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Review

Understanding Sustainable Tourism Trajectories in Developing Countries, Case Study: ASEAN

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ABSTRACT

Background: Sustainable tourism is essential for developing countries' economic and environmental health, particularly within the ASEAN region. This study explores the trajectory of sustainable tourism research within the ASEAN region, focusing on emerging trends, research gaps, and future directions. Sustainable tourism, critical for balancing economic, environmental, and socio-cultural aspects, faces significant challenges, particularly in developing countries.

Methods: The research utilised content and bibliometric analysis of 45 publications from the Scopus database, revealing increased scholarly interest post-2020.

Results: Key findings include a predominant focus on economic over environmental sustainability, limited research depth, and modest international collaboration, primarily involving Malaysia and Saudi Arabia. Thematic analysis identified six major themes: sustainable energy, innovation, socio-economic development, environmental management, tourism development, and case studies. Despite recent advancements, substantial gaps exist, particularly in practical applications and novel research areas such as alternative energy and carbon emissions.

Conclusions: Overall, the study underscores the need for more comprehensive research to address the complex challenges of sustainable tourism in ASEAN, emphasising enhancing international cooperation and focusing on under-researched themes to promote sustainable development in the region.

KEYWORDS: sustainable tourism; content analysis study; bibliometric approach; developing countries; ASEAN

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INTRODUCTION

Sustainable tourism refers to managing tourist destinations to minimise negative impacts on economic, environmental, and social aspects, aligning with sustainable development goals [1–3]. It aims to balance tourism requirements with responsible resource use, emphasising economic, environmental, and socio-cultural aspects [4]. The concept has evolved, stressing the importance of harmonising tourism with resource sustainability, including environmental, social, and economic dimensions [5–7] and is crucial for maintaining human lifestyle standards without harming nature and contributing to human health [8]. However, challenges persist, such as the disconnection between policy and execution, leading to adverse effects on ecology, environment, and local communities in destinations [9].

Sustainable tourism encompasses harmonising the demands of tourism with the conscientious utilisation of resources. Its primary concern lies in tourism's environmental, social, and economic impacts and promotes sustainable development in various sectors [5]. It has previously been observed by [10] that sustainable tourism development balances ecological, socio-cultural, and economic factors, as well as minimising harm to natural ecosystems. Since, in recent, the tourism sector has encountered sustainability obstacles that pertain to CO_2 emissions, water consumption, landscape deterioration, and biodiversity depletion [11]. Köroğlu et al. [12] assume that raising individual awareness and living in accordance with nature protection is necessary for achieving environmental sustainability in tourism. In such context, Demeuov et al. [13] are convinced that sports camps, as a natural conservation form, can contribute to sustainable tourism development by teaching participants, particularly children and young people, about responsible behaviour through sports and games.

Sustainable tourism is crucial for developing countries' economic and environmental health, particularly within the ASEAN region. It fosters economic growth and addresses environmental concerns, making it a vital component of long-term development strategies. Regarding economic impact, Aini [14] reported that tourism contributes significantly to GDP and employment in ASEAN, accounting for 12% of GDP and 4% of jobs, with projections of 125.78 million annual visitors. The tourism sector can generate substantial revenue, with estimates indicating that 22,000 international tourists could increase employment by 6.14% and yield 125.78 million annual visitors [14]. In terms of environmental considerations, Guluzade [15] claimed that sustainable tourism practices are essential to mitigate the environmental damage associated with tourism, which can hinder economic growth. Promoting ecotourism is linked to green economic recovery, with studies showing a positive relationship between tourism sustainability and green economic growth [16].

Implementing sustainable tourism in developing countries presents both significant challenges and opportunities. The complexities of

governance, community involvement, and infrastructure development are critical factors influencing the success of sustainable tourism initiatives. In their study, Alam et al. [17] stated that many developing regions suffer from inadequate infrastructure, which hampers tourism growth and sustainability efforts. Inadequate infrastructure includes insufficient transportation, accommodation, and recreational facilities. Meanwhile, Reindrawati [18] found that operational, structural, and cultural barriers hinder community involvement in tourism planning. Issues such as lack of information, decision-making structures, and historical mistrust complicate engagement. Additionally, Irfan et al. [19] concluded that a lack of definitions and integration of sustainable tourism into government policies leads to inconsistent implementation and prioritisation of economic over environmental goals.

Conversely, Alam et al. [17] also explained that sustainable tourism can generate significant foreign exchange and job opportunities, particularly in regions like South Asia, where tourism is rapidly expanding. Moreover, Maxim [20] added that adopting new technologies and smart solutions can enhance urban tourism management and sustainability practices. Alam [17], in this case, emphasised that there is potential for governments to create collaborative policies that involve public and private sectors, fostering a more sustainable tourism framework.

The current research on sustainable tourism trajectories within the ASEAN context reveals significant gaps, particularly in the integration of responsible tourism practices and the measurement of sustainability outcomes, several of which lack comprehensive metrics from the existing studies [21–24], insufficient focus on local communities [14], and post-pandemic recovery strategies [25]. Focusing on ASEAN as a case study is crucial due to its unique socio-economic dynamics and the pressing need for sustainable development in developing countries, such as diverse tourism markets [25], economic dependency on tourism [14], and [26]. While ASEAN presents a promising case for sustainable tourism, the challenges of balancing economic growth with environmental sustainability remain significant, highlighting the need for ongoing research and innovative solutions. Thus, the main objective of this study is to explore the trajectories of sustainable tourism within selected ASEAN regions representing developing countries by analysing the emerging trends, research gaps, and future research directions on sustainable tourism.

Literature Review

Conceptual framework of sustainable tourism

Sustainable tourism is a multifaceted concept that integrates economic, environmental, and social aspects to manage destinations' impacts effectively [27]. It involves the sustainable development goals of balancing economic growth, environmental protection, and social well-being [28]. The literature emphasises the importance of institutions in enabling or

restricting sustainable community-based tourism, influencing resource integration and value assessment [29]. Additionally, hotels' commitment to sustainable practices, particularly in the food and beverage department, is crucial, with proposed frameworks analysing their adherence to relevant standards [30].

A comprehensive analytical framework for smart and sustainable destination management integrates intervention approaches, strategic frameworks, and visions, offering a cutting-edge approach to destination sustainability [3,31,32]. Sustainable tourism aims to achieve a harmonious balance between economic benefits, environmental conservation, and social well-being within tourist destinations.

Global trends in sustainable tourism are evident through international case studies and best practices, showcasing the importance of balancing environmental, economic, socio-cultural, and institutional aspects [33]. Countries like India are leveraging their rich cultural and natural heritage to boost their tourism sector, contributing significantly to GDP and foreign exchange earnings [34]. Research on 111 tourist destinations worldwide emphasises the need for sustainable development to manage negative impacts and achieve sustainable goals [3].

Studies in Spain, Italy, and the Dominican Republic underscore the critical role of sustainable tourist destinations in economic, social, and environmental development, highlighting the long-term benefits of prioritising sustainability [35]. The evolution of sustainable tourism concepts over the years stresses the importance of responsible resource use and the multi-dimensional approach required for sustainable development in tourism, including global governance, infrastructure management, and waste management [5].

Global trends in sustainable tourism are increasingly important as destinations strive for sustainable development. Research highlights the challenges the tourism sector faces, emphasising the need to integrate environmental and economic components for lasting development [3,36]. Sustainable tourism involves managing negative economic, environmental, and social impacts, focusing on efficiency and technology gaps among regions [11].

Studies underscore the importance of balancing tourism requirements with responsible resource use, discussing global governance, waste management, and socio-cultural aspects [5]. Furthermore, a comprehensive literature review emphasises the need for sustainable tourism to maintain customer satisfaction, raise awareness, and spread sustainable practices while identifying research gaps for future studies [37]. Overall, these insights provide a roadmap for enhancing sustainable tourism practices globally.

Sustainable tourism in developing countries

Sustainable tourism practices in developing countries are essential for balancing economic growth with environmental preservation and community well-being. These practices not only enhance local economies

but also promote the sustainable use of natural resources. Several examples are proposed by studies from [38] about the economic benefit of sustainable tourism in India, sustainable tourism contribution to environmental conservation [39], and sustainable tourism initiatives in Marocco and Egypt despite facing challenges in geopolitical instability and resource management [40].

Nevertheless, developing countries also face a myriad of unique challenges and barriers that hinder their progress across various sectors, including health, such as Electronic Health Records (EHRs) [41], scientific research, such as limited access to resources [42], lack of interest among researchers and language barriers [43] as well as infrastructure such as road traffic injuries, where developing countries account for approximately 90% of the 1.3 million annual road traffic fatalities, with cost exceeding $100 billion per year due to inadequate safety (and attitudes towards road safety) [44,45].

Sustainable tourism in the ASEAN context

Tourism development in ASEAN reveals a dynamic landscape shaped by various factors, including economic growth, sustainability efforts, and the impact of the COVID-19 pandemic. The region has seen significant tourism competitiveness and strategy fluctuations, particularly in response to global challenges. Countries like Indonesia, Malaysia, and Vietnam have shown resilience, adapting their tourism strategies to maintain competitiveness [46]. The ASEAN Community-based Tourism Standard, adopted in 2016, aimed to enhance local tourism experiences, though its implementation faced challenges in countries like Laos, emphasising the need for stakeholder collaboration [47]. Regarding sustainable tourism practices, the ASEAN Socio-cultural Community Blueprint 2025 promotes eco-friendly practices to mitigate tourism's carbon footprint [14,24].

Meanwhile, sustainable tourism policies in ASEAN countries are increasingly focused on balancing economic growth with environmental sustainability. Various initiatives aim to enhance ecotourism, promote green financing [48,49], and develop integrated strategies for post-pandemic recovery [50,51]. Developing a Tourism Sustainable Competitiveness Indicator (TSCI) helps benchmark policies across ASEAN, focusing on environmental, socio-cultural, and economic sustainability [52]. Moreover, long-term strategies emphasise the importance of green finance and comprehensive financial policies to foster sustainable tourism development while addressing economic uncertainties [53].

Content analysis on sustainable tourism

Content analysis is a method used in various fields, such as technical information exchange [54], social work programs [55], and cultural coverage in media [56]. It involves quantitative and qualitative approaches to analyse textual data, identify trends, and categorise information. The process includes steps like analysing the content, forming typologies, sorting data

into categories, and counting frequencies of themes [57]. In religious studies, content analysis faces challenges like sensitivity to definitions, methodological requirements, and the need for qualified researchers [58]. Additionally, in virtual projects, content analysis is crucial for assessing the effectiveness of website content, analysing keywords, and improving publication strategies. Overall, content analysis is valuable for understanding and interpreting data across various disciplines.

Content analysis has also been utilised in various studies within sustainable tourism [59]. Performing a content analysis study in sustainable tourism research holds importance for multiple reasons [60]: It allows researchers to scrutinise the extant body of literature on green products, green production, green economy, sustainability, FinTech, smart tourism, and plant-based innovation, alongside other subjects, to discern the underlying concepts and intersections within these domains [59,61–63]. Additionally, Bosi et al. [64] highlighted that content analysis aids in the identification of the most influential authors, organisations, countries, and journals within these research domains, thereby offering valuable insights for subsequent research endeavours and opportunities for collaboration. Despite the quantity, a thorough analysis and assessment of bibliometrics in the context of sustainable tourism in developing countries, including ASEAN, is lacking in scientific studies. A brief, clear explanation of the trajectory of sustainable tourism is provided using ASEAN as a case study.

MATERIALS AND METHODS

Various methodologies have been used in content analysis studies [65–67]. One method combines content analysis with other data collection methods to enhance its use and validate findings obtained through other means [68]. The criteria for selecting journals and collecting data using the method of content analysis differ among various studies [69,70]. This view is supported by [71], who writes that the selection of journals was determined by the criteria of utility and economic efficiency to optimise the value of acquired materials within the confines of the library's budget. In another study focused on data papers, Kim [72] pointed out that detailed data documentation increases the possibility of data reuse.

The present study, in the meantime, strictly adheres to the principles of content analysis with bibliometric analysis, emphasising the findings obtained from various types of published documents within the Scopus database (including articles, conference papers, book chapters, and reviews) to identify publication trends, authorship and collaboration patterns, dominant topics and keywords, as well as directions of future research on sustainable tourism in the context of ASEAN. A broadly similar point has also been made by [73], who points out that content analysis facilitates researchers with comprehension of past studies' emphasis and focus, identifies literature gaps, and steers future research. Supporting this view, Dhamayant et al. [74] write that by applying content analysis,

researchers can contribute to the advancement of sustainability research and gain valuable insights into the current state of knowledge.

Data Collection

The data collection process in this research was carried out on the Scopus database by applying the core seek query. Initially, three keywords were typed: the so-called "sustainable", "tourism", and "developing countries". There are no exceptions in determining the year range, document type selection, and subject area. Meanwhile, in the language category, the study only focused on English since it constitutes the main and most widely used language. As a result, the documents collected were 1125. Given that the quantity of documents is considerably substantial and the emphasis of this analysis pertains to ASEAN, we additionally refined the dataset by modifying the keywords within the primary search query, specifically "sustainable", "tourism", and "ASEAN". As a result, 45 number of documents were successfully collected. The format applied is as follows: (TITLE-ABS-KEY (sustainable AND tourism) AND TITLE-ABS-KEY (asean)).

Data Analysis

Furthermore, all 45 articles successfully collected that had previously been extracted in CSV format from their original form were then analysed. Two software programs supporting the analysis were employed at this stage: the so-called Biblioshiny package in RStudio [75] and VOSviewer [76]. Biblioshiny in R-Studio enables researchers to analyse trends, keywords, authors, and journals across different datasets, providing valuable insights for future studies [77]. Similar to Biblioshiny, VOSviewer is also a powerful tool for bibliometric analysis, enabling researchers to visualise relationships between keywords, authors, and research trends [78–82]. In this stage, Biblioshiny was employed to analyse the core dataset information and publication growth. Meanwhile, VOSviewer was employed to assess the co-authorship analysis, content analysis through the co-occurrence network, and future research on sustainable tourism in ASEAN. In addition, a breakdown was made regarding the co-occurrence network with the aid of Microsoft Excel.

Figure 1. Core dataset information.

Figure 1 depicts the distribution of information with 39 sources and 45 documents identified. The development of publication shows annual growth at a rate of 2.12%. One hundred thirty-six authors were involved in publishing related publications, with authors of single-authored documents numbering 8. Meanwhile, International Co-Authorship contributed 15.56%, with an average of 3.13 co-authors per document. The author also found 160 keywords and 0 references, with an average document age of 4.11 and 10.18 average citations per document. Overall, a complete data collection and analysis process, also known as a research strategy adopted by [83], can be visually illustrated in the following Figure 2.

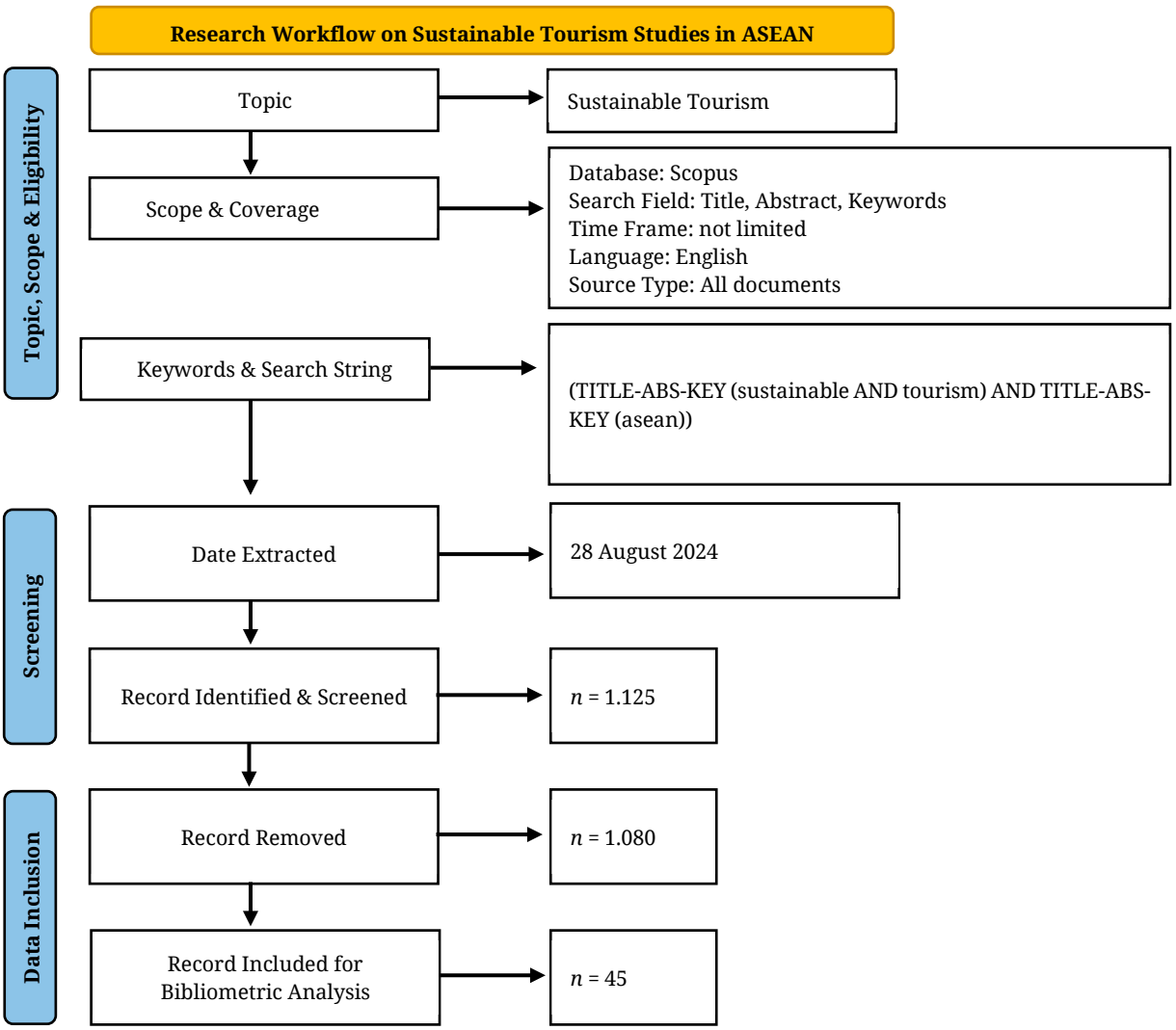


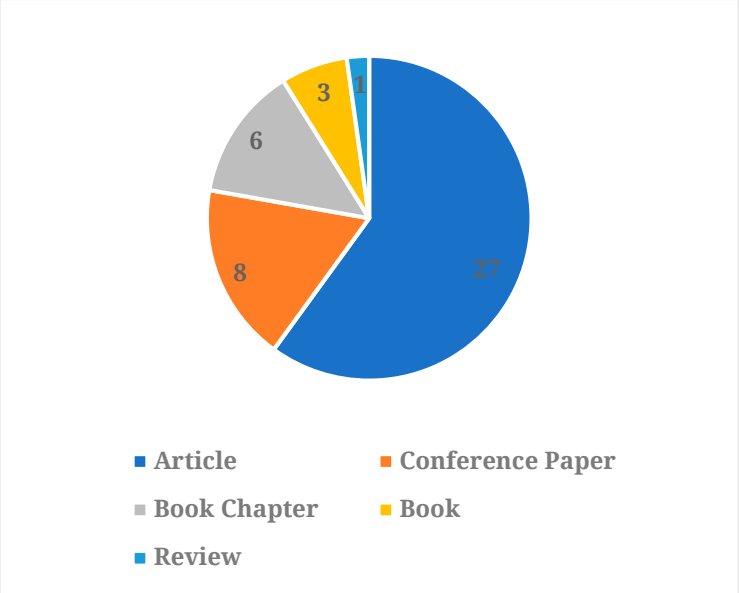
Figure 2. Flow diagram of research strategy from PRISMA model, adopted from [83].

RESULTS

This section examines the findings of our data analysis. A total of 45 articles were gathered to facilitate the ongoing data analysis process. Considering various indicators, most of the data gathered was subjected to further analysis. The results highlight four indicators used as material for

analysis, encompassing the annual distribution of the scientific publication, co-authorship analysis, thematic analysis through co-occurrence networks and its breakdown data, and the overlay of future research direction. As previously stated, there are no exceptions in determining the time span for document publication, document type, and subject area to avoid a minimum number of documents being produced due to limited case study research.

(a)



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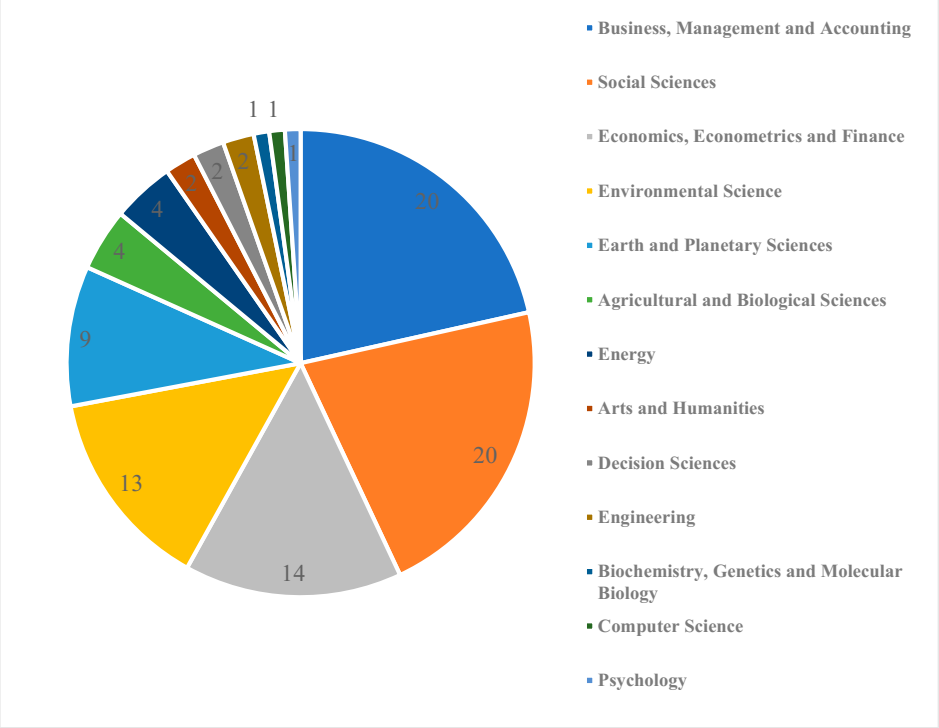


Figure 3. (**a**) Documents type selected with theme of sustainable tourism in ASEAN. (**b**) Documents by subject area with theme of sustainable tourism in ASEAN.

As illustrated in Figure 3a, five distinct categories of documents have been subjected to analysis, specifically articles, book chapters, reviews, conference papers, and books. Among these, articles represent the document category with the highest frequency, totalling 27. On the other hand, Figure 3b indicates that the domains of Business, Management, Accounting, and also Social Sciences emerge as the most prominent in the subject area with a compilation of 20 documents, succeeded by Economics, Econometrics, and Finance with 14 documents, Environmental Science with 13 documents, and Earth and Planetary Sciences with a total of 9 documents.

Annual Distribution of Scientific Publication

The annual distribution of scientific publications is very important for researchers to monitor the progress of science all the time. Through investigations of publication distribution, researchers can monitor specific issues of research in a particular discipline. Figure 4 shows the number of scientific publications on the topic of sustainable tourism in the ASEAN context as a representation of developing countries without limiting the range of years.

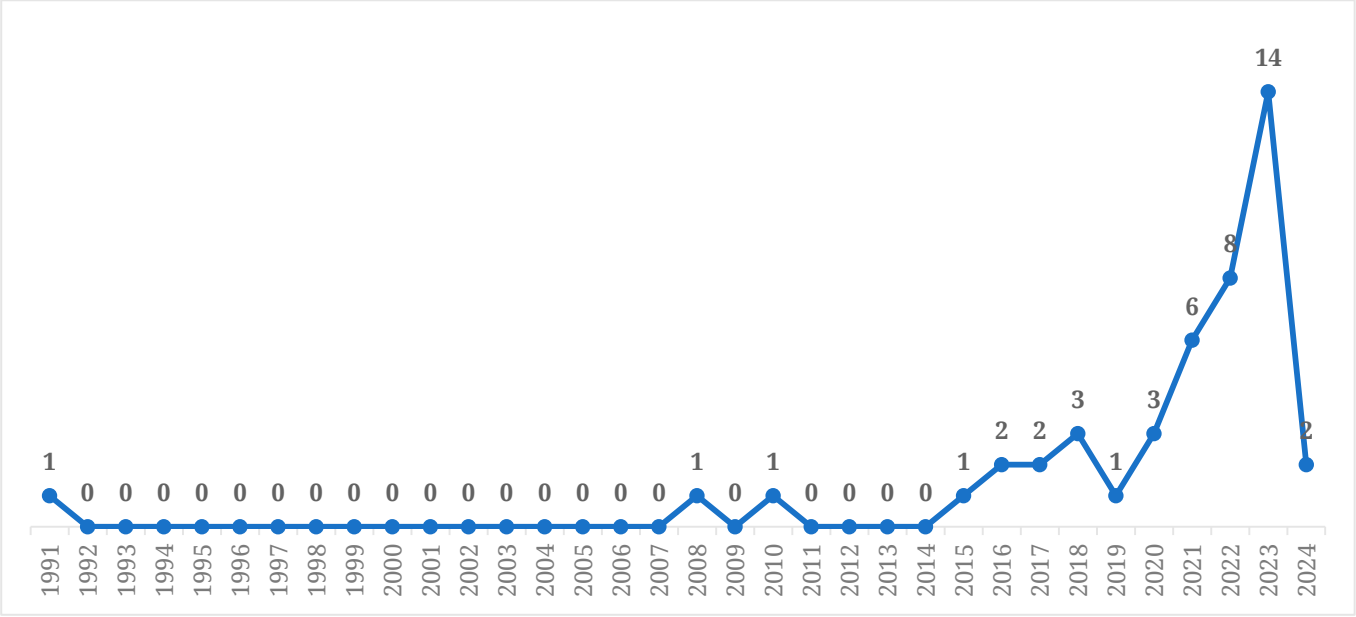


Figure 4. Annual publication from 1991 to 2024 of sustainable tourism research in ASEAN.

Research investigations about sustainable tourism within the ASEAN region commenced in 1991. In that particular year, a singular document was published. In the subsequent years, from 1992 to 2014, merely two documents were published, specifically in 2008 and 2010. The increase in the volume of publications was initiated gradually from 2015 to 2018 and experienced a significant surge from 2020 to 2023, albeit with a decrease in the quantity of publications from 2018 until 2019. Cumulatively, the total number of documents published thus far remains exceedingly

limited, with the thematic focus predominantly constrained to investigations concerning sustainable tourism in the ASEAN context.

Co-Authorship Analysis

In the realm of the co-authorship network, an analysis was carried out utilising Vosviewer to unveil notable international cooperation within sustainable tourism research. Sixteen items have been collected and categorised into 9 distinct clusters, each signifying a specific territory or country. In light of the limited interconnection among the items, the primary objective of this research is to explain the relationships between the interconnected items, culminating in the retention of only five items, as illustrated in Figure 5. In this context, all items represent developing countries and developed countries across different regions.

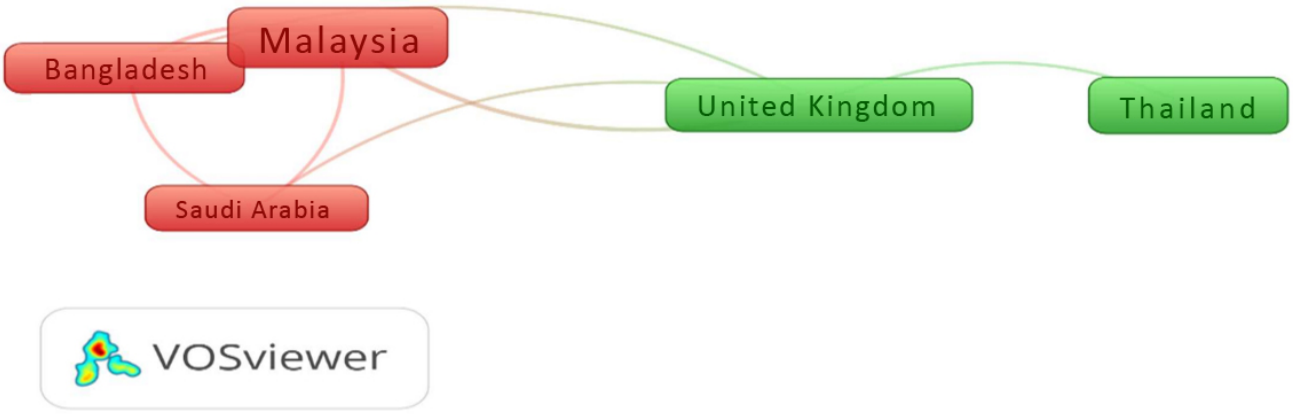


Figure 5. Co-authorship analysis based on territorial collaboration of scientific publication.

The criteria employed as a standard for determining the magnitude and extent of the co-authorship network for each item is the total link strength (TLS) associated with each item. A higher total link strength (TLS) indicates a greater level of interconnection. It has been identified that among the five interconnected items (Bangladesh, Malaysia, Saudi Arabia, United Kingdom, and Thailand), Malaysia and Saudi Arabia exhibited the highest total link strength, namely 5, followed by Bangladesh with 4 TLS, Saudi Arabia with a total of 3 TLS, and ultimately Thailand with a total of 1 TLS.

Thematic Analysis

In this section, an analysis was conducted on data of co-occurrence networks within the realm of sustainable tourism studies that had been previously extracted. Utilising the Vosviewer software, the analysis outcomes revealed the presence of 5 clusters, comprising 31 items distributed throughout, as illustrated in Figure 6. These clusters were

established based on the overall link strengths of each item or word within the entire network. Total link strength signifies the degree of correlation that an item shares with other items. The primary cluster, cluster 1 (red cluster), emerged as the largest cluster encompassing the highest number of items, specifically 8, followed by cluster 2 (green cluster) with seven items, cluster 3 (blue cluster) with seven items, cluster 4 (yellow cluster) with six items, and cluster 5 (purple cluster) with three items. Subsequently, a detailed breakdown of each cluster was conducted to facilitate a concise depiction and further analytical procedures.

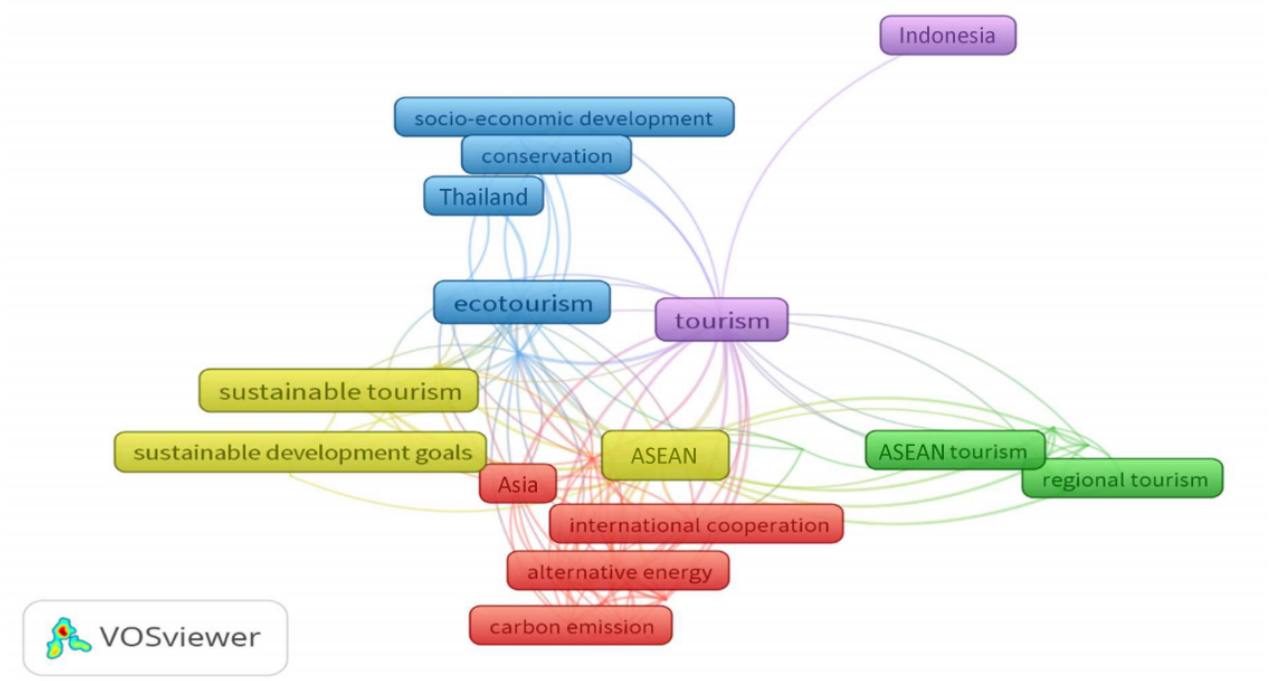
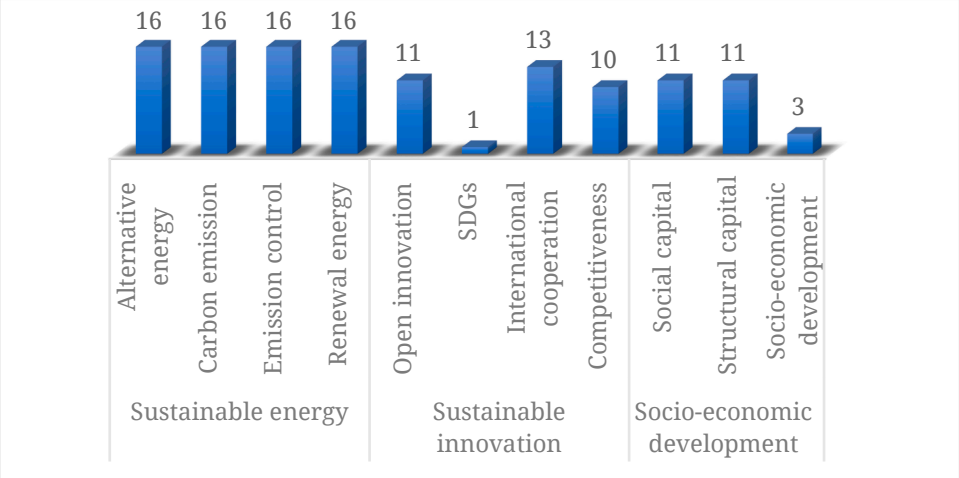


Figure 6. Co-occurrence analysis of sustainable tourism studies in ASEAN context.

More detailed, the subsequent phase of this part involved thematic analysis. The primary aim is to identify, analyse, and report patterns (themes) within qualitative data, enabling us to understand better the underlying concepts and experiences in the data set. In this instance, themes were categorised not according to the clusters depicted in the data visualisation illustrated in Figure 6 but by grouping each item based on the extent of correlation concerning the studied issues. The six themes are sustainable energy, innovation, socio-economic development, environmental management, tourism development, and case study. Each item contained in each thematic category exhibits a distinct Total Link Strength (TLS). In this context, a higher TLS signifies increased co-occurrence associated with the item. The results of the classification of the six themes are subsequently analysed in more detail in the following figures, where each figure represents three themes.

(a)



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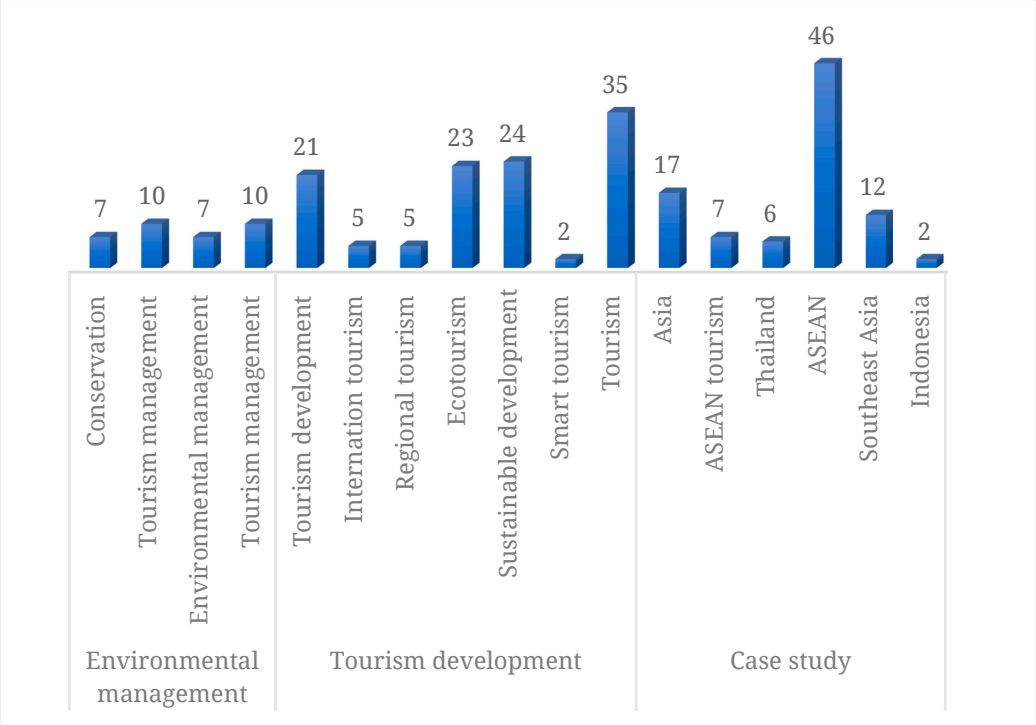

Figure 7. **(a)** First thematic analysis breakdown. **(b)** Second thematic analysis breakdown.

Figure 7a encompasses three primary themes: sustainable energy, sustainable development, and socio-economic development. The items within the first theme (sustainable energy) consist of “alternative energy”, “carbon emissions”, “emission control”, and “renewable energy”. In this theme, these four items each accumulate an identical quantity of TLS, amounting to 16 TLS. The items of the second theme (sustainable innovation) include “open innovation”, “SDGs”, “international cooperation”, and “competitiveness”. In this theme, international cooperation garners the highest TLS, totalling 13 TLS. The items in the third theme (socio-economic development) comprise “social capital”,

"structural capital", and "socio-economic development". In this theme, social and structural capital attain the same TLS count, specifically 11, representing the highest among the three items.

Figure 7b also consists of three themes: environmental management, tourism development, and case studies. The items within the first theme (environmental management) encompass "conservation", "tourism management", and "environmental management". Tourism management achieved the highest TLS in this theme with an aggregate of 10 TLS. The items within the second theme (tourism development) include "tourism development", "international tourism", "regional tourism", "ecotourism", "sustainable development", "smart tourism", and "tourism". In this theme, tourism garnered the highest TLS with 35 TLS. The items in the third theme (case study) consist of "Asia", "ASEAN tourism", "Thailand", "ASEAN", "Southeast Asia", and "Indonesia". In this theme, ASEAN attained the highest, with 46 TLS.

Overlay of Future Research Direction

The final part of this research involves analysing the future research direction by utilising the overlay visualisation of the co-occurrence analysis in Vosviewer, as illustrated in Figure 8. Future research direction analysis, especially in tourism studies, aims to identify emerging themes, gaps in the literature, and potential areas for further exploration within the field. This analysis is crucial to identify research gaps or novelties that could serve as a reference for future studies on sustainable tourism, especially in ASEAN or other developing countries. In this instance, gaps were determined based on the degree of co-occurrence, links, total link strengths (TLS), and the study period (2022–2024). Out of the analytical findings, we identified ten items categorised as issues with the latest study year range and the number of co-occurrences and TLS that is still minimal.

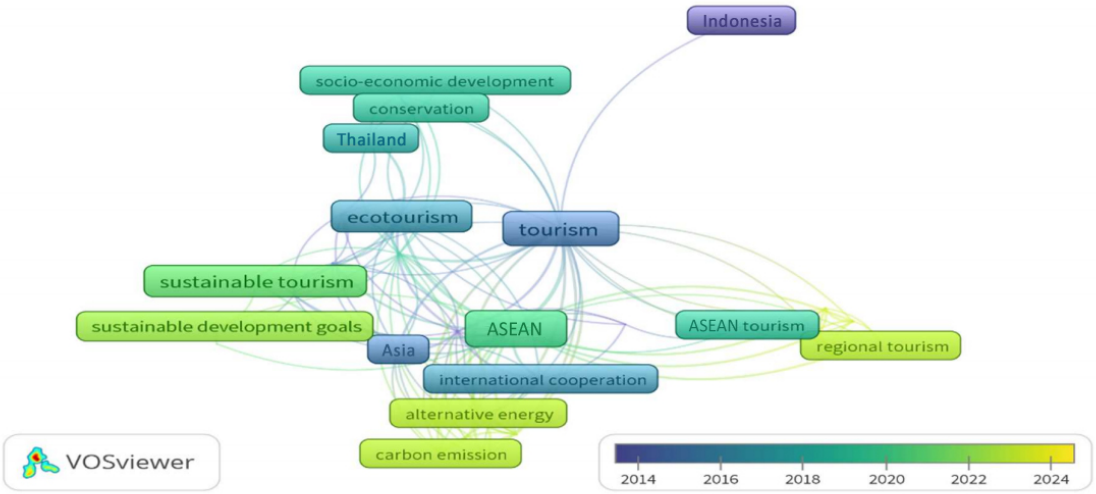

Figure 8. Overlay of future research direction based on co-occurrence analysis of sustainable tourism in ASEAN context.

To facilitate the identification of research gaps from the analysis of findings, an attempt was made to break down the overlay visualisation. Specifically, the items were categorised as follows: (1) items belonging to the yellow cluster, indicating the novelty in discussing the topics (2022–2024), and (2) items with the minimum number of occurrences and TSL, indicated by the item size, reflecting the limited extent of research. The breakdown results are detailed in Table 1 below, showing ten items. Specifically, these ten items were evaluated based on three measurement points: (1) co-occurrence, showing the frequency of appearance; (2) total link strengths, representing the overall connections robustness; and (3) year, indicating novelty of the studied issues.

Table 1. Recently less-explored issues on sustainable tourism study based on the overlay of future research direction (Figure 7).

No	Items	Co-occurrence	TSL	Year
1	Regional tourism	2	5	2022
2	Alternative energy	2	16	2022
3	Carbon emission	2	16	2022
4	Economic development	2	16	2022
5	Emission control	2	16	2022
6	Renewal energy	2	16	2022
7	Human capital	2	11	2023
8	Open innovation	2	11	2023
9	Social capital	2	11	2023
10	Structural capital	2	11	2023

Upon analysing Table 1, it is concluded that these ten items still exhibit a modest research depth with a substantial degree of novelty. This observation is supported by the total link strengths associated with each item. Notably, the items “alternative energy”, “carbon emission” and “economic development” collect the same number of co-occurrences, TLS, and publication year, the so-called 2, 10, and 2022. The similar number of co-occurrences, TLS, and publication year also applies to the items “human capital”, “open innovation”, “social capital”, and “structural capital”, the so-called 2, 11, 2023. “Regional tourism” constitutes the only item with a co-occurrence collection, TSL, and different publication years, namely 2, 5, 2022. As such, future research is strongly encouraged to focus more on the issues described above that are generally associated with sustainable tourism.

DISCUSSION

This study provides valuable insights into ASEAN’s sustainable tourism research, highlighting its current state and future potential. The findings reveal a late start in this field, with the first publication in 1991 and a significant surge only after 2020, indicating a growing but still limited

academic focus on ASEAN-related issues. The dominance of research in Business, Management, and Social Sciences suggests a primary concern with balancing economic development and sustainability. Co-authorship analysis shows modest international collaboration, with Malaysia and Saudi Arabia playing central roles, underscoring the need to strengthen regional global research networks.

The thematic analysis identified six key themes in sustainable tourism research focused on ASEAN: sustainable energy, sustainable innovation, socio-economic development, environmental management, tourism development, and case studies. Varying Total Link Strengths (TLS) among these themes suggest different levels of research maturity, with sustainable energy and tourism development being more established. At the same time, case studies indicate a gap in practical applications. The overlay analysis highlights emerging themes like alternative energy and carbon emission, which, despite high novelty and lack of research depth, signal areas that are ripe for further exploration, particularly in the socio-economic and human dimensions of sustainable tourism in ASEAN.

Challenges and Opportunities of Sustainable Tourism in Developing Countries within ASEAN

Sustainable tourism in the ASEAN region, which is comprised mostly of developing countries, faces several challenges that stem from both the socio-economic realities of these nations and the research findings in this field. As highlighted by the analysis of 45 articles, these challenges can be justified based on several indicators, including the annual distribution of publications, co-authorship networks, thematic concentrations, and emerging research directions. Below are the key challenges and their justification:

Late start and limited research depth

The study indicates that research only began in 1991, with slow progress until 2015 and a more significant rise post-2020. Even though this reflects a growing recognition of sustainability's importance, the overall research volume remains low. This limited depth of research hinders a comprehensive understanding of how tourism can be managed sustainably in developing countries within ASEAN. Despite a recent surge, the scarcity of publications suggests that sustainable tourism within the context of ASEAN is still emerging as an area of academic focus. The lack of depth in early studies limits the body of knowledge required to address the complex challenges that ASEAN nations face in balancing tourism growth with environmental and social well-being.

Economic focus on environmental sustainability

Another challenge is the predominant focus of research on economic and social dimensions over environmental sustainability. Most

publications analysed belong to fields like Business, Management, Accounting, and Social Sciences, with less attention given to Environmental Science and Earth and Planetary Sciences. This prioritisation reflects the economic pressures developing nations face within ASEAN, where tourism is a key driver for growth. ASEAN countries rapidly develop and often prioritise economic development over environmental sustainability due to immediate financial needs [84–86]. This challenge is further evidenced by the fact that more research focuses on socio-economic development [87–89] rather than the environmental impacts of tourism [90,91], leaving a gap in understanding how to mitigate tourism's ecological footprint.

Limited international collaboration

As revealed by the co-authorship network analysis, the modest level of international collaboration in ASEAN sustainable tourism research poses another challenge. Only five key countries (Bangladesh, Malaysia, Saudi Arabia, the United Kingdom, and Thailand) show notable involvement, and even among these, collaboration remains limited in scope. In developing ASEAN countries, limited resources, funding, and research infrastructure may constrain opportunities for international collaboration [92]. As a result, the scope of sustainable tourism research remains narrow, and knowledge exchange between countries is restricted [93]. This lack of global engagement reduces the diversity of research perspectives and inhibits the development of innovative, context-specific solutions.

Gaps in thematic focus

The thematic analysis reveals uneven attention to various themes within sustainable tourism. While areas like tourism development [16,94–98] and sustainable energy [99,100] are relatively well-established, critical topics such as socio-economic development [101,102], case studies [16,103–105], and environmental management [98,105,106] are underexplored. The lower Total Link Strength (TLS) for these themes highlights the gap in practical, real-world applications of theoretical frameworks, which is particularly concerning for developing nations requiring actionable policy insights. For ASEAN, where diverse socio-economic conditions demand tailored tourism models [107], the lack of detailed case studies and socio-economic research limits the ability of policymakers and practitioners to implement sustainable practices effectively. Theoretical knowledge is essential, but practical applications based on regional case studies are vital for driving real-world change.

Emerging research gaps and novel themes

The overlay visualisation of future research directions points to specific emerging themes, such as alternative energy [100], carbon emissions [99],

human capital [102], and social capital, that still exhibit modest research depth despite their importance. These areas, characterised by novelty but limited TLS, represent both a challenge and an opportunity for future research in ASEAN. The novelty of these topics reflects their relevance to the evolving discourse on sustainable tourism, but the lack of research limits their immediate applicability. Developing countries within ASEAN need innovative solutions to mitigate the environmental impact of tourism and develop human capital for managing tourism sustainably [108,109]. However, the limited research on topics such as alternative energy [100] and carbon emission control [99] suggests that more academic attention is needed to address these urgent issues effectively. ASEAN countries may struggle to transition to more sustainable tourism practices without deeply exploring these themes.

Challenges for policymakers and practitioners

The findings also have direct implications for policymakers and practitioners, who face the challenge of formulating strategies without a robust research base. The limited interdisciplinary nature of current research and its focus on specific themes may not provide the holistic insights needed to guide sustainable tourism development. Furthermore, gaps in areas like socio-economic and cultural sustainability make it difficult to create inclusive policies that account for all facets of sustainability. Policymakers in developing ASEAN countries face the challenge of balancing short-term economic gains from tourism with long-term sustainability [110,111]. The current research is not diverse or detailed enough to support the comprehensive policy frameworks needed to address these issues, especially considering the cultural and environmental diversity of the region.

In conclusion, the challenges of sustainable tourism in the ASEAN region stem from limited research, economic pressures, and insufficient international collaboration. Developing countries within ASEAN are particularly vulnerable to the environmental impacts of rapid tourism growth, yet the research necessary to guide sustainable practices is still in its infancy. Addressing these challenges requires more interdisciplinary research, international collaboration, and a focus on underexplored themes such as socio-economic development, environmental management, and human capital. These efforts would provide the insights needed to support the region's transition toward more sustainable tourism in developing countries, specifically ASEAN.

CONCLUSIONS

The study provides a comprehensive overview of sustainable tourism research in the ASEAN region, highlighting both the progress and persistable challenges. The analysis reveals that while there has been an increase in publications since 2020, research in this area remains limited, particularly in depth and breadth. Key themes such as sustainable energy

and tourism development have gained some attention, but critical areas like socio-economic development, environmental management, and practical case studies are underexplored. Additionally, the modest level of international collaboration and the late start of research in this domain indicate a need for stronger global partnerships and a more robust, interdisciplinary approach to studying sustainable tourism in ASEAN. Emerging research areas such as alternative energy and carbon emissions are crucial for future exploration, as they represent both challenges and opportunities for advancing sustainability in the region.

Despite its valuable insights, this study has certain limitations. Firstly, relying on a limited dataset of 45 articles may not fully capture the entire scope of sustainable tourism research in ASEAN. The exclusion of grey literature, such as government reports and industry publications, may also result in a narrower perspective. Additionally, the co-authorship and thematic analyses, while informative, are constrained by the availability and quality of the data, which may affect the accuracy of the findings. Lastly, the focus on specific themes and indicators may overlook other relevant factors influencing sustainable tourism in ASEAN, such as political and cultural dimensions. Future research should address these limitations by incorporating a broader range of sources and adopting a more holistic approach to studying sustainable tourism in the region.

DATA AVAILABILITY

The dataset of the study is available from the authors upon reasonable request.

AUTHOR CONTRIBUTIONS

Conceptualisation, TK and AKV; methodology, TK; software, TK; validation, AKV; formal analysis, AKV; writing—original draft preparation, TK; review and editing, AKV; visualisation, TK; supervision, AKV; funding acquisition, AKV.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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