

RESILIENCE AND SUSTAINABILITY IN TOURISM-FORESTRY SYSTEMS THROUGH RISK MANAGEMENT FRAMEWORK: REVIEW AND CONCEPT

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ABSTRACT

Objective: This study aims to explore and enhance the tourism-forestry risk management in research and industry practice. By integrating the concept of resilience and sustainability into risk management practices, this research addresses the multifaceted challenges faced by the forest-tourism field and promotes its long-term viability.

Methods: The study comprised of three stages. Firstly, it employs the scoping review technique in the Scopus database system to seek for research gaps related to the objective of the study. Secondly, the study continues with conceptual analysis from Malaysian context particularly on the industrial avenue to assess the current state of risk management practices. Final stage is to propose a tourism-forestry risk management framework for the tourism industry in Malaysia. This study evaluates the effectiveness of existing risk management strategies and identifies gaps and opportunities for improvement by analysing publicly available data from researchers, various stakeholders such as government agencies, industry professionals, and local communities.

Results: The findings contribute to the development of Risk Management Tourism-Forestry Framework (RTFF) for enhancing resilience and sustainability in tourism-forestry systems not limited to Malaysia but also for other nations. Moreover, the research outcomes provide valuable insights for the researchers on the knowledge gaps that should be filled. Furthermore, this study provides great lessons learned for all countries with similar socio-economic and environmental contexts towards the application of a risk management framework in their region. Finally, the proposed SDG-oriented risk management framework of RTFF offers a holistic and integrated approach, taking into account social, economic, and environmental dimensions, and provides a roadmap for fostering resilience and sustainability in the face of evolving challenges.

Conclusion: This study aims to improve the literature reviews on resilience and sustainability in tourism-forestry that are related to risk management issues. The manuscript addresses the multifaceted challenges faced by the tourism-forestry field and promotes its long-term viability

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by incorporating the concept of sustainable development goals into risk management practises. Elements of tourism-forestry in the state of the art in the literature as well as in practice not to mention the development of the framework, in which no other study has adopted the same methodology, thus proving the novelty of the study.

Keywords: tourism-forestry, risk management, resilience, sustainability.

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RESILIÊNCIA E SUSTENTABILIDADE NOS SISTEMAS TURÍSTICO-FLORESTAIS ATRAVÉS DO QUADRO DE GESTÃO DE RISCOS: REVISÃO E CONCEITO

RESUMO

Objetivo: Este estudo tem como objetivo explorar e aprimorar a gestão de risco turismo-florestal em pesquisa e prática industrial. Ao integrar o conceito de resiliência e sustentabilidade nas práticas de gestão de riscos, esta investigação aborda os desafios multifacetados enfrentados pelo setor do turismo florestal e promove a sua viabilidade a longo prazo.

Métodos: O estudo teve três etapas. Em primeiro lugar, emprega a técnica de revisão de escopo no sistema de base de dados Scopus para buscar lacunas de pesquisa relacionadas ao objetivo do estudo. Em segundo lugar, o estudo continua com análise conceitual do contexto malaio, particularmente na avenida industrial para avaliar o estado atual das práticas de gestão de risco. A etapa final é propor um quadro de gestão de risco turismo-floresta para a indústria do turismo na Malásia. Este estudo avalia a eficácia das estratégias de gestão de risco existentes e identifica lacunas e oportunidades de melhoria, analisando dados publicamente disponíveis de pesquisadores, várias partes interessadas, como agências governamentais, profissionais do setor e comunidades locais.

Resultados: Os resultados contribuem para o desenvolvimento do Quadro de Gestão de Riscos Turismo-Florestal (RTFF) para aumentar a resiliência e a sustentabilidade em sistemas turismo-florestais não limitados à Malásia, mas também para outras nações. Além disso, os resultados da investigação fornecem informações valiosas para os investigadores sobre as lacunas de conhecimento que devem ser colmatadas. Além disso, este estudo fornece grandes lições aprendidas para todos os países com contextos socioeconômicos e ambientais semelhantes para a aplicação de um quadro de gestão de risco na sua região. Por último, o quadro de gestão dos riscos proposto, orientado para os ODS, do RTFF oferece uma abordagem holística e integrada, tendo em conta as dimensões social, econômica e ambiental, e fornece um roteiro para promover a resiliência e a sustentabilidade face aos desafios em evolução.

Conclusão: Este estudo visa melhorar as revisões da literatura sobre resiliência e sustentabilidade no turismo-silvicultura que estão relacionadas a questões de gestão de risco. O manuscrito aborda os desafios multifacetados enfrentados pelo campo turismo-silvicultura e promove sua viabilidade a longo prazo, incorporando o conceito de metas de desenvolvimento sustentável em práticas de gestão de risco. Elementos do turismo-silvicultura no estado da arte na literatura, bem como na prática para não mencionar o desenvolvimento do quadro, em que nenhum outro estudo adotou a mesma metodologia, provando assim a novidade do estudo.

Palavras-chave: turismo-silvicultura, gestão de risco, resiliência, sustentabilidade.



1 INTRODUCTION

The intersection of tourism and forestry systems presents unique challenges and opportunities for enhancing resilience and sustainability (Bhammar et al , 2021; Tsai, 2016). Both sectors are vital for economic development and environmental conservation. However, they are also susceptible to various risks, including natural disasters, climate change, and socio-economic factors. To address these challenges, a comprehensive risk management framework is needed that aligns with the Sustainable Development Goals (SDGs) (Orchiston, 2012). Tourism plays a crucial role in many economies, particularly in regions with rich natural resources and cultural heritage. On the other hand, this can put a strain on ecosystems that are already fragile and the communities that live there (Helmi & Naparin, 2023). Moreover, forestry systems are necessary for the preservation of biodiversity, the sequestration of carbon, and the provision of livelihoods for communities (Bruzzi et al, 2011; Al-Tokhais, 2019). However, they are threatened by dangers such as wildfires, illegal logging, and the destruction of their habitat by humans. As a result, it is absolutely necessary to devise strategies that will improve the robustness and longevity of both industries.

Enhancing the resilience and sustainability of Malaysia's tourism and forestry systems is made possible by SDG-oriented risk management. The nation focuses on identifying and evaluating risks that have an influence on these industries by using the Sustainable Development Goals of the United Nations as a framework for direction.

While forestry faces issues like deforestation, illegal logging, and socio-economic risks to local communities, tourism may face risks like natural catastrophes, economic downturns, and reputational risks associated with sustainability. Accordingly, building climate resilience is essential for reducing the effects of climate change on both industries, with a focus on climate-resilient forestry practices and tourism infrastructure (Dogru et al., 2019; Devisscher, Spies & Griess, 2021). Additionally, encouraging sustainable tourist practices, such as ecotourism along with ethical tourism campaigns, guarantees that the tourism industry supports the SDGs relating to economic growth, decent work, and reduced inequities.

In order to safeguard biodiversity and natural ecosystems, SDG-oriented risk management in the forestry industry places a strong emphasis on ethical logging practices, sustainable land-use planning, and reforestation initiatives. Collaboration is crucial for promoting equitable development and empowering local communities to



manage natural resources (Wondirad, Tolkach, & King, 2020). Stakeholders include government organizations, the private sector, non-governmental organizations (NGOs), and academic institutions. Apart from that, in order to encourage sustainable practices and enforce compliance with risk mitigation measures across both industries, supportive laws and regulations are also essential.

In spite of the significance of tourism-forestry systems, there is a lack of research into perceiving how to effectively manage risks and promote resilience and sustainability in this regard. Studies that already exist frequently narrow their attention to either tourism or forestry in isolation, ignoring the interconnectedness of the two industries as well as any potential synergies that may exist between them. Therefore, this study aims to fill this gap by developing a risk management framework that specifically addresses the needs and challenges of tourism-forestry systems.

The objectives of this research are threefold. Firstly, to identify the research gaps in tourism-forestry in the Scopus database, which focuses on the risk management aspects and emphasizes resilience and sustainability. Secondly, to conceptually analyze the development of a risk management framework in practice. Thirdly, to suggest a risk management framework for tourism-forestry sustainability to be adopted by the industry and country as a whole.

2 LITERATURE REVIEW

2.1 TOURISM-FORESTRY IN MALAYSIA

The peninsular of Malaysia, the states of Sabah and Sarawak, and the federal territory of Labuan on the island of Borneo make up the country of Malaysia, which can be found in Southeast Asia. The landmass encompasses a total area of 329,750 km² and features a diverse topography, encompassing both mountainous and coastal regions. There are 4,800 kilometres of coastline that surround Malaysia. Temperatures range daily between 26 and 28 degrees Celsius due to the tropical nature of the climate. There are two monsoon seasons: the first runs from November to March, and the second runs from May to September. The annual rainfall ranges from 2,000 to 4,000 millimetres on average. Rainfall is plentiful. During the late afternoon and early evening, clouds block a significant portion of the sun's rays. About six hours of sunlight directly per day are enjoyed in Malaysia. The forests of Malaysia are home to an exceptionally diverse array of species and represent ecosystems of the highest degree of complexity. The percentage



of land covered by forests decreased from 56 percent in the year 2000 to 55 percent in the year 2007. On the National Biodiversity Index, Malaysia comes in at number 12 overall, making it one of the countries that is considered to have the greatest amount of flora and fauna in the world (NRE, 2011). Malaysia's resource-based socioeconomic development has been significantly aided by the country's extensive forest cover. According to the Federal Constitution of Malaysia, the legislative control of land and forests is an issue that is reserved exclusively for the states, and state governments have complete jurisdiction over the forest resources that are located within their borders. In addition, the legislative control of land and forests is a matter that is reserved exclusively for the states. The sector of the forestry industry that operates in Peninsular Malaysia is the primary focus of this paper. It provides a description of the current state of forestry in terms of policy and legislation, forest governance, and forest management, as well as a discussion of the current state of forestry in Peninsular Malaysia and a discussion of the current state of forestry in Peninsular Malaysia.

The tourism industry in Peninsular Malaysia is closely intertwined with the forestry industry, which is an essential component of Malaysia's economy as a whole. Forests in Peninsular Malaysia provide a natural setting for nature-based tourism activities, drawing tourists with their verdant greenery, diverse wildlife, and one-of-a-kind ecosystems. These factors combine to make Peninsular Malaysia's forests an attractive destination for nature-based tourism. In addition, forests in Malaysia offer a natural habitat for the country's flora and fauna. Activities such as hiking, watching birds, and looking for wild animals are just some of the things that can be done in national parks, nature preserves, and other types of protected areas. Other activities include ecotours (Kelkit et al., 2020).

In addition to this, forests provide a setting for ecotourism activities, which are aimed at fostering environmentally responsible behaviours, protecting natural resources, and improving the quality of life in the surrounding communities (Sen & Walter, 2020). Attractions based in forests, such as the Taman Negara National Park and the Cameron Highlands, are popular with tourists from both within Malaysia and from outside the country. The indigenous communities that live in or near the forests of Peninsular Malaysia are a major draw for cultural tourists. These communities offer visitors the opportunity to learn about traditional ways of life, as well as traditional arts and crafts and cultural performances. Practices of sustainable forest management are absolutely



necessary for preserving the allure of forests as tourist destinations and guaranteeing the sector's continued viability over the long term in Peninsular Malaysia. The forestry industry helps the country achieve its goals for sustainable development and contributes to the expansion of the tourism industry. This is accomplished by striking a healthy balance between economic growth and environmental conservation.

The Sustainable Development Goals (SDGs), which were first introduced in late 2014, were created with participation from Malaysia (Department of Statistics Malaysia [DOSM], 2019). The government of Malaysia has identified a number of Sustainable Development Goals (SDGs) that all companies operating in the country are required to achieve by the year 2030, particularly with regard to their level of economic, environmental, and social sustainability performance. To keep more people employed in the health care industry, to improve water quality by limiting the release of harmful chemicals, to increase the efficiency with which all sectors use water, to improve access to research and technology related to clean energy, to increase the efficiency with which the world consumes and produces resources, and to manage chemicals and waste in a way that is good for the environment and significantly reduces the amount of pollutant emissions are some of the most important goals.

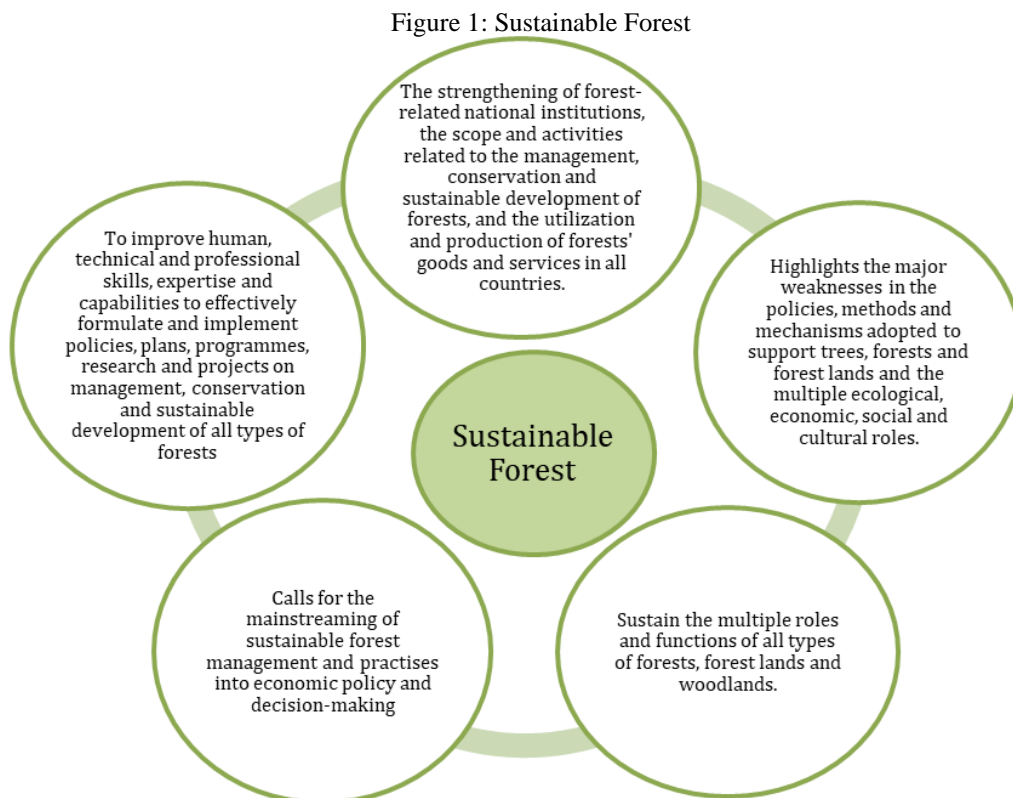
Goal 15 of the Sustainable Development Goal seeks to "protect, restore, and promote sustainable use of terrestrial ecosystems," as well as "manage forests in a sustainable way," "fight desertification," "stop and reverse land degradation," and "stop biodiversity loss" (United Nations, 2022). In light of these Sustainable Development Goals (SDGs), it is essential for every sector of the Malaysian economy, but particularly the tourism-forestry sector, to have an effective tourism-forestry system in place in order to achieve corporate sustainable performance. This line of research concentrated on tourism-forestry because of the rapid expansion of this industry in Malaysia, which has made it abundantly clear that the management system needs to be improved in order to prevent incidents that threaten the safety and health of people as well as the environment.

The Future We Want, the Rio+20 Conference's official conclusion document, emphasises the need to improve people's and communities' livelihoods by establishing the framework for forest sustainability before the 2030 Agenda for Sustainable Development is implemented (United Nations, 2022). It also acknowledges the UN Forum on Forests' contribution to achieving forest management through encouraging international policy coordination and collaboration and addressing forest-related



challenges in a comprehensive and integrated manner. The details of the document from the Rio+20 Conference on Sustainable Forests are shown in detail in Figure 1 below.

The effects of climate change on sustainable tourism are significant because of the threats it poses to biodiversity, water supplies, and human health brought on by rising temperatures, droughts, floods, and wildfires (Mohd Shariff, 2022). Ecotourism in Malaysia is a major industry, and green tourism is a major part of that (Musa & Nadarajah, 2023). Realising how crucial forests are to the continued success of human societies, we must do what we can to preserve and safeguard them for the sake of future generations (Lintangah et al., 2022). Therefore, sustainable tourism is valued since it serves the demands of today's visitors and hosts while also safeguarding and improving the future (Mohd Shariff, 2022).



Source: SDG Knowledge Platform, United Nations Website

Every tourism activity is carefully assessed and improved by the Forestry Department in an effort to increase future revenue (Musa & Nadarajah, 2023). Musa and Nadarajah (2023) added that these forested parks might be renovated into green tourist attraction that draws visitors from far and wide. Green visitors from all over the world travel to forest recreation zones due to their beauty, rarity, and practical importance. The



economic, environmental, cultural, and political facets of a destination all play a role in the success of the tourism industry (Suta & Mahagangga, 2018). The tourism industry has several positive effects, including the creation of new jobs, the development of new businesses, the generation of new revenue, and the maintenance of traditional ways of life and customs (Soewarni et al., 2019). Therefore, green tourism becomes a more reliable source of income and improves living conditions in Malaysia. The examples of the forest management policy of Malaysia are illustrated in Figure 2 below.

Figure 2: Examples of Malaysia's Policy on Forest Management

In 2009, Malaysia eventually has adopted:	<ul style="list-style-type: none">•National Climate Change Policy (NCCP)•National Green Technology Policy (NGTP)
Taking seriously the impacts of climate change in the country, several policies have been addressed in the 5-year Malaysia Plans including:	<ul style="list-style-type: none">•Environmental Quality Act 1974•National Forestry Act 1984•National Policy on Biological Diversity 1998•National Wetland Policy 2004

Source: Musa & Nadarajah (2023)

None of these policies, however, address the issue of adaptation in the context of tourism, and most of them are focused on mitigation rather than adaptation (Mohd Shariff, 2022). Additionally, local community involvement in conservation and tourist development significantly affects the development's long-term sustainability (Yushairi et al., 2023). When analysing initiatives for the growth of the tourism industry's sustainability, it is important to take into account the role that eco-tourism as an effort to conserve the environment and preserve flora and fauna and sustainable indigenous adoption tourism play. Due to the lack of demand for green tourism's resources, estimating its true worth is challenging (Musa & Nadarajah, 2023). In this scenario, forests still account for roughly 59.5% of Malaysia's total land area, but excessive logging poses a serious threat to the remaining part of them due to the country's rapid economic development (Jayasooria, 2019).

Without a doubt, everyone must work towards sustainability (Chong et al., 2018). In contrast to the growing number of enterprises in the nation, however, sustainability reporting practises have remained extremely low among Malaysian organisations (Nur Fatin et al., 2016). The lack of sustainability reporting practises can be attributed to



several factors, including high reporting costs, a lack of resources, inconsistent disclosure practises, challenges in measuring performance, and challenges in inspiring organisations to be pro-active in sustainability reporting (Muhammad Kashif et al., 2019). Being an emerging market, focus is often placed on organisational success, which leads to a lack of sustainability efforts (Chong et al., 2018).

The State Forestry Department is responsible for managing and regulating timber harvesting, collecting forestry revenues, and developing the land. Timber plantations are often established in permanently reserved forests (PRF) managed under private concessions, and Peninsular Malaysia has 120,000 hectares of timber plantations. However, there are concerns about forest degradation in some areas, particularly Sabah and Sarawak, where about 80% of forests are degraded. The forestry sector in Peninsular Malaysia has experienced rapid expansion and development in recent decades, resulting in a huge increase in data collection. Sustainable forest management is required to ensure the long-term viability of the forest sector in Peninsular Malaysia.

2.2 RISK MANAGEMENT AND SUSTAINABILITY IN TOURISM-FORESTRY SYSTEM

According to the Brundtland Commission, sustainable development is defined as growth that satisfies current demands without jeopardizing the capacity of future generations to meet their own needs (WCED, 1987). It is a multifaceted initiative that seeks to improve everyone's quality of life while safeguarding the planet's natural resources. It involves social and economic advancement and environmental preservation, all of which are essential to sustainable development (Kuhlman & Farrington, 2010). Contrarily, risk management entails identifying, assessing, and mitigating possible risks that can jeopardize the system's sustainability (Kaplan and Mikes, 2016). The decision-making processes involved in sustainable development heavily rely on risk management. Effective risk management aids in identifying and addressing the possible risks related to forestry and tourist operations, ensuring that these activities are in line with the objectives of sustainable development (Hurlbert et al., 2019). The Financing for Sustainable Development Report 2021 emphasizes the necessity of financing sustainable development while highlighting the systemic and interconnected nature of risk in a highly interdependent society (United Nations, 2021).



Study done by Hurlbert et al. (2019) stated that integrating risk management and sustainable development concepts can have a significant positive impact on the tourism and forestry systems. In order to benefit both protected people and places, sustainable tourism seeks to reduce its negative effects on the local environment (Ministry of Tourism, 2021). Sustainable forestry practices seek to strike a balance between growth in the economy, environmental protection, and social well-being (Hurlbert et al., 2019). The United Nations (2015) emphasizes the necessity of conserving and using drylands, mountains, and forests responsibly as well as preserving biodiversity. Furthermore, Gabriel-Campos (2021) argues that the forestry and tourist industries have an essential requirement for the integration of risk management and sustainable development. Both industries are essential to the country's economic development and attempts to protect the environment. To maintain long-term viability and responsible management, they must address a number of difficulties, which demand a balanced strategy.

Risk management is crucial in the context of tourism in order to recognize and respond to possible risks including natural disasters, and political and health issues. Such risks have the potential to have major impacts on travel-related activity and the economy as a whole. Given Malaysia's diverse landscape, abundant biodiversity, and distinctive cultural heritage, sustainable development in the tourism industry is equally crucial. To prevent harmful environmental and social effects, it is crucial to strike a balance between the expansion of the tourism industry and the preservation of natural and cultural resources (Lee, Olasehinde-Williams, & Akadiri, 2020). Likewise, Malaysia's forestry industry, also faces significant risks such as habitat destruction, illegal logging, deforestation, and the effects of climate change. These risks put in jeopardy important ecosystems, wildlife, and local inhabitants' means of subsistence that depend on the forest. Therefore, forestry must be developed sustainably in order to encourage ethical logging, replanting initiatives, and biodiversity preservation (Jaafar et al., 2020; Bebbington, 2018).

Integrating risk management into sustainable development is crucial in the context of forest-tourism systems to ensure the ethical and sustainable operation of these systems. This integration demands systematic, ongoing risk analysis and evaluation, sound decision-making, openness, accountability, and stakeholder involvement (Irwin, 2017). Risk management includes evaluating development proposals as well, especially when it comes to sustainable tourism in protected areas. This procedure entails evaluating



possible risks connected to suggested tourism activities and making sure they support sustainable development objectives (United Nations, 2015).

The integration of risk management and sustainable growth in these two industries faces numerous difficulties. Particularly for small enterprises and local communities, a lack of resources might make it difficult to execute comprehensive risk management practices (Yakob et al., 2019). Furthermore, obtaining sustainable outcomes requires successful collaboration across a variety of stakeholders, including government organisations, for-profit businesses, non-governmental organisations, and local communities (Wondirad, Tolkach & King, 2020). Therefore, Malaysia must adopt strong laws and regulations that encourage sustainable practices while properly controlling possible risks in order to tackle these difficulties. Additionally, Malaysia must embrace technological advancements in risk assessment, monitoring, and disaster management because they can improve both industries' overall resilience against risks. Based on the study done by Delgado-Aguilar, Hinojosa & Schmitt (2019), Lee et al. (2019), and Aven (2017), they suggest that early warning systems, data analytics, and remote sensing can be used to promptly detect vulnerabilities and address emerging risks.

To sum up, in order for Malaysia's tourist and forestry industries to continue to succeed and grow, it is crucial to integrate risk management and sustainable development. It can encourage ethical and environmentally friendly behaviors that reduce adverse environmental effects, assist regional communities, and boost these industries' resilience and overall well-being. As a country with a wealth of natural resources, it is crucial to protect these resources while promoting economic growth. Malaysia can pioneer the path for a sustainable future that protects its natural heritage, helps local communities, and draws ethical tourists from all over the world by taking a holistic and collaborative approach. These initiatives support the long-term sustainability and ethical management of the forestry and tourism industries, which benefits both current and future generations as well.

Hence, continuous improvement and tracking of progress toward achieving sustainable objectives are made possible by regular monitoring and evaluation of SDG-oriented risk management efforts. Malaysia can address issues related to the environment, society, and economy while fostering responsible growth and conservation by integrating risk management approaches with the SDGs. The nation can maintain its rich biodiversity, build a more sustainable future for its people, and make a substantial



contribution to the global effort to meet the Sustainable Development Goals of the United Nations.

3 METHODOLOGY

The methodology of this study have twofold – scoping review from the literature through Scopus database and conceptual analysis from industry practice and policy document to propose for the risk management framework.

For the first stage of the study, scoping review technique was adopted to evaluate the current state of the art in the literature analysing on the issues surrounding the tourism-forestry (so called eco-tourism), risk management, resilience and sustainability. The scoping review technique is deemed to find the research gaps that this study intended to fulfil. To gauge the basic technique of scoping review, three procedures were conducted to ensure the selection of articles related to the topics were done carefully. The process of scoping review is explained in the next section.

3.1 SCOPING REVIEW

3.1.1 Formulation of research question

The research question formulated in this study which served as the guidance to the scoping review is: “what are the risk management elements in tourism-forestry industry?”

3.1.2 Systematic searching strategies

The systematic searching strategies included three phases: the identification of keywords, the screening process and eligibility of the articles. All three phases were completed to ensure a thorough investigation (Figure 3):

Procedure 1: Identification of keywords

The first stage involved enhancing the keywords used in the search process. At this stage, multiple keywords were required to avoid retrieval bias (Durach et al., 2017). The main keywords were ("eco" OR "nature" OR "environment" OR "forest") AND ("tourism" OR "tourist") AND ("risk management"). For the search purpose, the basic functions of the Boolean operators OR and AND, as well as phrasal-level search, were used. Scopus was used to search for the articles. The search functions had retrieved 195 potential articles for the scoping review, with no duplication.



Procedure 2: Screening

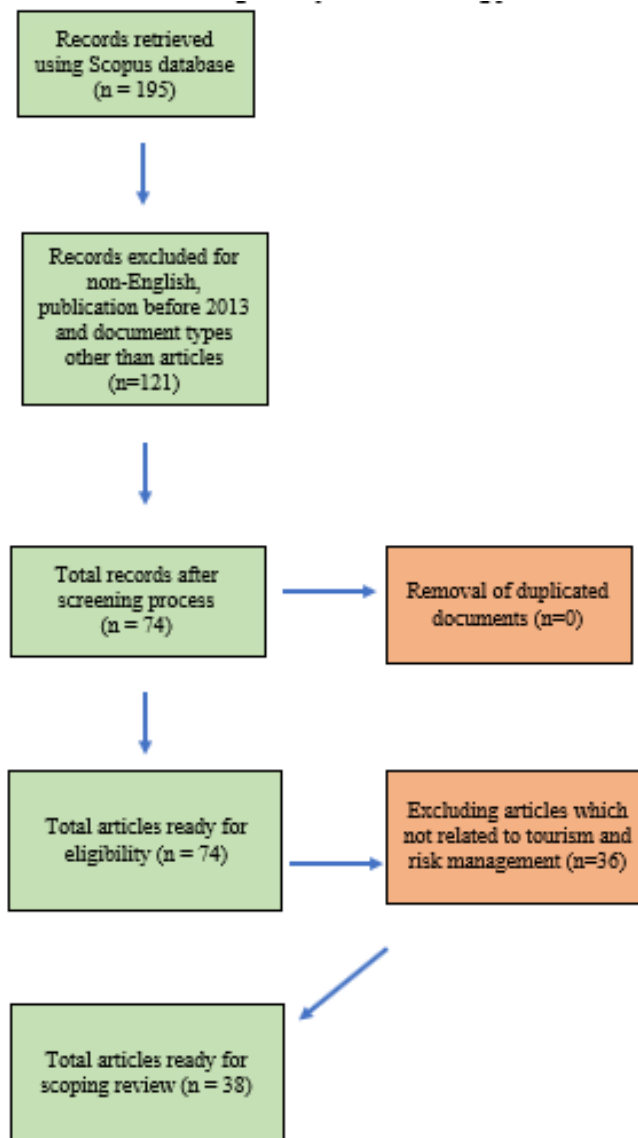
The next stage is systematic searching procedure, which removes the unrelated articles from the results for the next review stage. During this procedure, non-English articles were removed as suggested by Linares-Espinos et al., (2018). Since the sustainable development goals (SDG) was only initiated since 2015, the relevancy of narrowing the search into the last 10 years of publication is decided. This is to ensure the discussions are closely related to the research aims of this study. Only peer-reviewed articles were chosen during the screening process to assure the quality of the articles (Shaffril et al, 2022). After screening process, 121 articles were removed from the selection, only 74 articles were remained for the stage.

Procedure 3: Eligibility

During the third procedure for determining eligibility, each of the 74 articles had to be reassessed to determine whether or not they adhered to the criteria for selection. At this point, the abstracts were read in order to determine whether or not the articles were appropriate. When the suitability of the article could not be determined from the title and abstract alone, the full article was scanned for key points. As a direct consequence of this, 36 articles that have nothing to do with tourism and risk management were disqualified from the selection process. As a result, 38 articles were chosen in the end to be included in the scoping review.



Figure 3: Systematic searching procedure



Source: Authors data

3.2 EXTRACTION AND INVESTIGATION OF DATA

The research question served as a compass throughout the process of data extraction. The risk and forest tourism or eco-tourism activities were the subject of all of the data that were extracted from the studies that were chosen. For the purpose of evaluating the collected data, this qualitative study utilised the thematic analysis. Through this analysis, the themes were determined based on the patterns that were retrieved from the chosen studies. These similarities and correlations between the abstracted data served as the basis for this analysis (Braun and Clarke, 2006; Shaffril et al, 2022). In the initial phase of the synthesis, the data that were comparable to one another or connected in some way were grouped together under a predetermined topic. At this point, there have been



determined to be six primary themes (forest, tourism, risk, resilience, sustainability, ecotourism). At the second stage, the themes were reviewed to ensure that they were useful and provided an accurate representation of the data. During the course of this procedure, two topics—the economic impact of eco-tourism and biohazards type of materials that are harmful to the forest —were disregarded due to their insufficient connection to the primary research question.

4 RESULTS & DISCUSSION

4.1 RESULTS FROM SCOPING REVIEW

As a result of the scoping review, the list was screened and filtered to the most cited articles. Table 1 list out the top 10 most cited articles. The most cited article was Anguelovski et al. (2019) with 89 citations, second top cited article was Armenski et al (2018) with 68 citations and third was Yang et al. (2018) with 63 citations. Since the aim of this study is to evaluate the existing framework that govern the tourism-forestry risk management, one of the analysis criteria is to evaluate among all the top 10 articles, which one has developed a tourism-forestry risk management framework. Three articles have suggested framework in their studies (Yang et al, 2018; Maria et al., 2017 and Accastello et al. 2019). From the three articles, only Accastello et al. (2019) developed a risk management framework. However, their proposed framework merely for the protection of the forest from natural hazards. Only two times occurrence of tourism in Accastello et al. (2019). Hence proved the existence of research gaps on the risk management framework on tourism-forestry field.

Table 1: Top 10 Most-Cited Article out of 38 articles

Author	Year	Journal	Citation	Methods	Country	Dimension	Proposed Framework? (Yes/No)
Anguelovski, I., Irazábal-Zurita, C., Connolly, J.J.T.	2019	International Journal of Urban and Regional Research	89	Greenbelt Project Analysis - Case Study	Colombia	Environmental-justice implications of green infrastructure planning	No
Armenski, T., Dwyer, L., Pavluković, V.	2018	Journal of Travel Research	68	Exploratory and confirmatory factor analysis	Serbia	<ul style="list-style-type: none"> • <i>risk management</i> • adaptive environmental strategies, • innovation and product development • planning for sustainable 	No



						development, •networking and community concern, • education for sustainability.	
Yang, E.C.L., Khoo-Lattimore, C., Arcodia, C.	2018	Journal of Travel Research	63	Two phases of semi structured in-depth interviews, with field work in between	Asian	• Tourist risk taking behaviour – risk perception and risk management	Yes Feminist Framework
Maria Gstaettner, A., Rodger, K., Lee, D.	2017	Journal of Outdoor Recreation and Tourism	45	Interview	Australia	• Visitors’ perceived benefits derived from pursuing the risky activity • Visitors were encouraged to follow others already pursuing the activity • Visitors felt that responsibility for their own safety was shared due to the high presence of management	Yes. Valuable Analytical Framework in Theory of Planned Behaviour
Yin, K., Wang, D., Zhao, H., ...Li, B., Xing, M.	2021	Science of the Total Environment	43	Survey	China	• Human activities (Risk and Threats) • Abundance of Microplastics (Environment impacts)	No
Sharma, M., Sehrawat, R., Daim, T., Shaygan, A.	2021	Technological Forecasting and Social Change	40	Interview – analysis through Analytic hierarchy process - Interpretive Structural Modeling- Decision-making trial and evaluation laboratory (AHP-ISM-DEMATEL) technique	India and Netherlands	Adoption of blockchain technology Key drivers: • Low Cost • Risk management Critical barriers: • Lack of government policy • Market uncertainty	No
Gabriel-Campos, E., Werner-Masters,	2021	Journal of Hospitality and Tourism Management	38	In-depth semi-structured interviews	Peru	• Community resilience • Social network perspective	No

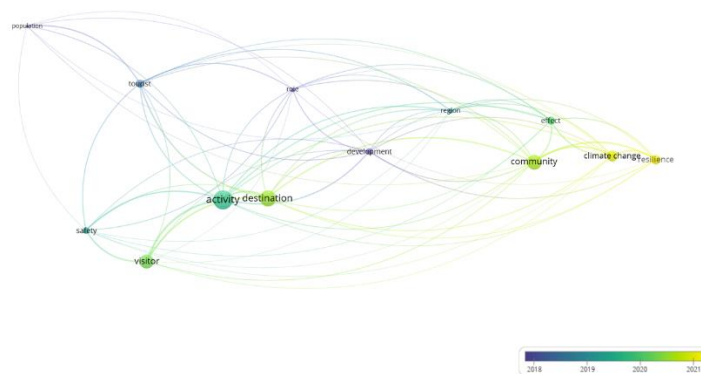


K., Cordova-Buiza, F., Paucar-Caceres, A.				and focus groups		• Community preparedness to threats (Covid-19 and climate change)	
Accastello, C., Blanc, S., Brun, F.	2019	Sustainability (Switzerland)	20	Conceptual Framework	Switzerland	Protection demand and protection supply	Yes. Integrated “grey-green” risk management strategies
Casteller, A., Häfelfinger, T., Cortés Donoso, E., ...Kulakowski, D., Bebi, P.	2018	Natural Hazards and Earth System Sciences	17	Field work - Tree-ring methods	Chile	• Avalanches and debris flows (natural hazards) • Structure of forest (Forest eco-system)	No
Bradly, A.	2015	Social Responsibility Journal	17	In-depth interview	Fiji	• Community investment • legitimacy, interdependence and risk management	No

Source: Authors data

Based on the selection of 38 articles, an overlay visualization was analyzed through VoSViewer to see the main items or words of all the articles. With a setting of co-occurrence at a minimum of 7 times, there were 13 items been the main focus of those selected articles. Cluster 1, which the recent articles between 2020 to 2021 focused more on climate change, community, effect, region and resilience. From the analysis we could see that sustainability, risk management, tourism and forest have not been the main discussions in those 38 articles. This surprising results of the VosViewer visualization analysis has been the call for more serious studies to focus on the risk management of tourism-forestry field.

Figure 4: Overlay Visualization of the articles data and keywords (VosViewer)



Source: Authors data



Table 2: Cluster and items from the VosViewer screening of the final document search

Cluster	Items
Cluster 1	Climate Community Effect Region Resilience
Cluster 2	Activity Destination Safety Visitor
Cluster 3	Development Role
Cluster 4	Population Tourist

Source: Authors data

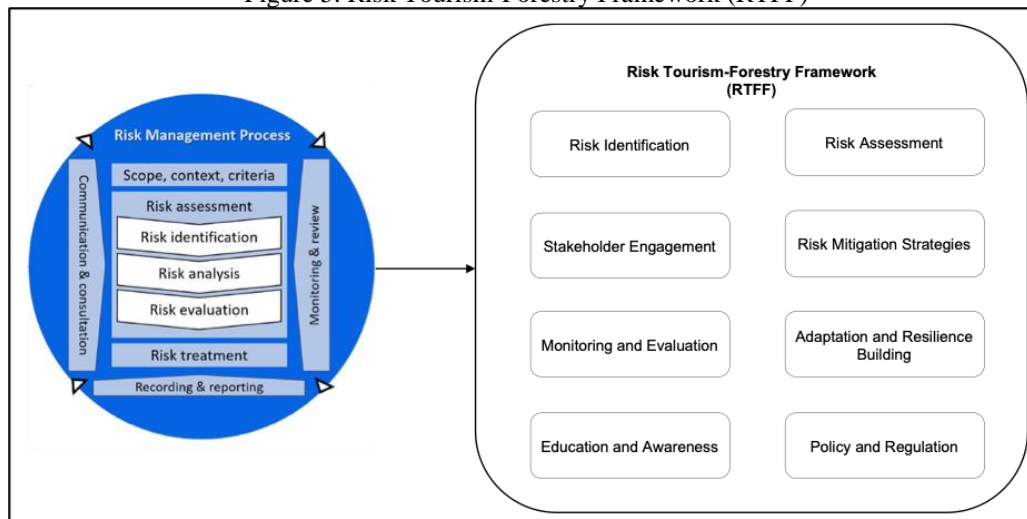
In the next stage of this study, there will be conceptual discussion on development of risk tourism forestry framework established from this study as a recommended adaptation of framework for future research avenue.

4.2 DISCUSSION: DEVELOPMENT OF RISK TOURISM-FORESTRY FRAMEWORK (RTFF)

The Risk Tourism-Forestry Framework (RTFF) was adapted from the Risk Management Framework ISO 31000:2018. From this framework, this study adds several components that fit into the forest-tourism system. The aims are to promote sustainable practices, enhance resilience, and ensure the long-term viability of these industries in a changing environment. The key components of the Risk Tourism-Forestry Framework (RTFF) consist of eight components which are risk identification, risk assessment, stakeholder engagement, risk mitigation strategies, monitoring and evaluation, adaptation and resilience building, education and awareness, and policy and regulation (see Figure 5).



Figure 5. Risk Tourism-Forestry Framework (RTFF)



Source: Adapted from Institute of Risk Management (2018) - ISO 31000:2018

4.2.1 Risk Identification

Identifying possible risks that can affect the forestry and tourism industries is the first step. Natural disasters, the effects of climate change, disease outbreaks, instability in politics, economic downturns, illegal logging, habitat degradation, and societal conflicts over land usage can all be considered risks (Jaafar et al., 2020).

4.2.2 Risk Assessment

Risks are evaluated after being identified to figure out their likelihood and potential consequences. This entails gathering information, performing impact analyses, and assessing the vulnerability of both industries to various risks. According to their severity and possible impacts, the assessment aids in prioritizing risks (Ruan, Li, & Liu, 2017).

4.2.3 Stakeholder Engagement

It is essential to involve relevant stakeholders, including government organizations, NGOs, local communities, tourism businesses, forest managers, and environmental experts, in order to understand differing viewpoints and obtain support for the integration of the risk management approach (Wondirad, Tolkach, & King, 2020; Vliet et al., 2020).



4.2.4 Risk Mitigation Strategies

To mitigate identified risks, particular measures are designed based on risk assessments. The objectives of sustainable development should be supported by these measures, which should also encourage ethical behavior in the forestry and tourism industries as highlighted by Stepanova et al (2023). The implementation of sustainable land-use planning, the adoption of climate-resilient tourism infrastructure, the enforcement of anti-illegal logging policies, the promotion of ecotourism, and the development of early warning systems for disasters are some of the examples of risk mitigation strategies (Lee & Chen, 2021).

4.2.5 Monitoring and Evaluation

The effectiveness of strategies to mitigate risks must be monitored and evaluated often in order to detect any possible risks. This entails gathering information on performance indicators for the tourist and forestry industries, evaluating the results of implemented solutions, and making making the necessary changes to enhance the overall framework for risk management (Nugraha, Hamin, & Elliott, 2020).

4.2.6 Adaptation and Resilience Building

The risk management framework should be adaptable to accommodate changing conditions given that risks are dynamic and the environment is constantly changing. Meanwhile, building resilience entails improving both industries' abilities to deal with and recover from unforeseen events while continuing to perform their respective responsibilities and provide their services (Dogru et al., 2019; Devisscher, Spies & Griess, 2021).

4.2.7 Education and Awareness

It is essential to build awareness of the value of risk management and sustainable practices among stakeholders, tourists, and the community at large. Education programs can promote ethical tourism practices and cultivate a conservation culture in the forestry industry (Aliperti, Nagai, & Cruz, 2020).



4.2.8 Policy and Regulation

In order to support the integration of risk management in the tourism-forestry system, sound policies and regulations are required. Therefore, according to Murieta, Galarraga & Olazabal (2020), governments should provide clear guidelines, incentives, and enforcement mechanisms in order to promote sustainable practices and ensure adherence to risk mitigation strategies,

Hence, it is predicted that by combining all of these elements, this framework will be able to resolve potential issues, encourage the long-term sustainability of both industries and protect cultural heritage and natural resources.

5 CONCLUSION

The study aimed to not only explore another method of research critical review (scoping review) in tourism-forestry and analyse conceptually on the risk management practice in the industry but also to develop a framework for enhancing resilience and sustainability in tourism-forestry systems through SDG-oriented risk management. The study found that integrating SDG-oriented risk management practices in tourism-forestry systems can bring several benefits, including enhanced resilience, improved sustainability, effective decision-making, stakeholder engagement, and a synergistic approach to achieving the SDGs consistent with previous studies (Butler, 2018; Spiegel et al, 2020). The study's contributions to the field include the development of a practical and comprehensive approach to enhancing resilience and sustainability in tourism-forestry systems through SDG-oriented risk management. The framework developed in this study provides guidance to policymakers, practitioners, and stakeholders in these sectors on how to address the challenges faced by tourism-forestry systems and achieve sustainable development.

Future research can statistically explore the effectiveness of the framework developed in this study in enhancing resilience and sustainability in tourism-forestry systems. Further research can also investigate the interdependencies and synergies between different SDGs in tourism-forestry systems and identify win-win strategies that address multiple goals simultaneously. Additionally, research can explore the role of technology and innovation in enhancing SDG-oriented risk management practices in tourism-forestry systems. In conclusion, the study's contributions to the field include the



development of a practical and comprehensive approach to enhancing resilience and sustainability in tourism-forestry systems.

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