

# Enhancing Tourism Sustainability of Archipelago Countries: A Bibliometric Exploration of the Triple Helix Concept

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## Abstract

This study employs a comprehensive bibliometric approach to unravel the intricate economic, ecological, and social linkages in sustainable tourism within archipelago countries. Utilizing bibliographic methodologies, the research endeavours to map the literature related to this specified theme, with Scopus serving as the primary data source. The VOS-viewer analysis tool is employed to delineate and characterize the identified keywords. A total of 1,380 documents related to the research theme were meticulously gathered, with the study specifically limiting the recorded country areas to selected archipelago countries. Authorship analysis spotlights Hall C.M. as the foremost contributor based on the analyzed sample data, and the literature journal "Governance, the State and Sustainable Tourism: A Political Economy Approach" emerges as the most-cited publication. The United Kingdom takes centre stage as the primary contributor among countries. At the same time, the School of Business and Economics at Linnaeus University, Sweden, stands out as the institution making the most substantial contribution to publications concerning the economic, ecological, and social linkages of sustainable tourism in archipelago countries. This study significantly contributes to the mapping of literature on economic, ecological, and social interconnections, providing valuable insights into sustainable tourism in archipelago countries over the past 12 years.

## Keywords

Triple Helix Concept

Sustainable Tourism

Archipelagos

Bibliographical



## Introduction

The complex relationship between tourism industry agglomeration and economic growth has become increasingly intricate and nuanced. Extensive research has demonstrated the interdependence of tourism and economic growth in both short and long-term contexts (Tang et al., 2016). At the regional level, the agglomeration of the tourism industry has emerged as a substantial driver of economic growth (Shuwen et al., 2020). The global dynamics of the relationship between economic growth and tourism growth hinge on significant events, such as economic and financial crises (Chirilă et al., 2020). The temporal aspects of tourism-led and economic-driven economic growth are highly contingent upon economic events (Antonakakis et al., 2015). Supporting the hypothesis that the tourism sector propels economic growth, policymakers are encouraged to foster and expand the tourism industry to sustain economic development (Tang et al., 2016). This promotion can be facilitated through the incorporation of sophisticated IT facilities, warm hospitality, and diverse tourist attractions (Mardhani et al., 2021).

The sustainability and benefits of tourism development over time are crucial considerations for its growth and impact on destination areas (Garrigós-Simón et al., 2015). Factors such as economic, environmental, and tourism policies related to tourist arrivals contribute to the sustainability of tourism growth (Chen, 2023). Social innovation, as a cooperative process addressing local needs and generating new solutions and social value, can further promote tourism sustainability (Partanen & Sarkki, 2021). The Triple Helix Concept of Tourism model provides an empirical foundation for the economic, ecological, and social sectors that underpin the sustainability of the tourism sector.

The sharing economy has become an integral part of the tourism sector, playing a pivotal role in economic development. With the rapid growth of tourism, the sharing economy stands out as a major catalyst in this sector (Navickas et al., 2022). Its model outshines traditional economic approaches by offering more affordable prices for travellers, fulfilling individual needs effectively, fostering community participation, providing a comprehensive range of services, and improving access to tourism services (Navickas et al., 2021).

In the broader context of economic development, tourism activities play a vital role, particularly in the evolution of local economies (Teriş et al., 2020). Often hailed as a sustainable economic development strategy, tourism's impact on local economies is empirically assessed through research methodologies, as seen in studies such as (Gilliland et al., 2020). In small towns, tourism emerges as a crucial driver, contributing significantly to local economic growth and job creation within communities (Rogerson & Rogerson, 2018; Khusnul Ashar, 2013).

Moving on to ecological considerations, sustainable tourism development has become imperative in light of environmental challenges, such as pollution, landscape destruction, and ecological imbalances. Addressing these concerns, researchers have focused on concepts like tourism carrying capacity, emphasizing the maximum number of visitors that should not be exceeded in tourism development (Li et al., 2021; He, 2013). This capacity is divided into environmental, cultural economic, and institutional carrying capacities (Sati, 2020), with a significant increase in tourists posing a challenge to destination capacities (Dong et al., 2022).

The ecological impact extends to carbon footprint calculations for low-carbon tourism, where the emissions should align with the environment's carrying capacity (Huang & Tang, 2021). Notably, tourism's carbon footprint is concentrated in specific sectors, with tourists contributing 47% of the carbon footprint (Cadarso et al., 2015; Buratti et al., 2022).

Shifting the focus to social impact, sustainable tourism development aims to empower local communities economically, socially, politically, and psychologically (Gohori & van der Merwe, 2022). This empowerment fosters a significant

relationship between communities and sustainable tourism development (Khalid et al., 2019). A bottom-up approach to tourism planning, coupled with community empowerment in various dimensions, proves to be the most relevant (Rachmawati, 2020).

In archipelago nations endowed with diverse geological features, the formulation and implementation of robust conservation policies emerge as imperative measures to effectively leverage their tourism potential and mitigate potential threats (Ali & Unjah, 2011). Within the specific realm of archipelago countries, sustainable tourism development is closely linked to conservation initiatives, offering substantial benefits to local communities, particularly in the domain of ecotourism (Building et al., 2010). Recognizing the intrinsic interconnection, the proactive adoption of sustainable tourism practices becomes paramount for fostering the growth of tourism in these nations. The escalating trajectory of tourism expansion assumes a pivotal role in driving not only economic and social transformations but also exerting tangible impacts on local communities (Cao et al., 2021). Hence, an integrated approach encompassing conservation policies and sustainable tourism practices is indispensable for harnessing the full potential of archipelago countries and ensuring the well-being of their diverse communities.

To better understand the economic, ecological, and social linkages in sustainable tourism within archipelago countries, this study employs a bibliometric approach. (Sarfraz et al., 2023). A literature review motivates this study, which aims to map empirical studies on economic, ecological, and social linkages in sustainable tourism within archipelago countries from 2010 to 2022. This paper is structured into distinct sections to facilitate a comprehensive exploration of the subject matter. Commencing with the introduction, the initial section provides an overview of the research issues, delineates the objectives, and elucidates the anticipated contributions of the study. Subsequently, the second section undertakes a synthesis of existing literature on economic, ecological, and social linkages in sustainable tourism. In the third section, the methodology employed in the study is explicated, providing a detailed account of the research approach. Moving forward, the fourth section unveils the outcomes derived from the bibliometric analysis, presenting empirical findings. The fifth section engages in a nuanced discussion of the obtained results, delving into their implications and contextual significance. Finally, the last section encapsulates the research endeavour with a conclusive summary, encapsulating key insights and potential avenues for future research. This organizational structure aims to provide a coherent and systematic framework for the exploration and dissemination of the study's findings.

## Role of Tourism on the Local Economy

The tourism sector plays a pivotal role in both direct and indirect contributions to various economic sectors. Directly influencing businesses linked to tourism and indirectly impacting those unrelated to it, the relationship between these two categories significantly shapes tourism development. Fafurida & Mulyaningsih (2023) underscores that as tourism develops, it generates increased employment opportunities and income. The heightened employment and business prospects particularly benefit communities residing in proximity to tourist areas, leading to an overall rise in community income.

Achieving sustainable tourism development necessitates multifaceted changes across natural, human, and capital resources, infrastructure, facilities, tourist access, and promotional strategies. In the context of sustainability, environmental considerations become paramount. According to Othman et al. (2012), tourism generates demands for supporting facilities and services, such as telecommunications, water, electricity, accommodation, transportation, and access. While this development enhances infrastructure, it concurrently poses risks to the environment through habitat destruction, nutrient depletion, land conversion, and water and air pollution within the development area.

Although development is anticipated to yield profits, there is often a neglect of the imperative to protect the environment. Post-arrival of foreign and domestic tourists, environmental stewardship, including land and water conservation, becomes essential. The tourism sector remains the preferred choice for travellers seeking leisure, work assignments, research, or other formalities. Tourists frequently utilize their spare time to explore local tourist sites, and heritage destinations, or even venture further for recreational and educational purposes.

Heritage sites often coexist harmoniously with village life, especially in rural tourism, which has gained prominence due to evolving market dynamics and traveller preferences. Lwoga & Maturo (2020) elucidates that rural tourism, situated in the countryside and conventionally focused on natural attractions at national and world heritage sites, integrates local culture and heritage.

Particular attention is drawn to conservative areas in tourism development. Widianingsih et al. (2023) exemplify the significant positive impact at the MSME, service, and restaurant levels after tourism area development in Danau Toba, Indonesia. This spot, featuring Natural Tourism, Artificial Tourism, and Cultural Tourism, emphasizes nature as a tourism strength, necessitating meticulous management for sustainable tourism development.

## Tourism and Environmental Sustainability

The overall prosperity of a country is significantly contingent upon the preservation of its ecology, as this plays a pivotal role in both societal well-being and economic vitality. Research conducted by Wei & Lihua (2022) emphasizes the profound impact of the country's environmental quality, encompassing elements such as clean air, soil, and water, on the health of all living organisms. Notably, a conducive environment, as elucidated in prior studies, fosters the development of high-quality human resources and ensures the security of fauna and flora. This interconnected chain of effects is particularly relevant if the tourism industry seeks a transformation towards environmentally based sustainable tourism development.

Examining the tourist perspective, Rodríguez et al. (2020) delve into tourists' attitudes concerning the environmental economy, with a specific focus on circular economy (CE) principles and environmental behaviour related to lodging and hospitality. The study's findings reveal several noteworthy trends: (a) Older travellers exhibit pro-environmental attitudes; (b) a majority of travellers express a willingness to pay a premium for eco-friendly hotels, influenced by socio-demographic variables; (c) most travellers consider it essential for hotels to implement energy-saving policies; (d) attitudes toward circular practices vary based on socio-economic profiles; (e) common sustainable hotel practices among travellers include utilizing recycling bins and participating in the reusable towel and linen schemes; (f) women report higher circular behaviour compared to men; and (g) a substantial 86.5% of travellers extend the same circular economy practices observed in their residences to their holiday accommodations.

## Literature Review

### An Archipelago

An archipelago is an area that contains a chain or group of islands scattered in lakes, rivers, or the ocean. An archipelago is a group of islands, interconnecting waters, and other natural features that are closely interrelated and form an intrinsic geographical, economic, and political entity (Franckx & Boeye, 2020). The relation of island to island is characterized by repetition and assorted multiplicity, acting to intensify, amplify and disrupt relations of land and water, island and

continent/mainland. In the field of island studies, the archipelago remains one of the least examined meta-geographical concepts (Stratford et al., 2011).

## The Triple Helix Tourism Foundation

Sustainability principles encompass the environmental, economic, and socio-cultural aspects of tourism development, requiring a balanced approach to guarantee its long-term sustainability. The development model of tourism in this study is based on the sustainability principle, also known as the triple helix. Triple Helix on Foundation Tourism model reveals the empirical basis of the economic, ecological, and social sectors supporting the sustainability of the tourism sector.

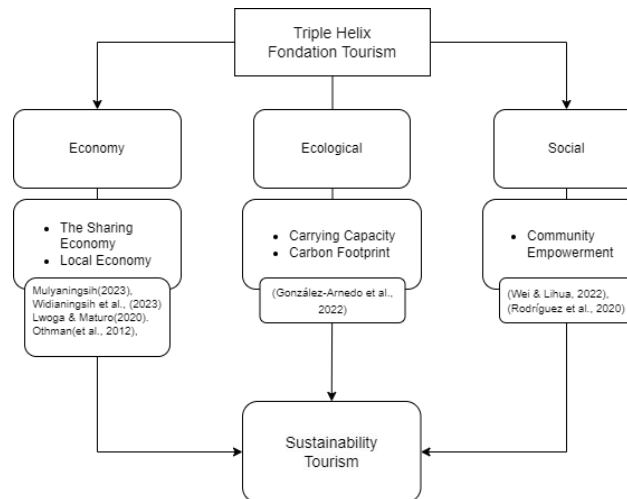


Fig 1. Triple Helix Tourism Foundation

### Economy

The sharing economy is growing and becoming essential to tourism, which also contributes to economic development. Considering the rapid development of the tourism sector, the sharing economy is one of the biggest catalysts in the tourism sector (Navickas et al., 2022). The sharing economy model is superior to traditional economic models due to more affordable prices for travellers, better fulfilment of individual needs, opportunities to be part of a community, a more comprehensive range of services, and better access to tourism services (Navickas et al., 2021).

The development of tourism activities plays a vital role in the evolution of local economies (Teriş et al., 2020). Tourism is often promoted as a sustainable economic development strategy. The research methodology focuses on empirically assessing the economic impact of tourism on local economies (Gilliland et al., 2020). In small towns, tourism is an essential driver of the local economy. Tourism expansion can contribute to increased local economic growth and job creation for local communities (Rogerson & Rogerson, 2018; Khusnul Ashar, 2013).

### Ecological Impact

In response to the emergence of a series of problems in sustainable tourism development, such as environmental pollution, landscape destruction, ecological imbalance, and decreased satisfaction of tourists and residents, some previous researchers focused on tourism carrying capacity (Li et al., 2021). Tourism carrying capacity and destination development are new concepts for sustainable tourism development. Tourism carrying capacity focuses on the maximum number of visitors that tourism development should not exceed (He, 2013). Three types of tourism carrying

capacity include environmental carrying capacity, cultural and economic carrying capacity, and institutional carrying capacity (Sati, 2020). A significant increase in the number of tourists poses a challenge to the carrying capacity of tourist destinations (Dong et al., 2022)

Calculation of tourism carbon footprint is essential for low-carbon tourism. Tourism carbon emissions can be absorbed by the carrying capacity of the environment (Huang & Tang, 2021). Specifically, tourism's carbon footprint is concentrated in a few sectors where most of the emissions are domestic (Buratti et al., 2022). Cadarso et al. (2015) explained that the domestic carbon footprint represents 10.6% of total CO<sub>2</sub> emissions, with tourists contributing 47% of the carbon footprint, followed by households at 36%, tourism businesses at 14%, and public administration expenditure at 3%.

## Social Impact

The social impact of sustainable tourism development focuses on community empowerment. Gohori & van der Merwe (2022) proved that tourism development could empower local communities economically, socially, politically, and psychologically. The findings of Khalid et al. (2019) support this with a significant relationship between community empowerment and sustainable tourism development. High community empowerment allows communities to build sustainable tourism with the support of local communities. With support from local communities, some level of control over the development process can be achieved. A bottom-up tourism planning approach is the most relevant approach accompanied by community empowerment in all dimensions: economic, psychological, social, and political (Rachmawati, 2020).

Archipelagos have the geological diversity to become popular tourist destinations. Without good conservation policies, this tourism potential will be threatened and depressed (Ali & Unjah, 2011). Conservation efforts as a form of sustainable tourism development provide many benefits for local communities, especially ecotourism in archipelago countries. Its sustainability is highly dependent on the environment of the ecotourism industry (Building et al., 2010). The implementation of sustainable tourism is crucial for the growth of tourism in archipelago countries. The rapid growth of tourism in archipelago countries is driving economic and social transformation with implications for local communities (Cao et al., 2021).

## Methods

Employing bibliographic methodologies, this study endeavours to map the literature review related to the specified theme. The primary data source for this research is Scopus, chosen due to its extensive collection and accessibility of pertinent literature pertinent to the study's data requirements. Specifically focusing on representative keywords within the realm of sustainable tourism and the economy, Scopus serves as a robust database. Scopus is recognized as the largest database with peer-reviewed documents that can be used for such analysis (Agyekum et al., 2024). Scopus is a comprehensive abstract and citation database for peer-reviewed literature, ensuring the study's sources are credible and relevant.

To aid in delineating and characterizing the identified keywords for this study, the VOS-viewer analysis tool has been employed. VOSviewer software that facilitates the construction and visualization of bibliometric networks. Information professionals can generate these visualizations to reveal researcher collaborations and trends in research topics supporting subject liaison service and collection activities (McAllister et al., 2022). This software utilizes various bibliometric indicators and data to generate data on relationships and also was used to conduct bibliometrics analysis on key characteristics of literature such as the number of publications, countries/regions, institutions, authors, journals,

literature, keywords and so on. By leveraging these metrics, the software enables researchers to identify patterns, trends, and connections within scholarly literature (Guan et al., 2023; Traymbak et al., 2024).

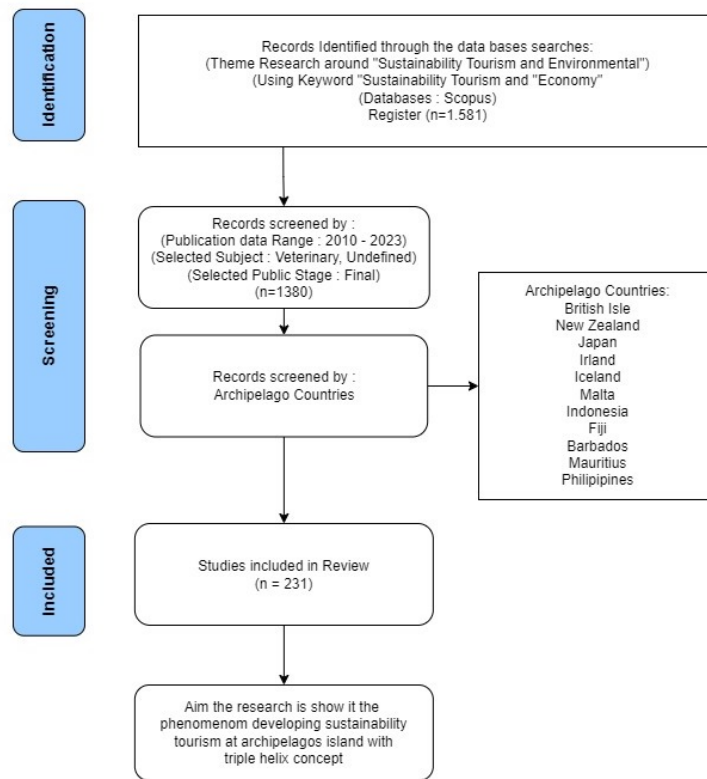


Fig 2. Conceptual Framework PRISMA

Figure 2 outlines the procedure for determining the study sample using PRISMA. PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses, which is a set of guidelines designed to improve the reporting of systematic reviews and meta-analyses. This approach ensures a transparent and systematic method for identifying, screening, and selecting the studies to be included in the review. The use of PRISMA for sample selection and Vosviewer for bibliometric analysis indicates a rigorous and methodical approach, enhancing the study's reliability and reproducibility.

The PRISMA concept is carried out in three stages: identification, screening, and inclusion. The first stage involves identifying documents that generally align with the research theme. The journal database used for this purpose is Scopus, and the keyword "Sustainability and Economy" is employed. A total of 1,581 journal documents are obtained. The next stage is screening, where the documents are selected based on the time frame of 2010-2023. The selection criteria include the subjects "Veterinary" and "Undefined," as well as the publication level of the journal being "Final." A total of 1,380 documents are obtained.

A total of 1,380 documents related to the research theme were obtained. The authors also limited the country areas recorded in the library to selected archipelago countries. Archipelago countries often face unique environmental, economic, and social challenges, such as vulnerability to climate change, reliance on marine resources, and logistical issues due to their geographic dispersal. The focused study of these countries can uncover specific insights and

solutions tailored to these contexts. In the digital library, several countries were listed, such as the British Isle, Indonesia, New Zealand, Japan, Fiji, Barbados, Ireland, Iceland, Malta, Mauritius, Philippines.

From the initial collection of 1,380 documents, the researchers narrowed down their dataset to 231 documents. This reduction suggests a thorough filtering process to ensure that only the most relevant documents were included in the final analysis. This is likely based on criteria such as relevance, quality, and alignment with the research focus.

The discussion of sustainable tourism and the economy on archipelago countries has yet to be a focus for previous researchers. By concentrating on archipelago countries, this research adds a novel perspective to the existing body of knowledge. This focus can provide insights into the specific dynamics and challenges of sustainable tourism and economic development in island contexts, which may differ significantly from those in continental regions. The unique emphasis on archipelago countries in this study constitutes a novel contribution, providing a complementary perspective to existing research on the subject. This study sheds light on previously underexplored areas by focusing specifically on the scholarly output and research trends within these geographically distinct regions. It provides insights that are particularly relevant to understanding the scientific and academic landscapes of archipelago nations.

By linking the research to the Triple Helix model, the study likely aims to create a holistic approach that leverages the strengths and insights of academia, industry, and government. This integrated perspective can enhance the relevance and impact of the research, ensuring that the findings are actionable and beneficial for various stakeholders involved in sustainable tourism and economic development of archipelago countries.

## Results

### Keyword and Theme Analysis

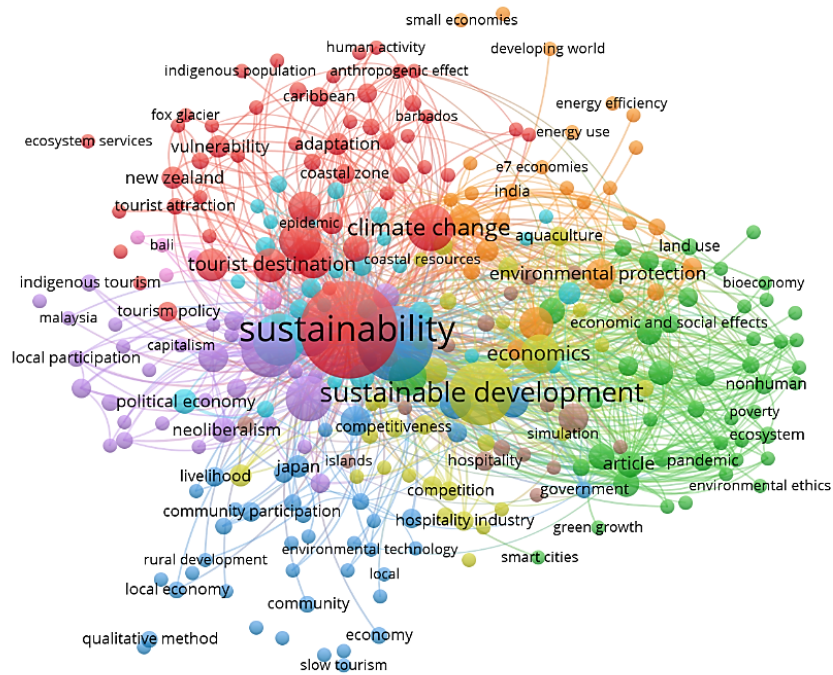


Fig 3. Keyword Network Visualization



Keyword analysis emphasizes the identification of all keywords in publications on economic, ecological, and social linkages in sustainable tourism of archipelago countries. This research uses the keywords Sustainability, Tourism, and Economy as the main focal points of research. Figure 3 shows that the keyword Sustainability has the largest circle, with a total of 95 occurrences, signalling that sustainability is a major in this keyword search. The other four keywords with the highest frequency are Tourism (56 occurrences), Sustainable Development (40 occurrences), Ecotourism (30 occurrences), and Tourism Development (27 occurrences). Based on the analysis of the VOSviewer tool, sustainability has a reasonably close relationship in various lines of discussion, starting from human development and technology to environmental development. The analysis results show that there are nine clusters with 286 discussion topics. The explanation is as follows:

Table 1. Result of Sustainability Tourism Cluster

| Cluster | Research Theme  |
|---------|---|
| 1       | Studies on blue economy and tourism   |
| 2       | Studies on green economy and social   |
| 3       | Studies on local communities (rural areas, small island development, and local economy)                                 |
| 4       | Studies on developing water quality (aquaculture, groundwater, and water resources)                                     |
| 5       | Studies on supporting local community (community empowerment, local participation, rural economy, and rural population) |
| 6       | Studies on engaging government (decision-making, political economy, policy)   |
| 7       | Studies on resource energy (alternative energy, carbon emission, and energy efficiency)                                 |
| 8       | Studies on the tourism industry (business mode, hospitality, hotel industry, and tourism sectors)                       |
| 9       | Studies on factor tourism (culture, ecological, and education)  |

### Cluster 1. Studies on Blue Economy and Tourism

The optimal utilization of natural resources, particularly water resources, is a subject of economic discourse aiming to manage these resources effectively without disrupting their ecological balance (Broussard et al., 2023). The concept of Blue Economy (BE) specifically addresses the sustainable utilization of ocean-based water resources. According to (Pranita et al., (2023), BE emphasizes the responsible use of marine area resources to foster economic growth, improve livelihoods, and generate employment while aligning with the Sustainable Development Goals (SDGs) program and preserving ocean conditions. BE management places a primary focus on the conservation of marine resources.

The integration of BE with tourism underscores the need for responsible and sustainable management practices in marine tourism. This includes environmentally friendly marine transportation and the incorporation of renewable energy. Various forms of tourism that can be developed within this framework encompass coastal tourism, incorporating recreational and entertainment-oriented activities such as swimming, snorkelling, diving, beach activities, recreational fishing, diverse water sports, cruises, sports competitions, and the use of recreational and sailing boats (Putri & Kamila, 2023).

### Cluster 2. Studies on Green Economy and Social Aspect of Tourism

According to Stojkoski et al. (2023), achieving sustainable development necessitates countries' consideration of various internal factors such as economic and social elements, as well as external factors, particularly environmental aspects.

External challenges like climate change, as highlighted by Liu et al. (2023), pose significant threats to livelihoods, the sustainability of human development, and the overall environmental well-being. Within the realm of economics, the development of the resource sector is divided into two spheres: the blue sector, encompassing water-related resources, and the green sector, focusing on environmental aspects like forests. The development associated with the green environment is denoted as the Green Economy (GE). Pollution emerges as a critical issue within the context of GE. (Han et al., 2023) contend that the implementation of Green Technology Innovation (GTI) serves as an effective strategy for addressing pollution concerns and contributes to the attainment of sustainability objectives. Nevertheless, market failures suggest that government intervention is essential to enhance the efficacy of technological innovation and maximize its positive social impact on emission reduction.

### Cluster 3. Studies on Local Community (Rural Area, Small Island Development, and Local Economy)

The Local Community emerges as a pivotal player in ensuring the sustainability of tourism, wielding significant influence over its trajectory. Functioning as a key actor, this group exerts a substantial impact on the overall sustainability dynamics of tourism. The regulatory framework established by local authorities further shapes the environmental impact in and around tourism areas, with a discernible evolution in the stringency of regulations observed over the sample period (Chang et al., 2023).

Notably, the research reveals a trend of increasing regulatory strictness over time, particularly emphasizing expenditure-based regulations. These regulations compel companies to adopt a more stringent approach towards mitigating carbon gas emissions, thereby reducing expenses and curbing the environmental impact of their operations on the tourism sector. The efficacy of such regulations is contingent upon the support they receive from the local community. Empowering local communities in the context of tourism yields multifaceted benefits, ensuring the preservation of tourist attractions while simultaneously fostering growth in the local economy, culture, and history (Shahmoradi et al., 2023).

### Cluster 4. Studies on Developing Water Quality (Aquaculture, Ground Water, and Water Resource)

Blue Economy is recognized for harnessing resources from marine areas, necessitating vigilant attention to the quality of the marine environment. Within the marine environment, conflicting community activities arise, including renewable energy production, aquaculture, and tourism. In light of these activities, effective cross-sectoral management becomes imperative to facilitate human endeavours in marine areas efficiently, safely, and sustainably (Papadopoulou & Vlachou, 2022). The imperative for alternative energy systems, such as offshore wind power, to progress towards sustainability goals is undeniable. However, it is increasingly evident that biodiversity loss and climate change are interconnected challenges. Both species diversity and diverse habitats face threats. Seascapes valued for citizen health and well-being coexist with the cumulative impacts of various economic activities, such as cruise ships, marine transportation, tourism activities, fisheries, and aquaculture. Therefore, the post-utilization quality of the ocean must be carefully considered (Lloret et al., 2022).

### Cluster 5. Studies on Support Local Community (Community Empowerment, Local Participation, Rural Economy and Rural Population)

The power of local communities is the main ammunition for generating sustainable tourism inclusion. With the community as the main base, policies related to sustainable tourism are easy to implement. Tourism-based development is the most straightforward development in improving community welfare and overall quality of life. The tourism sector

provides more opportunities to connect local communities with tourist interactions through the utilization of local resources and cultural customs. In addition, tourism can encourage environmental ethics among local communities to always maintain sustainability. Prayitno (2023) explains that in tourism, social capital is vital in encouraging pro-social and pro-environmental attitudes that sustain human-nature relationships through an increased sense of belonging to their environment.

#### Cluster 6. Studies on Engage Government (Decision Making, Political Economy, and Policy)

The role of the government significantly impacts sustainable tourism planning. The superior position of the government has its privileges. The policy that must be proclaimed is planning based on the principles of humanity and environmental protection so that human-environment integration becomes a good combination. According to Hafezi et al. (2023), the community has understood the decision of local policymakers in developing sustainable tourism. The policies to be carried out are cultural sustainability, socio-economic sustainability, environmental sustainability, and sustainable management. Research Wang et al. (2023); Nga et al. (2022) show that policies influence local environmental and tourism planning.

#### Cluster 7. Studies on Resource Energy (Alternative Energy, Carbon Emission, and Energy Efficiency)

The finite nature of natural resources, integral to human existence, is approaching a critical juncture, raising concerns for individuals who derive enjoyment from these resources. The paramount consideration in the utilization of these resources is efficiency. Thi et al. (2023) underscores the advantages of incorporating renewable energy as a strategic element in fostering sustainable tourism. The promotion of tourism can be effectively achieved through the development of initiatives such as green finance and the integration of renewable energy, as proposed by (Hailiang et al., 2023).

#### Cluster 8. Studies on Tourism Industry (Business Mode, Hospitality, Hotel Industry, and Tourism Sectors)

The offerings within the tourism industry encompass a diverse array of both services and goods, reflecting the varied needs of consumers. The dynamism in supply aligns with the demands of consumers, creating a symbiotic relationship that generates economic vitality within the tourism sector. Díaz et al. (2023) highlight the potential of integrating modern technology into tourism services, giving rise to the concept of a "smart tourism ecosystem." The emergence of smart tourism destinations has garnered increasing attention in recent years.

As articulated by Vardopoulos et al. (2023), digital technology has transformed the paradigm of smart cities, enhancing resilience and sustainability by leveraging the cultural and historical components of cities. This, in turn, offers unique growth opportunities within the real estate industry. Real estate, ranging from hospitality accommodations to urban landscapes and cultural heritage destinations, is deemed a crucial asset in shaping the tourist experience. The interconnectedness between cultural sites and the overall appeal of destinations, including land and residential prices and building activity, is evident. Initiatives centred around culture-driven urban sustainability, coupled with their associated real estate dimensions, contribute significantly to enhancing cities, positioning them as internationally recognized, sustainable, and resilient tourist destinations.

#### Cluster 9. Studies on Factor Tourism (Culture, Ecological, and Education)

Sustainable tourism development places a primary emphasis on the preservation of all resources. Ensuring the perpetual conservation of natural resources contributes to heightened community awareness and innovation, thereby amplifying tourist interest in local neighbourhoods. Augmented community education plays a pivotal role in elevating the hospitality

standards for travellers. Yang & Duan, (2020) underscore that human resource enhancement, particularly through education in eco-tourism, forms the bedrock for the robust development of national parks within the eco-tourism domain. This educational approach imparts standardized behaviour to visitors, instils environmental protection awareness, and bolsters the local economy.

Tomasi et al. (2020) provide a comprehensive overview of how Higher Education Institutions (HEIs) can stimulate regional development through tourism education. The findings suggest that international students can be regarded as educational tourists, contributing positively to their destination country during their stay. Universities, in this context, can actively facilitate interactions between tourists and local stakeholders, fostering learning experiences in tourist destinations and enhancing local economic sustainability. Numerous case studies are outlined to exemplify these dynamics. We posit that any institution organizing or managing education programs should incorporate a tourism component to capitalize on the destination's opportunities for achieving learning objectives.

Moreover, environmental conservation aligns synergistically with tourism, as articulated by (Nurhayati et al., 2022). The management of sea turtle conservation, classified as a nature tourism activity within bio-ecoregions, embodies the principles of bio-ecotourism. Conservation efforts, encompassing environmental, socio-cultural, and economic considerations, draw special attention and support from the community.

## Authorship Analysis

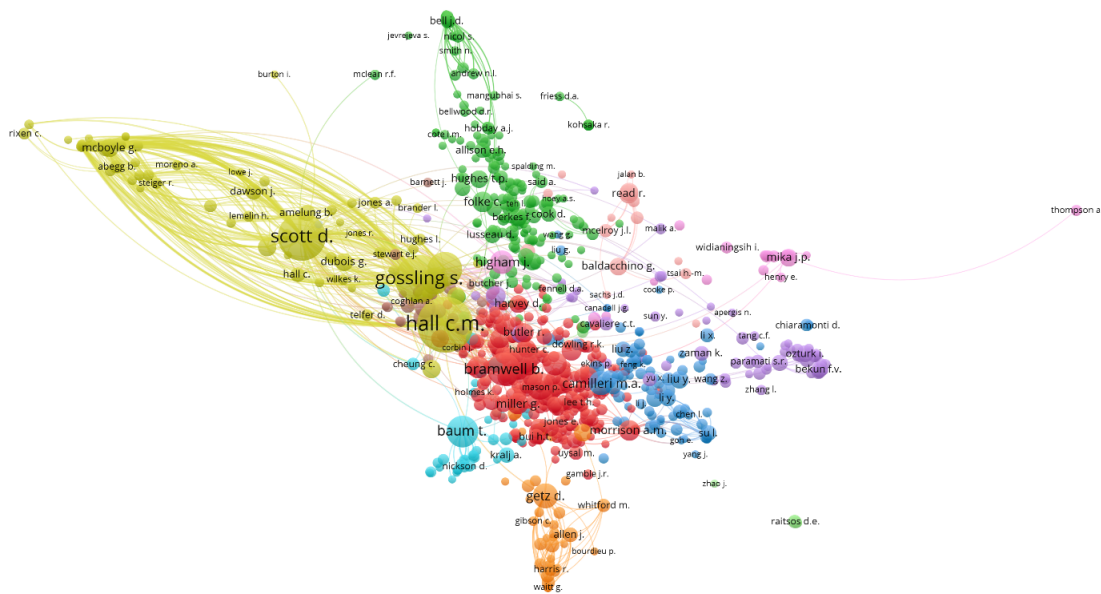


Fig 4. Authorship Network Visualization

The authorship analysis aims to delineate authors who have made substantial contributions to the research documents. The chosen approach for this analysis is the co-citation approach, wherein pairs of papers cited in source articles are tracked. When numerous authors co-cite the same pairs of papers, it gives rise to the formation of research clusters (Kademani et al., 2011). The findings revealed that a total of 901 authors significantly contributed to publications addressing economic, ecological, and social linkages in sustainable tourism within archipelago countries, resulting in the identification of 12 distinct clusters.

Within this cohort of authors, five individuals stand out with the highest number of citations, namely Hall C.M. (170 citations), Gössling S. (126 citations), Scott D. (125 citations), Becken S. (65 citations), and Bramwell B. (60 citations). Bramwell B. belongs to Cluster 1, while the remaining four authors are affiliated with Cluster 4. It is noteworthy that some authors within the same cluster collaborate to produce joint publication documents, exemplified by works such as (1) "Pandemics, Tourism, and Global Change: A Rapid Assessment of COVID-19" (Gössling et al., 2020) and (2) "International Tourism and Climate Change" (Scott et al., 2012).

## Citation Analysis

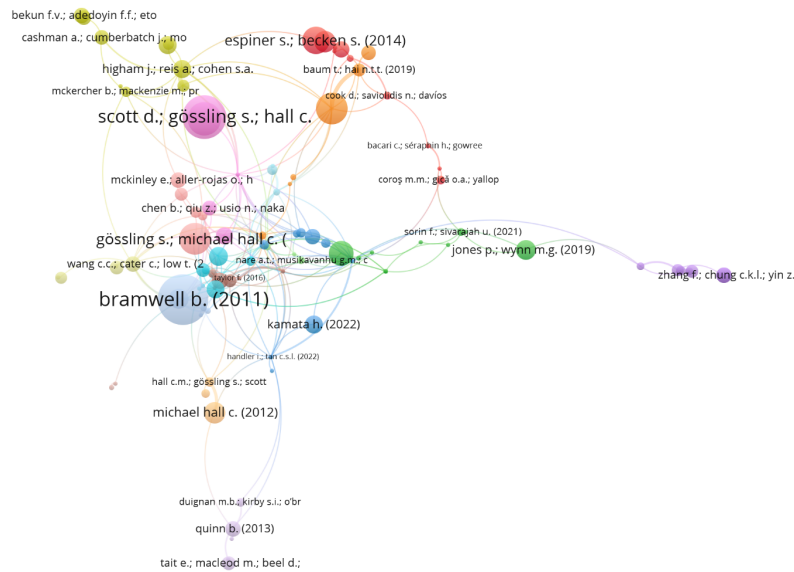


Fig 5. Citation Network Visualization

The examination of citations unveiled a substantial number of referenced literature documents about the economic, ecological, and social linkages of sustainable tourism in archipelago countries. The chosen approach for citation analysis was the bibliographic coupling approach, selected for its ability to gauge similarities between entities beyond documents, including relationships like author-to-author or journal-to-journal connections (Ma et al., 2022). Throughout the observational period, 17 clusters emerged, encompassing a total of 111 cited documents.

The study's outcomes highlighted five published documents that garnered the highest citations within the analyzed sample:

1. "Governance, The State and Sustainable Tourism: A Political Economy Approach" (Bramwell, 2011)/ 330 citations)
2. "International Tourism and Climate Change" (Scott et al., 2012)/ 241 citations)
3. "Sustaining Precarity: Critically Examining Tourism and Employment" (Robinson et al., 2019)/ 131 citations)
4. "Sharing Versus Collaborative Economy: How to Align ICT Developments and The SDGs in Tourism?" (Gössling & Hall, 2019)/ 128 citations)
5. "Tourist Towns on The Edge: Conceptualising Vulnerability and Resilience in A Protected Area Tourism System" (Espiner & Becken, 2014)/ 100 citations).

## Countries Analysis

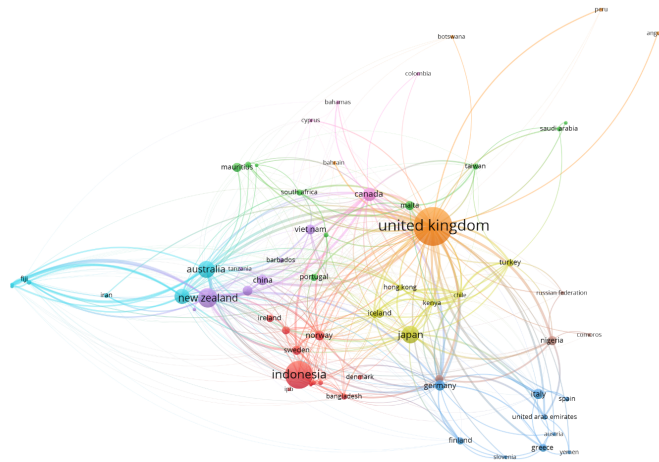


Fig 6. Countries Network Visualization

The countries' analysis delineated the various nations that played a role in publishing literature on economic, ecological, and social linkages in sustainable tourism within archipelago countries. The citation analysis employed the bibliographic coupling approach, which involves two documents citing a common reference (Ma et al., 2022). Out of the 66 countries identified, 9 distinct clusters were formed, each denoted by a specific colour corresponding to its respective cluster. The outcomes reveal that five countries made the most substantial contributions to related research, namely the United Kingdom (with 105 documents), Indonesia (55 documents), New Zealand (27 documents), Japan (23 documents), and Australia (21 documents). Notably, New Zealand exhibited a noteworthy contribution in 2017, while Australia and the United Kingdom significantly contributed in 2018. Japan's substantial contribution occurred in 2019, and Indonesia emerged as a major contributor in 2020.

## Institutions Analysis

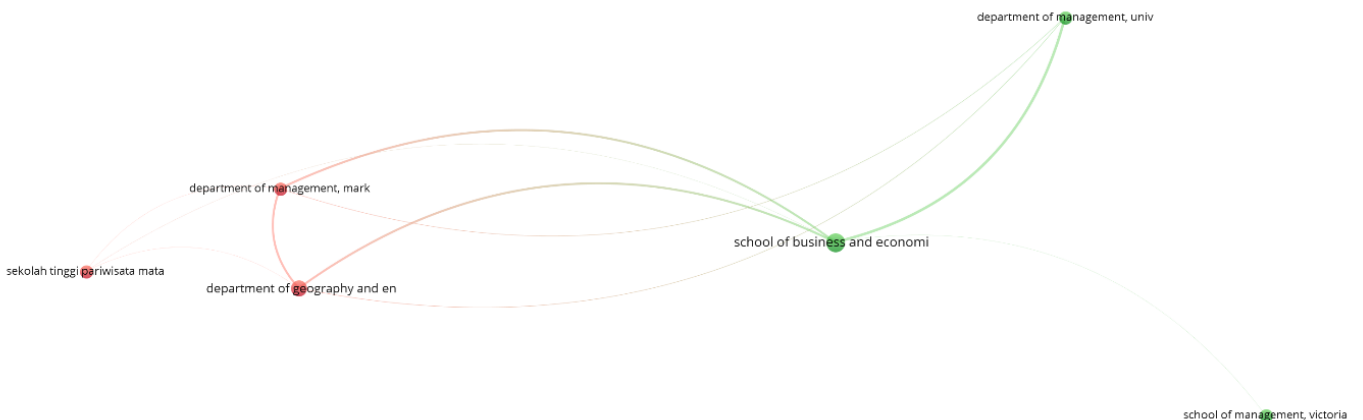


Fig 7. Institutions Network Visualization

The analysis of institutions involved an examination of several entities that have made substantial contributions to the literature on economic, ecological, and social linkages in sustainable tourism within archipelago countries. The findings reveal that six institutions played a significant role in publishing related research, forming two distinct clusters. However, the average publication output for each institution remains relatively modest. The institution leading in publication output was the School of Business and Economics at Linnaeus University, Sweden, with four documents. Following closely, the Department of Geography and Environmental Management at the University of Waterloo, Canada, secured the second-highest publication output, totalling three documents. In contrast, the remaining institutions generated only 1 to 2 publication documents each.

## Discussion

The concept of sustainability in tourism development covers the environmental, economic, and socio-cultural facets, necessitating a well-rounded strategy to ensure its continued viability. The tourism development framework examined in this research is founded on sustainable principles, commonly referred to as the triple helix. The Triple Helix in the Foundation Tourism model showcases the practical underpinnings of the economic, environmental, and societal dimensions that uphold the sustainability of the tourism industry.

The findings from the analysis of keywords and themes unveiled the five most frequently occurring keywords and identified nine closely related themes prevalent in publications addressing economic, ecological, and social linkages in sustainable tourism within archipelago countries. Sustainability emerged as the most frequent keyword, aligning with Bujas et al. (2023) observation that publications focused on sustainability are pivotal with a high citation rate. Subsequently, the other four frequently occurring keywords were Tourism, Sustainable Development, Ecotourism, and Tourism Development.

A detailed breakdown of the nine identified themes includes (1) Studies on blue economy and tourism, (2) Studies on green economy and society, (3) Studies on local communities (rural areas, small island development, and local economy), (4) Studies on developing water quality (aquaculture, groundwater, and water resources), (5) Studies on supporting local communities (community empowerment, local participation, rural economy, and rural population), (6) Studies on government engagement (decision making, political economy, policy), (7) Studies on energy resources (alternative energy, carbon emission, and energy efficiency), (8) Studies on the tourism industry (business mode, hospitality, hotel industry, and tourism sectors), and (9) Studies on tourism factors (culture, ecology, and education).

The authorship analysis highlighted Hall C.M. as the most influential contributor based on the highest number of citations, totalling 170. Additionally, the literary journal "Governance, The State and Sustainable Tourism: A Political Economy Approach" (Bramwell, 2011) secured the highest number of citations, reaching 330. This journal underscores the necessity of collective action to advance sustainable tourism goals in tourist destinations, employing a strategic-relational political economy approach rooted in social theory.

Regarding the publication landscape, the United Kingdom emerged as the country making the most significant contribution, with a total of 105 documents in publications related to economic, ecological, and social linkages in sustainable tourism within archipelago countries. This dominance extends to the domain of tourism sustainable competitiveness research (Soh et al., 2023). Furthermore, the institution analysis revealed that the School of Business and Economics at Linnaeus University in Sweden made a substantial contribution, producing a total of 4 documents.

This paper makes a noteworthy contribution by unveiling the empirical foundation of the economic, ecological, and social sectors that underpin the sustainability of the tourism industry within the Triple Helix Foundation Tourism model.

## Conclusion

The research and practical applications suggest that stakeholders have the potential to enhance tourism through the triple helix concept. This concept highlights the empirical foundation of the economic, ecological, and social sectors that play a significant role in ensuring the sustainability of the tourism industry, making a noteworthy contribution to the field.

Employing a bibliometric approach, this study undertook an extensive examination of the literature surrounding economic, ecological, and social linkages in sustainable tourism within archipelago countries, spanning 12 years. The key findings encompass a thematic and keyword analysis that delineates nine distinct clusters, elucidating nine themes intricately connected to publications addressing the mentioned linkages. The central research focus revolves around the keywords Sustainability, Tourism, and Economy. Authorship analysis highlights Hall C.M. as the foremost contributor based on the analyzed sample data, and the literature journal "Governance, the State and Sustainable Tourism: A Political Economy Approach" (Bramwell, 2011) emerges as the most-cited publication. Moreover, the United Kingdom emerges as the primary contributor among countries, while the School of Business and Economics at Linnaeus University, Sweden, stands out as the institution making the most substantial contribution to publications concerning the economic, ecological, and social linkages of sustainable tourism on archipelago countries.

However, this study is not without limitations, which include: (1) reliance solely on the scopus.com website for literature search, suggesting potential expansion to other platforms like Web of Science (WoS) in future research; (2) restriction of the analysis to articles, urging further investigations into literature from books and proceedings; and (3) the availability of data only from 2021 introduces both constraints and opportunities for this study, the limited timeframe restricts the ability to analyze long-term trends and patterns, potentially limiting the depth of historical comparisons and the understanding of how research output on archipelago countries has evolved; and (4) utilization of Vosviewer software in the bibliographic analysis, warranting exploration of alternative software such as citespace in subsequent research.

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