure long-term success?	2.03	2	2	0.927	0.859	14	Middle
Q27	Do you agree that emerging technology risks and opportunities can be addressed effectively?	2.03	2	2	0.946	0.895	14	Middle
Q28	Do you agree that reforms enhance social inclusion and sustainability?	2.02	2	2	0.903	0.815	17	Middle
Q29	Do you agree that climate change goals, such as achieving net-zero carbon emissions by 2050, can be integrated into the insurance sector?	2.4	2	2	0.838	0.702	1	High
Q30	Do you agree that national programs for data security and privacy shape the future of sustainable insurance?	2.06	2	2	0.911	0.83	13	Middle
Total		2.0155	1.95455	1.8636	0.867682	0.76	16.36	Middle

The preceding table presents the mean level of the statistical model, with an arithmetic mean of (2.015) and a standard deviation of (0.867). The arithmetic averages of the sample members range from (1.69) to (2.4), reflecting a level of appreciation that varies from moderate to high.

Among the surveyed questions, Question No. 29(Do you agree that climate change goals, such as achieving net-zero carbon emissions by 2050, can be integrated into the insurance sector?) which received the highest rating, with an arithmetic mean of (2.4). Meanwhile, Question No. 13(Do you agree that AI contributes to achieving SDGs in the Arab region?) had the lowest rating, with an arithmetic mean of 1.69.

Differences in the sample opinions for demographic factors

The following tables is one-way ANOVA test to indicate the extent to which there are statistically significant differences based on demographic means regarding:

1. ***Tests regarding (How can emerging technology risks influence insurers' performance and KPIs?)***

Histogram of Responses_ Normal distribution Exhibit No.14

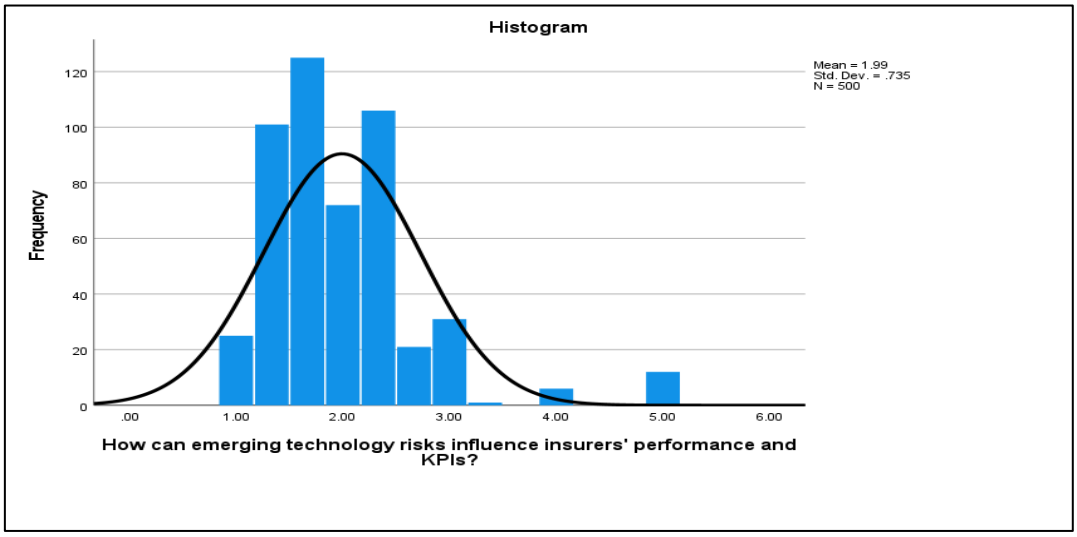


Exhibit No. 14 shows a histogram that breaks down the responses to the 3 questions mentioned under the questionnaire section of (How can emerging technology risks influence insurers' performance and KPIs?) The graph follows a normal distribution, which means most people's answers were grouped around the Totally agree (100%) and Agree (75%) options.

The average response score was 1.99, with a standard deviation of 0.735, showing that majority of participants strongly believe with the researcher point and answers were pretty consistent and leaned heavily toward agreement.

Table (7) One-Way ANOVA

Item		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	1.699	1	1.699	3.158	0.076
	Within Groups	267.93	498	0.538		
	Total	269.629	499			
Age	Between Groups	56.345	3	18.782	43.678	<0.001
	Within Groups	213.284	496	0.43		
	Total	269.629	499			
Educational level	Between Groups	87.882	3	29.294	79.945	<0.001
	Within Groups	181.747	496	0.366		
	Total	269.629	499			
Experience Years	Between Groups	26	3	8.667	17.644	<0.001
	Within Groups	243.629	496	0.491		
	Total	269.629	499			
Party Affiliation	Between Groups	10.535	5	2.107	4.017	0.001
	Within Groups	259.094	494	0.524		
	Total	269.629	499			

According to the above table, there are statistically significant differences at significance level $\alpha \leq 0.05$ between the sample's opinions as follows:

- Gender's sample, the value of F (3.158) at the level of statistical significance (0.076), which is greater than the specified value (0.05)
- Age's sample, the value of F (43.678) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Educational level's sample, the value of F (79.945) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Experience level's sample, the value of F (17.644) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Party Affiliation's sample, the value of F (4.017) at the level of statistical significance (0.001), which is greater than the specified value (0.05)

Additionally, before conducting the Independent-Samples T test to examine How can emerging technology risks influence insurers' performance and KPIs? it is essential to assess whether the sample data adheres to a normal distribution using the Kolmogorov-Smirnov test in the following manner.

Table (8) Kolmogorov-Smirnova, Shapiro-Wilk test

Tests of Normality	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
How can emerging technology risks influence insurers' performance and KPIs?	0.179	500	0.001	0.827	500	<0.001
a. Lilliefors Significance Correction						

The above table shows that the significance value of the Kolmogorov-Smirnov test is 0.001, which is less than 0.05 which indicates variance in the normal

distribution in the sample data of this section shown differences are attributed to the diversity in participants' due to their experience level and educational backgrounds.

Table (9) Independent-Samples T test

Item	N	Mean	Std. Deviation	Std. Error Mean
Male	330	1.950	0.787	0.043
Female	170	2.073	0.617	0.047
Total	500	2.011	0.702	0.045
Less than 25 years old	17	2.980	1.450	0.352
25 years to less than 35 years	127	1.693	0.553	0.049
35 years to less than 45 years	196	1.801	0.450	0.032
45 years and over	160	2.356	0.799	0.063
Total	500	2.208	0.813	0.124
Diploma or less	29	3.678	1.418	0.263
Bachelor's	282	1.897	0.441	0.026
Master's	131	1.896	0.663	0.058
Ph.D	58	1.822	0.489	0.064
Total	500	2.323	0.753	0.103
Less than 5 years	36	2.482	1.175	0.196
6-10 years	130	1.651	0.493	0.043
11-15 years old	117	2.037	0.403	0.037
16 years and over	217	2.089	0.820	0.056
Total	500	2.065	0.723	0.083
Insurance/Re	177	2.168	0.886	0.067
Regulator	94	2.014	0.819	0.085
IT Developer	74	1.829	0.497	0.058
Social Organization	69	1.874	0.515	0.062
Banking	55	1.855	0.524	0.071
Other	31	1.807	0.508	0.091
Total	500	1.924	0.625	0.072

The above table shown the arithmetic mean and standard deviation of the sample regarding the impact of emerging technology risks on insurers' performance and key performance indicators (KPIs). The results indicate a general convergence of averages across all categories, except for educational level however almost of participant hold a bachelor's degree.

Furthermore, participant with diplomas or less qualifications recorded the highest mean score (3.678), while those with bachelor's degrees had the lowest mean (1.822). Meanwhile, participants with master's degrees demonstrated a moderate mean score of (1.896). This variation suggests potential differences in perception or awareness of emerging technology risks based on educational background.

2. ***Tests regarding_ How can reforms and recommendations mitigate technological risks in the insurance sector?***

Histogram of Responses_ Normal distribution Exhibit No.15

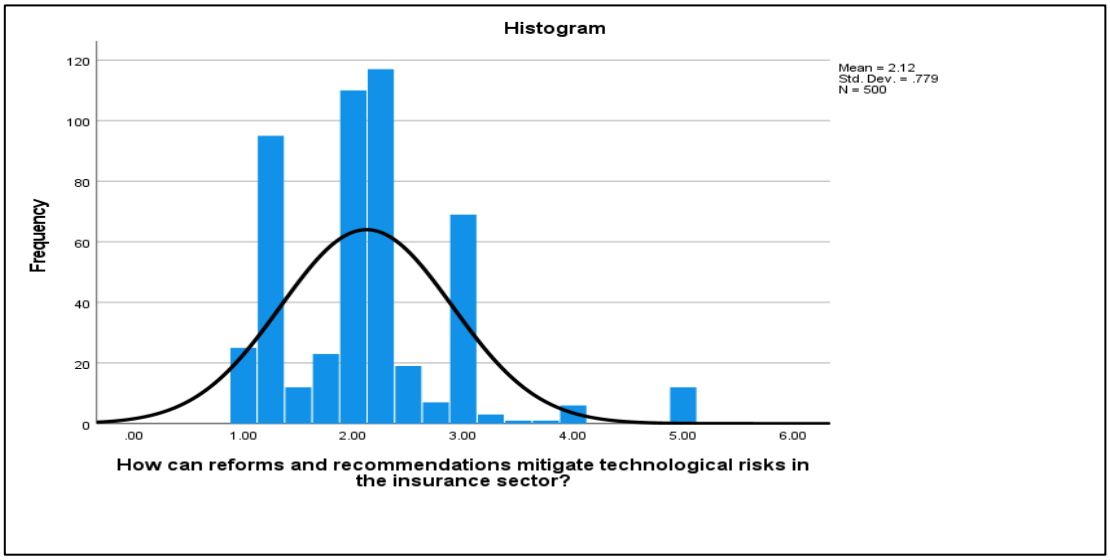


Exhibit No. 15 shows a histogram that breaks down the responses to the 4 questions mentioned under the questionnaire section of (How can reforms and recommendations mitigate technological risks in the insurance sector?) The graph follows a normal distribution, which means most people's answers were grouped around the Totally agree (100%) and Agree (75%) options.

The average response score was (2.12), with a standard deviation of (0.779), showing majority of participants strongly believe with the researcher point and answers were pretty consistent and leaned heavily toward agreement.

Table (10) One-Way ANOVA

Item		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	0.39	1.00	0.39	0.64	0.424
	Within Groups	302.29	498.00	0.61		
	Total	302.68	499.00			
Age	Between Groups	18.35	3.00	6.12	10.67	<0.001
	Within Groups	284.33	496.00	0.57		
	Total	302.68	499.00			
Educational level	Between Groups	73.08	3.00	24.36	52.62	<0.001
	Within Groups	229.60	496.00	0.46		
	Total	302.68	499.00			
Experience Years	Between Groups	14.98	3.00	5.00	8.61	<0.001
	Within Groups	287.69	496.00	0.58		
	Total	302.68	499.00			
Party Affiliation	Between Groups	9.96	5.00	1.99	3.36	0.005
	Within Groups	292.71	494.00	0.59		
	Total	302.68	499.00			

According to the above table, there are statistically significant differences at significance level $\alpha \leq 0.05$ between the sample's opinions as follows:

- Gender's sample, the value of F (0.64) at the level of statistical significance (0.424), which is greater than the specified value (0.05)
- Age's sample, the value of F (10.67) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Educational level's sample, the value of F (52.62) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Experience level's sample, the value of F (8.61) at the level of statistical significance (0.001), which is less than the specified value (0.05)
- Party Affiliation's sample, the value of F (3.36) at the level of statistical significance (0.001), which is greater than the specified value (0.05)

Additionally, before conducting the Independent-Samples T test to examine How can reforms and recommendations mitigate technological risks in the insurance sector? It is essential to assess whether the sample data adheres to a normal distribution using the Kolmogorov-Smirnov test in the following manner.

Table (11) Kolmogorov-Smirnova, Shapiro-Wilk

Tests of Normality	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
How can reforms and recommendations mitigate technological risks in the insurance sector?	0.198	500	<0.001	0.877	500	<0.001
a. Lilliefors Significance Correction						

The above table shows that the significance value of the Kolmogorov-Smirnov test is 0.001, which is less than 0.05 which indicates variance in the normal distribution in the sample data of this section shown differences are attributed to the diversity in participants' due to their experience level and educational backgrounds.

Table (12) Independent-Samples T test

Item	N	Mean	Std. Deviation	Std. Error Mean
Male	330	2.100	0.830	0.046
Female	170	2.159	0.669	0.051
Total	500	2.129	0.750	0.049
Less than 25 years old	17	2.882	1.492	0.362
25 years to less than 35 years	127	1.935	0.523	0.046
35 years to less than 45 years	196	2.056	0.632	0.045

45 years and over	160	2.264	0.926	0.073
Total	500	2.284	0.893	0.132
Diploma or less	29	3.621	1.472	0.273
Bachelor's	282	1.980	0.593	0.035
Master's	131	2.029	0.703	0.061
Ph.D	58	2.259	0.321	0.042
Total	500	2.472	0.772	0.103
Less than 5 years	36	2.389	1.203	0.201
6-10 years	130	1.860	0.557	0.049
11-15 years old	117	2.092	0.723	0.067
16 years and over	217	2.247	0.795	0.054
Total	500	2.147	0.819	0.093
Insurance/Re	177	2.285	0.926	0.070
Regulator	94	2.088	0.844	0.087
IT Developer	74	2.034	0.565	0.066
Social Organization	69	1.924	0.558	0.067
Banking	55	2.141	0.600	0.081
Other	31	1.879	0.622	0.112
Total	500	2.058	0.686	0.080

The above table shown the arithmetic mean and standard deviation of the sample regarding the how can reforms and recommendations mitigate technological risks in the insurance sector? The results indicate a general convergence of averages across all categories, except for educational level however almost of participant hold a bachelor's degree.

Furthermore, participant with diplomas or less qualifications recorded the highest mean score (3.621), while those with bachelor's degrees had the lowest mean (1.980). Meanwhile, participants with master's degrees demonstrated a moderate mean score of (2.029). This variation suggests potential differences in perception or awareness of emerging technology risks based on educational background.

Statistics' conclusion

The following conclusions were reached based on the analysis of the research's sample:

1. The research findings reveal that there are no significant differences between the views of the sample and the researcher regarding the attitude of the Arab insurance industry toward emerging technology risks within the context of Vision 2030. This concern includes the future of the Arab world and the sustainable insurance market, which will develop technology and mitigate its risks. This research identifies the most essential emerging technology risks that affect the performance of insurers and their KPIs, so that they can formulate the required reforms and recommendations to minimize those technological risks within the Arab insurance industry.

2. However, the sample's opinions exhibited varying opinions on two key questions how can emerging technology risks influence insurers' performance and KPIs? and how can reforms and recommendations mitigate technological risks in the insurance sector?
3. The research results did not indicate any important differences within the sample regarding majority of the research questions when analysed in terms of several demographic factors. However, there were significant differences regarding, how can emerging technology risks influence insurers' performance and KPIs? which were noted most among participants aged below 25, those with at least a bachelor's degree and participant with 6 to 10 years' experience.
4. Additionally, regarding to the question on how the Arab insurance industry can capitalize on emerging technology risks to achieve Vision 2030? no meaningful differences were identified at the level of male participant. Noteworthy differences were noticed among participant aged 25 years and below, with only a diploma or lower, and those with an experience of fewer than five years.
5. Ultimately, variations in responses given were majorly because of differences in educational level and experience, at least as regard to the two questions how can emerging technology risks influence insurers' performance and KPIs? and how can reforms and recommendations mitigate technological risks in the insurance sector?

Research's Conclusion and Recommendations

Based on the findings from the previous chapters, which include the address of the Analytical-Descriptive approach, this study utilizes numerous references, whether academic or practical, as well as published articles and reports. Additionally, it conducts interviews with executive levels in the insurance and reinsurance markets, regulators, IT, banking, and social/organizational associations. Furthermore, the analysis has also incorporated the results of the survey questionnaire in order to reach how the Arab insurance industry would capitalize on emerging technology risks to achieve Vision 2030, as well as how it would address the emerging technology risks shaping the future outlook of the Arab sustainable insurance market and its associated risks towards 2030.
Therefore., the researcher reached for the following conclusions and recommendations that address the core of the research as follows:

- The Arab insurance industry has to participate in building resilient ecosystems by launching multiple initiatives in collaboration with governments and various industries to enhance the sustainability model that aligns with the SDGs and Vision 2030.
- The Arab insurers need to collaborate to address investments in potential and existing technological infrastructure in order to create innovative business models that meet the evolving needs of consumers and modern businesses, which also consider the underserved populations.
- It is essential to adopt new technological business solutions that address emerging tech-related risks with address also the minimum level of the security measure that must be taken.
- Innovate green insurance products that support recent environmental initiatives, with a strong emphasis on technological risks and their potential negative impacts on businesses' KPIs.
- Increase awareness among businesses and individuals regarding technological risks, providing incentives for those who have implemented security measures and precautions.
- Address the integration of AI technologies with the operation of the Arab insurance industry and with address their associated risks, which are expected to contribute 14% to the financial sector's GDP by 2030.
- Explore various alternatives and financial securities to mitigate the adverse impacts of technology on KPIs through insurance covers and reserves.
- Implement regulatory reforms that encourage innovation while integrating technological advancements, ensuring that insurance companies and their clients adhere to necessary restrictions.
- Develop talent workforce within the industry, equipping employees to manage new technology risks and implement security measures related to emerging technologies within their daily operations.

- Promote a culture of digital financial literacy by establishing mandatory regulations for the digitization and automation of business processes and payment across industries including suitable security measures.
- Address technological risks through comprehensive insurance coverage, awareness campaigns, and the establishment of minimum precaution and security measures.
- Create awards and penalties by the regulators or the federations for the Arab insurers who prioritize address the technology by new innovate solutions as well as rewarding products that align with national governmental agenda such as environmentally friendly initiatives and women's empowerment.
- Tackle the global emerging risks and limited reinsurance capacities by introducing ART financial products, such as catastrophe bonds and gender bonds.
- Develop a national agenda with reforms aimed at overcoming technological challenges in both financial and non-financial industries by introducing training initiatives, financial awareness programs, cyber risk responses.
- Establish national pools to address technological risks and other emerging threats, integrating banks and IT developers to create robust business models that ensure profitable outcomes.

الحَمدُ للَّـهِ الَّذِي بِنعمَتِهِ تَتِمُّ الصَّالِحَات

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Appendix No. I

Survey questionnaire

Dear Sir,

I hope this email finds you and all your colleagues well.

Today I'm writing this email to inform you that I am currently conducting research titled: *"How would the Arab insurance industry address the risks posed by key emerging technologies and respond to capitalize on its opportunities to achieve their governments' goals for Vision 2030?"*

In order to ensure the quality and significance of this scientific research, and to include a practical perspective, I kindly ask for your assistance in completing a research questionnaire.

The questionnaire consists of approximately 30 questions designed to effectively capture your esteemed professional opinions on a scale ranging from *"Totally Agree" (100%)* to *"Not Agree at All" (0%)*. There is also available space for your comments and notes, should you wish to add any.

Completing the research questionnaire should take no more than 10 minutes. Most importantly, both your identity and responses will remain strictly confidential and anonymous.

This research encompasses a significant portion of the Arab insurance markets, with a particular focus on Egypt, Saudi Arabia, and the UAE. It involves participants holding diverse job positions, including insurance experts, regulators, federation representatives, banker, social organization representatives focusing on emerging technology and sustainable Vision 2030 goals, and IT developers.

You can access the questionnaire, available in both Arabic and English, via the link provided below:

https://forms.gle/wmMe3VtptfUejotAA

Alternatively, you can scan the QR Code below:

Your responses are vital as they will help us understand key issues and develop appropriate solutions to address the risks associated with recent technological advancements.

Please do not hesitate to contact me if you have any queries or encounter any issues related to the questionnaire or the underlying research.

Additionally, I would greatly appreciate it if you could forward this email to your colleagues to help us increase the response rate. Kindly ensure that the questionnaire is completed by 01/01/2025 to meet the judgmental committee's deadline.

Thank you in advance for your time and effort.

1) Personal Data

A. Name (Optional)		
B. Job Title		
C. Nationality		
D. Gender	• Male	◯
	• Female	◯
E. Age	• Less than 25 years old	◯
	• 25 years to less than 35 years	◯
	• 35 years to less than 45 years	◯
	• 45 years and over	◯
F. Educational level	• Diploma or less	◯
	• Bachelor's	◯
	• Master's	◯
	• Ph.D	◯
G. Experience Years	• Less than 5 years	◯
	• 6-10 years	◯
	• 11-15 years old	◯
	• 16 years and over	◯
H. Which party are you affiliated with?	• Insurance/Reinsurance	◯
	• Regulatory Authority	◯
	• Information Technology Developer	◯
	• Social/Governmental Organization	◯
	• Banking	◯
	• Other	◯

2) Technical Options

Kindly select the suitable choice for each phrase, which includes 5 options ranging from (Totally Agree) to (Not Agree at All)

And also, please feel free to include any accompanying notes, if available.

No.	Question	Options					Other & Notes
		Totally agree 100%	Agree 75%	Neutral 50%	Not agree 25%	Not agree at all 0%	
How can sustainable insurance respond to address Sustainable Development Goals (SDGs)?							
Q1	Do you agree that sustainable insurance practices align with addressing SDGs?						
How can the Principles for Sustainable Insurance (PSI) play a role in incorporating ESG factors?							
Q2	Do you agree that the PSI effectively drive ESG integration in insurance practices?						

How can sustainability-focused insurance form partnerships with other industries (e.g., energy, agriculture, healthcare, construction)? the green economy leading up to 2030 driven by AI revolution?							
Q3	Do you agree that collaboration between insurance and the energy industry promote sustainability?						
Q4	Do you agree that insurance encourages sustainable agriculture through tailored policies?						
Q5	Do you agree that collaboration opportunities with healthcare and construction industries can be maximized?						
How can new Arab emerging insurance business models drive sustainability?							
Q6	Do you agree that financial inclusion can be enhanced through new insurance models?						
Q7	Do you agree that emerging green insurance policies address environmental risks?						
Q8	Do you agree that social inclusion and insurance awareness can be improved?						
How can key sustainable green technology drivers be leveraged?							
Q9	Do you agree that IoT, blockchain, and cloud computing transform the insurance sector?						
Q10	Do you agree that AI and machine learning drive sustainability in the insurance industry?						
Q11	Do you agree that big data can be used for more sustainable insurance practices?						
How can AI transform industries in the Arab region to achieve sustainability goals?							
Q12	Do you agree that AI applications can transform the insurance and other industries?						
Q13	Do you agree that AI contributes to achieving SDGs in the Arab region?						
How can risks associated with emerging technologies in the insurance sector be addressed?							
Q14	Do you agree that regulatory and compliance risks impact technology adoption?						

Q15	Do you agree that data privacy and security challenges in emerging technologies can be managed?						
Q16	Do you agree that insufficient infrastructure and investment challenges can be overcome?						
How can emerging technology risks influence insurers' performance and KPIs?							
Q17	Do you agree that financial performance and operational efficiency are affected by technological risks?						
Q18	Do you agree that these risks impact reputational integrity?						
Q19	Do you agree that regulatory compliance and legal exposure are influenced by technological risks?						
How can reforms and recommendations mitigate technological risks in the insurance sector?							
Q20	Do you agree that regulatory frameworks can adapt to emerging technological risks?						
Q21	Do you agree that partnerships between insurance companies and regulators address these risks?						
Q22	Do you agree that workforce capabilities can be developed to manage technological challenges?						
Q23	Do you agree that innovations in product development and cybersecurity measures can be fostered?						
How can the Arab insurance industry capitalize on emerging technology risks to achieve Vision 2030?							
Q24	Do you agree that innovative product lines and business models drive sustainability?						
Q25	Do you agree that technology-driven market expansion supports Vision 2030?						
Q26	Do you agree that resilience and ecosystem-building ensure long-term success?						
How can strategies shape the future outlook of the Arab sustainable insurance market?							

Q27	Do you agree that emerging technology risks and opportunities can be addressed effectively?						
Q28	Do you agree that reforms enhance social inclusion and sustainability?						
Q29	Do you agree that climate change goals, such as achieving net-zero carbon emissions by 2050, can be integrated into the insurance sector?						
Q30	Do you agree that national programs for data security and privacy shape the future of sustainable insurance?						

Thank you for taking the time to complete this questionnaire.
Your input is greatly appreciated.

Best regards

Appendix No. II

Interviews with top-level executives from

insurance/reinsurance, regulators, IT developers, and social organizations

Dear Respected Sirs,
I hope this email finds you and all your colleagues well.

With reference to the above-mentioned subject and our recent phone discussion conversation, I would highly appreciate it if you could provide me your assistance for answering the following inquiries. These inquiries are crucial for my conducting my research. The title of my research is *"How would the Arab insurance industry address the risks posed by key emerging technologies and respond to capitalize on its opportunities to achieve their governments' goals for Vision 2030?"*

I trust and appreciate the insights you will provide towards assistance in obtaining answers to the aforementioned questions or, alternatively, if you are unable to reply yourself, would it be possible for you to delegate a colleague who able to address them.

1. How does your firm respond to emerging risks associated with recent technological advancements?
2. Does your firm address sustainable model, including alignment with the SDGs, ESGs and Vison 2030?
3. How does your firm integrate their sustainable model with sustainable insurance practices, including the integration of other industries?
4. In your opinion, what is the most successful model for addressing sustainability within the Arab insurance industry?
5. What is your point of view on the adoption and impact of recent technological drivers in your firm?
6. How does the utilization of artificial intelligence (AI) transform your industry, including its contribution to achieving the SDGs and Vision 2030?
7. What technological risks has your firm encountered, and how have they adversely impacted on yours KPIs?
8. Could you share your firm's experiences in addressing the risks associated with emerging technologies and its adverse impact on KPIs?
9. What reforms and recommendations do your firm propose for leveraging technological risks, and what strategies have you implemented in this regard?
10. How can the Arab insurance market's address the issues of technology risks to achieve Vision 2030 goals?
11. What is your firm's outlook on the future of the insurance industry leading up to vison 2030?

Appreciate your valuable time, understanding and support which is crucial to this discourse.

I await your reply and thoughts with anticipation.

Best regards