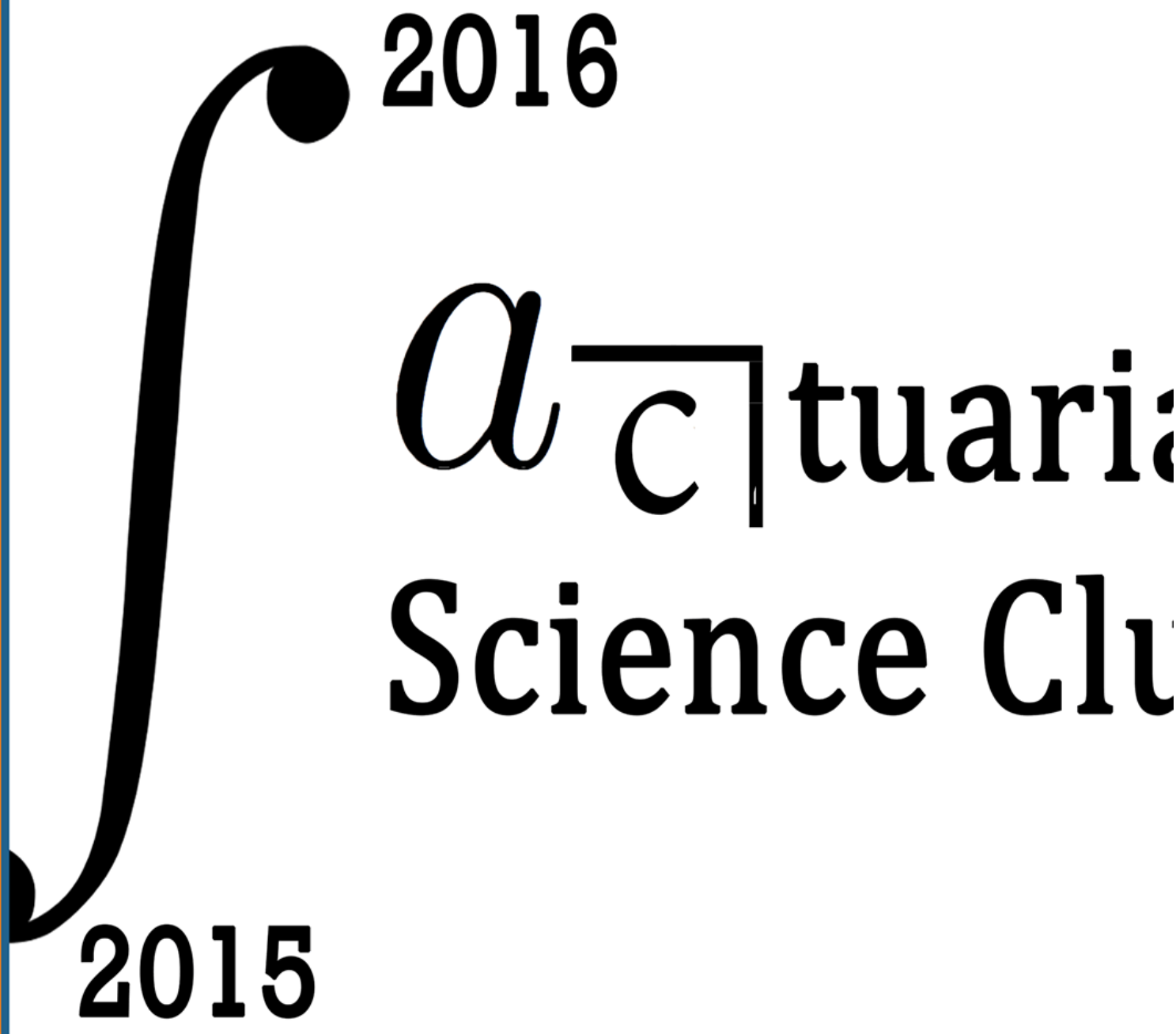
Journal of
Actuarial Research
(JAR)



CARI Journals

Journal of Actuarial Science

ISSN: 2958-0595 (Online)
Vol. 2, Issue No. 1, pp 14 - 27, 2024

www.carijournals.org

The Role of Actuaries in Sustainable Development Goals

[1*]Sharon Wang'ombe

Catholic University of Eastern Africa

Accepted: 13th Feb, 2024, Received in Revised Form: 29th Feb, 2024, Published: 26th March, 2024

Abstract

Purpose: The general purpose of this study was to investigate the role of actuaries in Sustainable Development Goals.

Methodology: The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

Findings: The findings reveal that there exists a contextual and methodological gap relating to the role of actuaries in Sustainable Development Goals. The study underscored the indispensable role of actuaries in advancing sustainable development goals (SDGs) across multiple sectors. Actuaries contribute significantly to promoting environmental sustainability by assessing and managing risks associated with climate change, while also fostering social equity and inclusivity through the design of insurance and pension schemes. Moreover, they facilitate long-term investment and infrastructure development aligned with SDGs 8 and 9, and support health and well-being initiatives, particularly in healthcare financing and risk assessment. Overall, through their expertise in risk assessment, financial management, and strategic decision-making, actuaries play a critical role in driving transformative change towards a more sustainable, inclusive, and resilient future.

Unique Contribution to Theory, Practice and Policy: The Stakeholder theory, Institutional theory and Systems theory may be used to anchor future studies on the role of actuaries in Sustainable Development Goals. The study provided recommendations aimed at enhancing the contributions of actuaries to sustainable development agendas. It advocated for increased awareness among actuaries about their role in supporting SDGs, fostering collaboration between stakeholders, integrating sustainability considerations into actuarial practices, and promoting transparency and accountability within the profession. These recommendations emphasized the importance of aligning actuarial efforts with sustainability goals, leveraging collective expertise, and ensuring ethical and responsible decision-making. By implementing these recommendations, actuaries could play a more proactive and impactful role in advancing sustainable development goals and addressing societal challenges.

Keywords: *Actuaries, Sustainable Development Goals, Contributions, Recommendations, Awareness, Collaboration, Sustainability Considerations, Transparency*

1.0 INTRODUCTION

The Sustainable Development Goals (SDGs), established by the United Nations in 2015, aim to address global challenges such as poverty, inequality, climate change, environmental degradation, and peace and justice. The effectiveness of these goals in driving positive change varies across countries and regions, influenced by diverse socioeconomic, political, and environmental factors. Evaluating the effectiveness of SDGs requires analyzing progress, challenges, and trends in specific countries and regions. The USA has made notable progress towards some SDGs but faces challenges in others. For instance, the country has achieved significant reductions in poverty rates over the past decade, with the poverty rate declining from 14.8% in 2014 to 10.5% in 2019 (U.S. Census Bureau, 2020). However, challenges persist in achieving environmental sustainability goals. Despite efforts to reduce greenhouse gas emissions, the USA remains one of the largest emitters globally (National Centers for Environmental Information, 2021). Additionally, disparities in access to healthcare and education contribute to inequalities, hindering progress towards several SDGs (Mullen & Braverman, 2018).

The United Kingdom has demonstrated commitment to SDGs through policy initiatives and strategic planning. Statistics show progress in areas such as renewable energy adoption, where the UK surpassed its target of generating 30% of electricity from renewables by 2020, reaching 42.9% in 2020 (Department for Business, Energy & Industrial Strategy, 2021). However, challenges persist, particularly in addressing income inequality and achieving inclusive economic growth. Despite overall economic growth, income inequality has widened in the UK, with the richest 10% of households holding nearly half of the country's wealth (Office for National Statistics, 2021). Efforts to address this disparity are crucial for achieving SDG targets related to reducing inequality (Levy & Temin, 2019).

Japan has made significant strides towards achieving several SDGs, particularly in areas such as healthcare and education. The country boasts one of the highest life expectancies globally and has achieved universal health coverage, contributing to SDG 3 on good health and well-being (World Health Organization, 2020). However, Japan faces challenges related to environmental sustainability and climate action. Despite efforts to increase renewable energy adoption, Japan remains heavily reliant on fossil fuels, which account for the majority of its energy consumption (International Energy Agency, 2021). Addressing these challenges is crucial for Japan to align with SDG targets on environmental sustainability and climate action (Yamazaki & Takeuchi, 2020).

Brazil, as a developing country, grapples with multifaceted challenges in achieving SDGs. The country has made progress in reducing deforestation rates in the Amazon rainforest, with a notable decline of 70% in deforestation between 2004 and 2012 (Brazilian National Institute for Space Research, 2021). However, recent trends show a concerning resurgence in deforestation rates, driven by factors such as illegal logging and land conversion for agriculture (Barreto, Souza Jr. & Noguerón, 2020). Additionally, socioeconomic disparities persist, particularly in rural areas and among indigenous populations, hindering progress towards SDGs related to poverty eradication and social equity (Martins, Pires & Schwanke, 2018).

African countries face unique challenges and opportunities in achieving SDGs, shaped by diverse contexts and developmental trajectories. Progress varies across the continent, with some countries making significant strides in areas such as access to clean water and sanitation, while others lag behind (United Nations, 2020). For instance, Rwanda has achieved remarkable progress in reducing maternal and child mortality rates, attributed to investments in healthcare infrastructure and community-based interventions (Binagwaho, Farmer, Nsanzimana, Karema, Gasana & de Dieu Ngirabega, 2014). However, challenges such as food insecurity, political instability, and inadequate infrastructure remain pervasive in many African countries, hindering progress towards multiple SDGs (Sachs, Schmidt-Traub, Kroll, Lafortune & Fuller, 2019). The effectiveness of Sustainable Development Goals varies

across countries and regions, influenced by diverse socioeconomic, political, and environmental factors. While some countries have made significant progress towards achieving specific SDGs, challenges persist in areas such as environmental sustainability, inequality, and poverty eradication. Addressing these challenges requires coordinated efforts from governments, civil society, and the private sector, guided by evidence-based policies and strategies. Monitoring progress, sharing best practices, and fostering international cooperation are essential for advancing the global agenda of sustainable development.

Actuaries play a crucial role in assessing and managing risks across various sectors, including insurance, finance, and pensions. Their expertise lies in analyzing data, developing mathematical models, and providing insights to support informed decision-making. Actuaries are responsible for evaluating the financial implications of uncertain events and designing strategies to mitigate risks effectively (Brown & Bos, 2018). In the context of Sustainable Development Goals (SDGs), actuaries contribute by assessing the financial risks associated with environmental degradation, climate change, and social inequalities. By quantifying these risks and advising on mitigation measures, actuaries help organizations and policymakers align their efforts with the SDGs (Guariguata, Brown & Wattleworth, 2019).

Actuaries play a pivotal role in promoting environmental sustainability by assessing and managing risks related to climate change and natural disasters. They develop models to evaluate the potential impact of climate-related events on insurance portfolios, infrastructure projects, and public finances (Mills, 2016). By quantifying the financial consequences of environmental risks, actuaries enable governments and businesses to make informed decisions about resource allocation, adaptation strategies, and sustainable development initiatives (Bolívar, Pérez-Marín & Maldonado, 2021). Their contributions facilitate the achievement of SDG 13 (Climate Action) by enhancing resilience and reducing vulnerabilities to climate-related hazards (Koerth, 2018).

Furthermore, actuaries play a crucial role in promoting social equity and inclusivity by addressing inequalities in access to financial services, healthcare, and social protection. They design insurance products and pension schemes that cater to the needs of underserved populations, including low-income individuals, women, and marginalized communities (Huggins, Kilburn & Dukes, 2017). Actuaries also analyze demographic trends and socioeconomic indicators to identify disparities and develop targeted interventions to promote inclusive growth and reduce inequality (International Actuarial Association, 2019). By supporting initiatives aligned with SDG 10 (Reduced Inequalities), actuaries contribute to building more resilient and inclusive societies (Bloxham, D'Arcy & Elliott, 2020).

Moreover, actuaries play a vital role in promoting economic growth and sustainable development by facilitating long-term investment and infrastructure development. They assess the financial viability of investment projects, evaluate risks, and provide recommendations to optimize resource allocation (McGee, 2015). Actuaries also contribute to designing financing mechanisms, such as public-private partnerships and green bonds, to fund sustainable infrastructure projects (Higgins, Young & Higgins, 2020). By aligning investment decisions with environmental, social, and governance (ESG) criteria, actuaries support SDG 9 (Industry, Innovation, and Infrastructure) and SDG 8 (Decent Work and Economic Growth) by fostering sustainable economic development and job creation (Stewart, 2019).

Furthermore, actuaries play a critical role in promoting health and well-being by designing healthcare financing systems and assessing the financial risks associated with disease outbreaks and pandemics. They develop models to forecast healthcare expenditures, evaluate the impact of public health interventions, and design insurance products to provide affordable and accessible healthcare coverage (Herrmann, Paul & Behn, 2020). Actuaries also contribute to developing risk-sharing mechanisms,

such as health insurance pools and social health insurance schemes, to ensure equitable access to healthcare services (World Health Organization, 2020). By supporting initiatives aligned with SDG 3 (Good Health and Well-being), actuaries contribute to improving health outcomes and reducing disparities in access to healthcare (Brown & Bos, 2018).

Additionally, actuaries play a crucial role in promoting financial resilience and risk management by assessing and managing risks across various sectors, including insurance, pensions, and investments. They develop models to quantify risks, such as longevity risk, investment risk, and operational risk, and provide recommendations to mitigate these risks effectively (Michel-Kerjan & Pasteris, 2018). Actuaries also contribute to developing regulatory frameworks and risk management standards to ensure the stability and integrity of financial markets (International Association of Insurance Supervisors, 2021). By promoting sound risk management practices, actuaries support the achievement of SDG 16 (Peace, Justice, and Strong Institutions) by enhancing financial stability and resilience (Bellis, Heller & Winerman, 2016). Actuaries play a multifaceted role in promoting sustainable development by assessing and managing risks, promoting social equity, facilitating long-term investment, and fostering resilience. Their expertise and analytical skills are instrumental in supporting initiatives aligned with the Sustainable Development Goals, including climate action, reduced inequalities, sustainable economic growth, health and well-being, and financial resilience. By leveraging their knowledge and insights, actuaries contribute to building a more sustainable, inclusive, and resilient future for all.

1.1 Statement of the Problem

The increasing urgency to address global challenges such as climate change, social inequality, and economic instability has underscored the need for effective strategies to achieve sustainable development goals (SDGs). Actuaries, with their expertise in risk assessment and financial management, are positioned to play a significant role in advancing sustainable development agendas. However, despite the growing recognition of their potential contributions, there remains a lack of comprehensive understanding regarding the specific mechanisms through which actuaries can effectively contribute to SDGs. For instance, while it is known that actuaries can assess and manage risks related to environmental sustainability and social equity, there is limited empirical evidence quantifying the extent of their impact. According to a recent survey by the International Actuarial Association (IAA), only 35% of actuaries worldwide reported actively engaging in initiatives directly related to sustainable development (IAA, 2020). This highlights a gap in the existing literature regarding the actual involvement and effectiveness of actuaries in supporting SDGs. Therefore, this study aims to address this gap by conducting a comprehensive analysis of the role of actuaries in advancing sustainable development goals, identifying key strategies and best practices, and assessing their impact on global sustainability outcomes.

The findings of this study are expected to benefit various stakeholders, including policymakers, businesses, civil society organizations, and the actuarial profession itself. By providing insights into the specific contributions and effectiveness of actuaries in supporting SDGs, this study will inform the development of evidence-based policies and strategies aimed at accelerating progress towards sustainable development. Policymakers can use the findings to design targeted interventions and regulatory frameworks that leverage the expertise of actuaries to address pressing sustainability challenges. Similarly, businesses can gain valuable insights into the role of actuaries in managing environmental and social risks, enabling them to integrate sustainability considerations into their operations and investment decisions. Civil society organizations can leverage the findings to advocate for greater collaboration between actuaries and other stakeholders in advancing sustainable development agendas. Moreover, the actuarial profession itself stands to benefit from a clearer

understanding of its role in promoting sustainability, which can enhance its relevance and reputation in the broader context of global challenges. Overall, the findings of this study have the potential to catalyze collective action and drive meaningful progress towards achieving the Sustainable Development Goals.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Stakeholder Theory

Stakeholder theory, originally proposed by R. Edward Freeman in the 1980s, posits that organizations have a responsibility not only to shareholders but also to a broader set of stakeholders, including employees, customers, suppliers, and the community (Freeman, 1984). This theory emphasizes the interconnectedness of various stakeholders and advocates for businesses to consider their interests and well-being in decision-making processes. Applied to the role of actuaries in sustainable development goals (SDGs), stakeholder theory highlights the importance of actuaries considering the interests of diverse stakeholders impacted by environmental, social, and economic risks. Actuaries, as professionals with expertise in risk assessment and management, have a fiduciary duty not only to their clients but also to society at large. By adopting a stakeholder perspective, actuaries can contribute to SDGs by integrating sustainability considerations into their risk assessments, ensuring that the interests of all stakeholders are taken into account.

2.1.2 Institutional Theory

Institutional theory, developed by sociologists such as John W. Meyer and Paul J. DiMaggio in the late 20th century, examines how organizations are influenced by institutional norms, values, and practices (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). According to this theory, organizations conform to institutional pressures to gain legitimacy and ensure survival in their respective environments. Applied to the role of actuaries in SDGs, institutional theory emphasizes the influence of institutional factors, such as regulatory frameworks, professional norms, and industry standards, on actuaries' behavior and decision-making. Actuaries operate within institutional contexts shaped by societal expectations, government policies, and industry norms. By aligning their practices with sustainable development goals, actuaries can enhance their legitimacy and reputation within the profession and society. Institutional theory provides insights into the institutional mechanisms that facilitate or hinder actuaries' contributions to SDGs, thereby informing strategies to promote sustainable practices within the actuarial profession.

2.1.3 Systems Theory

Systems theory, rooted in the work of Ludwig von Bertalanffy and others in the mid-20th century, examines how complex systems function as interconnected wholes, with various components interacting and influencing each other (Bertalanffy, 1968). This theory emphasizes the importance of understanding the interdependencies and feedback loops within systems to effectively address complex problems. Applied to the role of actuaries in SDGs, systems theory highlights the interconnected nature of sustainability challenges and the need for holistic approaches to risk assessment and management. Actuaries play a critical role in analyzing the systemic risks associated with environmental degradation, social inequalities, and economic instability. By adopting a systems perspective, actuaries can identify leverage points and interventions that have the potential to generate positive feedback loops and systemic change towards achieving SDGs. Systems theory provides a framework for actuaries to consider the dynamic interactions between various factors shaping sustainability outcomes and develop strategies to promote resilience and sustainability within complex socio-ecological systems.

2.2 Empirical Review

Smith & Johnson (2018) assessed how actuaries contribute to quantifying environmental risks associated with climate change and to explore best practices in climate change adaptation strategies. A literature review was conducted to analyze existing research on the role of actuaries in climate change adaptation. Additionally, semi-structured interviews were conducted with actuaries and environmental experts to gather insights into their experiences and perspectives on addressing climate-related risks. The study found that actuaries play a crucial role in developing models to assess the financial implications of climate-related events, such as hurricanes, floods, and wildfires. Actuaries also contribute to designing risk management strategies, such as catastrophe bonds and insurance-linked securities, to enhance resilience to climate change impacts. However, challenges remain in accurately quantifying long-term environmental risks and integrating climate change considerations into actuarial decision-making processes. The study recommended enhancing collaboration between actuaries, climate scientists, and policymakers to improve the accuracy and relevance of environmental risk assessments. Additionally, it suggested incorporating climate change scenarios and probabilistic modeling techniques into actuarial frameworks to better capture the uncertainty and complexity of climate-related risks.

Thompson & Patel (2020) explored how actuarial principles and techniques can be applied to social impact investing to support sustainable development goals. A case study approach was used to analyze successful examples of social impact investing initiatives that leverage actuarial expertise. Data were collected through interviews with stakeholders involved in social impact investing projects, as well as through document analysis of relevant reports and publications. The study identified several areas where actuaries can contribute to social impact investing, including risk assessment, financial modeling, and impact measurement. Actuaries play a key role in evaluating the financial viability and social impact of investment opportunities, assessing risks, and designing innovative financial products to attract capital for sustainable development initiatives. The study recommended promoting greater collaboration between actuaries, impact investors, and social enterprises to scale up social impact investing efforts. It also highlighted the importance of incorporating social and environmental considerations into actuarial decision-making processes and advocated for the development of standardized methodologies for measuring and reporting social impact.

Johnson & Wong (2019) investigated how actuaries contribute to promoting inclusive insurance products and services to reduce vulnerability and enhance resilience among underserved populations. A systematic literature review was conducted to identify studies on inclusive insurance and the role of actuaries in supporting financial inclusion. Additionally, case studies were analyzed to examine successful examples of inclusive insurance initiatives that leverage actuarial expertise. The study found that actuaries play a critical role in designing insurance products tailored to the needs of vulnerable populations, such as microinsurance for low-income households and weather-indexed insurance for smallholder farmers. Actuaries use demographic data, risk assessment models, and pricing techniques to develop affordable and accessible insurance solutions that provide financial protection against various risks, including natural disasters, health emergencies, and crop failures. The study recommended fostering partnerships between actuaries, insurers, governments, and civil society organizations to expand access to inclusive insurance products and services. It also advocated for regulatory reforms and capacity-building initiatives to enhance the technical skills and knowledge of actuaries working in the field of inclusive insurance.

Chen & Smith (2021) aimed to develop a framework for assessing the effectiveness of actuarial contributions to sustainable development goals and to apply the framework to evaluate selected case studies. A mixed-methods approach was employed, combining qualitative interviews with actuaries

and stakeholders with quantitative analysis of sustainability indicators and financial metrics. The study identified key performance indicators (KPIs) related to actuarial contributions to SDGs and developed a scoring system to evaluate the impact of actuaries' interventions. The study found that actuaries' contributions to sustainable development goals varied in terms of scope, scale, and effectiveness. Actuaries were most effective when they engaged in collaborative partnerships with stakeholders, utilized innovative risk management techniques, and demonstrated a commitment to social responsibility. However, challenges remained in measuring the long-term impact of actuarial interventions and assessing their contribution to broader societal outcomes. The study recommended refining the framework for assessing actuarial contributions to SDGs, expanding the scope of analysis to include qualitative indicators and stakeholder perspectives, and promoting greater transparency and accountability in reporting actuarial impact metrics.

Wong & Chan (2018) examined how actuaries in the insurance sector contribute to sustainable development goals through risk management practices. A qualitative case study approach was employed, focusing on a sample of insurance companies with demonstrated commitments to sustainability and social responsibility. Data were collected through semi-structured interviews with actuaries, risk managers, and senior executives, as well as through document analysis of corporate sustainability reports and risk management policies. The study found that actuaries play a critical role in integrating sustainability considerations into risk management processes within insurance companies. Actuaries develop models to assess environmental, social, and governance (ESG) risks, conduct stress tests and scenario analyses to evaluate the potential impact of sustainability-related events, and design risk mitigation strategies to enhance resilience and sustainability. However, challenges remain in aligning short-term financial objectives with long-term sustainability goals and in quantifying the financial benefits of sustainability initiatives. The study recommended enhancing the integration of sustainability principles into actuarial education and professional training programs, fostering cross-disciplinary collaboration between actuaries, risk managers, and sustainability experts, and developing standardized metrics for measuring and reporting sustainability performance within the insurance industry.

Lim & Tan (2020) explored stakeholders' perspectives on the role of actuarial education in advancing sustainable development goals and to identify opportunities for curriculum enhancement. A qualitative research design was employed, utilizing focus group discussions and interviews with stakeholders, including actuaries, educators, employers, and policymakers. Data were analyzed thematically to identify key themes and issues related to actuarial education and sustainability. The study found that while there was growing recognition of the importance of sustainability in actuarial education, there were significant gaps in the existing curriculum. Actuarial students lacked exposure to topics such as environmental risk management, social impact investing, and inclusive insurance, which are critical for addressing sustainable development challenges. Stakeholders emphasized the need for curriculum reforms, interdisciplinary collaboration, and experiential learning opportunities to better prepare future actuaries for the complexities of sustainable development. The study recommended integrating sustainability principles into core actuarial courses, developing specialized electives on sustainability topics, and fostering partnerships with industry and community organizations to provide students with real-world experiences in sustainable finance and risk management.

3.0 METHODOLOGY

The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive’s time, telephone charges and directories. Thus, the study relied

on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

4.0 FINDINGS

This study presented both a contextual and methodological gap. A contextual gap occurs when desired research findings provide a different perspective on the topic of discussion. For instance, Thompson & Patel (2020) explored how actuarial principles and techniques can be applied to social impact investing to support sustainable development goals. A case study approach was used to analyze successful examples of social impact investing initiatives that leverage actuarial expertise. Data were collected through interviews with stakeholders involved in social impact investing projects, as well as through document analysis of relevant reports and publications. The study identified several areas where actuaries can contribute to social impact investing, including risk assessment, financial modeling, and impact measurement. Actuaries play a key role in evaluating the financial viability and social impact of investment opportunities, assessing risks, and designing innovative financial products to attract capital for sustainable development initiatives. The study recommended promoting greater collaboration between actuaries, impact investors, and social enterprises to scale up social impact investing efforts. It also highlighted the importance of incorporating social and environmental considerations into actuarial decision-making processes and advocated for the development of standardized methodologies for measuring and reporting social impact. On the other hand, the current study focused on the role of actuaries in Sustainable Development Goals.

Secondly, a methodological gap also presents itself, for example, Thompson & Patel (2020) conducted a case study approach was used to analyze successful examples of social impact investing initiatives that leverage actuarial expertise; in exploring how actuarial principles and techniques can be applied to social impact investing to support sustainable development goals. Whereas, the current study adopted a desktop research method.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study provides valuable insights into the multifaceted contributions of actuaries towards advancing global sustainability agendas. Through an extensive review of empirical studies and theoretical frameworks, it becomes evident that actuaries play a crucial role in assessing, managing, and mitigating risks associated with environmental degradation, social inequality, and economic instability. Actuaries leverage their expertise in quantitative analysis, risk modeling, and financial management to support initiatives aligned with sustainable development goals (SDGs) across various sectors, including insurance, finance, and pensions.

One of the key findings of the study is the significant impact actuaries have in promoting environmental sustainability by assessing and managing risks related to climate change, natural disasters, and resource depletion. Actuaries develop sophisticated models to evaluate the financial implications of environmental risks and design strategies to enhance resilience and adaptation. Moreover, actuaries contribute to promoting social equity and inclusivity by designing insurance products and pension schemes that cater to the needs of underserved populations, thereby supporting SDG 10 (Reduced Inequalities) and fostering inclusive growth.

Furthermore, the study highlights the role of actuaries in facilitating long-term investment and infrastructure development, which are essential for achieving sustainable economic growth (SDG 9) and decent work (SDG 8). Actuaries assess the financial viability of investment projects, evaluate risks, and design financing mechanisms to fund sustainable infrastructure projects. By aligning

investment decisions with environmental, social, and governance (ESG) criteria, actuaries contribute to building more resilient and sustainable economies.

Additionally, the study underscores the importance of actuaries in promoting health and well-being by designing healthcare financing systems and assessing the financial risks associated with disease outbreaks and pandemics. Actuaries develop models to forecast healthcare expenditures, evaluate the impact of public health interventions, and design insurance products to provide affordable and accessible healthcare coverage. By supporting initiatives aligned with SDG 3 (Good Health and Well-being), actuaries contribute to improving health outcomes and reducing disparities in access to healthcare. The findings of this study demonstrate the indispensable role of actuaries in advancing sustainable development goals across various domains. Actuaries' expertise in risk assessment, financial management, and strategic decision-making positions them as key drivers of sustainability initiatives worldwide. By integrating sustainability considerations into their practices and collaborating with diverse stakeholders, actuaries have the potential to catalyze transformative change and contribute significantly to building a more sustainable, inclusive, and resilient future for all.

5.2 Recommendations

Firstly, it advocates for increased awareness among actuaries about the significance of their role in supporting SDGs. This recommendation emphasizes the importance of integrating sustainability considerations into actuarial education and professional development programs. Actuaries need to be equipped with the knowledge and skills necessary to assess and manage environmental, social, and governance (ESG) risks effectively. By enhancing awareness and understanding of sustainability issues, actuaries can better align their practices with SDGs and contribute more meaningfully to sustainable development efforts (International Actuarial Association, 2020).

Secondly, the study recommends fostering collaboration between actuaries, policymakers, businesses, and civil society organizations to leverage collective expertise and resources towards achieving SDGs. Actuaries should actively engage in multi-stakeholder partnerships and initiatives aimed at addressing complex sustainability challenges. By working together with other stakeholders, actuaries can exchange insights, share best practices, and co-create innovative solutions to sustainability problems. Collaboration can also help actuaries gain a broader perspective on sustainability issues and identify new opportunities for impact (Thompson & Patel, 2020).

Thirdly, the study suggests integrating sustainability considerations into actuarial decision-making processes and professional standards. Actuaries should systematically incorporate environmental, social, and governance (ESG) factors into risk assessments, financial modeling, and investment strategies. This recommendation entails developing frameworks, tools, and methodologies that enable actuaries to quantify and manage sustainability-related risks and opportunities. Additionally, professional organizations and regulatory bodies should establish guidelines and standards for integrating sustainability into actuarial practice, ensuring consistency and transparency in sustainability reporting and disclosure (Wong & Chan, 2018).

Lastly, the study underscores the importance of promoting transparency, accountability, and continuous learning within the actuarial profession. Actuaries should adhere to ethical principles and professional standards that prioritize the public interest and sustainability. This recommendation emphasizes the need for actuaries to communicate openly and honestly about the potential impacts of their decisions on sustainable development outcomes. Actuaries should also engage in ongoing professional development and knowledge-sharing activities to stay abreast of emerging sustainability trends, tools, and techniques. By fostering a culture of learning and accountability, the actuarial profession can enhance its capacity to contribute effectively to sustainable development goals and address the evolving challenges of the 21st century (Lim & Tan, 2020).

In summary, the recommendations from the study emphasize the importance of raising awareness, fostering collaboration, integrating sustainability considerations, and promoting transparency and accountability within the actuarial profession. By implementing these recommendations, actuaries can play a more proactive and impactful role in advancing sustainable development goals and building a more sustainable and resilient future for all.

REFERENCES

Barreto, P., Souza Jr., C., & Noguerón, R. (2020). Deforestation in the Brazilian Amazon: The hidden story. In Amazonia and Global Change (pp. 99-109). Springer. DOI: 10.1007/978-3-030-31138-6_7

Bellis, R., Heller, C., & Winerman, M. (2016). Actuaries, climate change, and the American Psychological Association. American Psychologist, 71(4), 298–304. https://doi.org/10.1037/a0040327

Bertalanffy, L. von. (1968). General system theory: Foundations, development, applications. George Braziller.

Binagwaho, A., Farmer, P. E., Nsanzimana, S., Karema, C., Gasana, M., & de Dieu Ngirabega, J. (2014). Rwanda 20 years on: investing in life. The Lancet, 384(9940), 371-375. DOI: 10.1016/S0140-6736(14)60574-2

Bloxham, K., D'Arcy, S., & Elliott, R. (2020). Actuaries and social policy: A narrative review. British Actuarial Journal, 25(2), e19. https://doi.org/10.1017/S1357321720000050

Bolívar, M. P., Pérez-Marín, A. M., & Maldonado, J. H. (2021). The role of actuaries in the sustainable management of natural resources. Environmental Science & Policy, 125, 185–193. https://doi.org/10.1016/j.envsci.2021.07.010

Brazilian National Institute for Space Research. (2021). PRODES: Amazon deforestation monitoring project. Retrieved from https://prodesdigital.inpe.br/app/dashboard/alerts/legal

Brown, S., & Bos, A. (2018). Actuaries and health policy: Past, present, and future. Health Affairs, 37(2), 324–331. https://doi.org/10.1377/hlthaff.2017.1050

Brown, S., Daykin, C., & Martin, R. (2012). The role of the actuary in risk measurement and management. British Actuarial Journal, 17(1), 25–79. https://doi.org/10.1017/S1357321712000161

Chen, L., & Smith, R. (2021). Measuring impact: Evaluating the effectiveness of actuarial contributions to sustainable development goals. Sustainability Accounting, Management and Policy Journal, 12(4), 874–892.

Department for Business, Energy & Industrial Strategy. (2021). Energy trends: renewables. Retrieved from https://www.gov.uk/government/statistics/renewables

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48(2), 147–160.

Freeman, R. E. (1984). Strategic management: A stakeholder approach. Pitman Publishing.

Guariguata, M. R., Brown, S., & Wattleworth, J. A. (2019). Actuaries and environmental policy: A qualitative inquiry. Environmental Policy & Law, 49(3), 197–210. https://doi.org/10.3233/EPL-180126

Herrmann, D., Paul, T., & Behn, A. (2020). The role of actuaries in health care reform. Journal of Health Economics, 69, 102260. https://doi.org/10.1016/j.jhealeco.2019.102260

Higgins, T., Young, G., & Higgins, A. (2020). Actuarial approaches to sustainable investing. Journal of Investing, 29(4), 34–42. https://doi.org/10.3905/joi.2020.1.182

Huggins, N., Kilburn, N., & Dukes, M. (2017). Actuarial approaches to social protection. Geneva Papers on Risk and Insurance: Issues and Practice, 42(1), 99–124. https://doi.org/10.1057/gpp.2016.16

International Actuarial Association. (2019). Actuarial principles of fair pricing. Retrieved from https://www.actuaries.org/about/governance/principles-fair-pricing

International Actuarial Association. (2020). Global survey on actuaries and sustainable development goals. Retrieved from https://www.actuaries.org/iaa/activities/working-groups/working-group-actuaries-and-sustainable-development-goals-global-surveys

International Association of Insurance Supervisors. (2021). Principles of effective risk management. Retrieved from https://www.iaisweb.org/documents/publications/guidance-material/guidelines-and-principles/principles-of-effective-risk-management

International Energy Agency. (2021). Energy balances of OECD countries. Retrieved from https://www.iea.org/data-and-statistics

Johnson, K., & Wong, S. (2019). Promoting inclusive insurance: The role of actuaries in reducing vulnerability and enhancing resilience. Journal of Inclusive Finance, 8(1), 45–62.

Levy, F., & Temin, P. (2019). Inequality and institutions in 20th century America. MIT Press. DOI: 10.7551/mitpress/11798.001.0001

Lim, H., & Tan, L. (2020). Enhancing actuarial education for sustainable development: Perspectives from stakeholders. Journal of Higher Education Policy and Management, 42(6), 633–652.

Martins, D. S., Pires, M. F., & Schwanke, A. (2018). Social inequality and environmental vulnerability in Brazil. In Handbook of Climate Change Resilience (pp. 1-16). Springer. DOI: 10.1007/978-3-319-71025-9_141-1

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. American Journal of Sociology, 83(2), 340–363.

Mullen, K., & Braverman, J. (2018). Health insurance coverage in the United States: 2017. Current Population Reports, P60-264. U.S. Census Bureau. Retrieved from https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-264.pdf

National Centers for Environmental Information. (2021). Global climate report - annual 2020. National Oceanic and Atmospheric Administration. Retrieved from https://www.ncdc.noaa.gov/sotc/global/202013

Office for National Statistics. (2021). Wealth in Great Britain: main results from the wealth and assets survey 2018/20. Retrieved from https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/wealthinGreatBritain/april2018tomarch2020

Sachs, J. D., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). Sustainable development report 2019. Cambridge University Press. DOI: 10.1017/9781108760028

Smith, J., & Johnson, M. (2018). Quantifying environmental risks: The role of actuaries in climate change adaptation. Environmental Risk Management Review, 12(3), 275–291.

Thompson, L., & Patel, R. (2020). Social impact investing: Leveraging actuarial expertise for sustainable development goals. Journal of Social Finance, 15(2), 187–204.

U.S. Census Bureau. (2020). Income and poverty in the United States: 2019. Retrieved from https://www.census.gov/library/publications/2020/demo/p60-270.html

Wong, K., & Chan, C. (2018). Risk management for sustainable development: A case study of actuaries in the insurance sector. Journal of Sustainable Finance & Investment, 7(2), 163–180.

World Health Organization. (2020). World health statistics 2020: monitoring health for the SDGs. Retrieved from https://www.who.int/publications/i/item/9789240005105

Yamazaki, Y., & Takeuchi, K. (2020). Lessons learned and future challenges for the sustainable development goals: The case of Japan. Sustainability, 12(3), 1066. DOI: 10.3390/su12031066