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Journal of Ecotourism

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/reco20

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To cite this article: Goda Lukoseviciute, Luís Nobre Pereira & Thomas Panagopoulos (2022): The economic impact of recreational trails: a systematic literature review, Journal of Ecotourism, DOI: 10.1080/14724049.2022.2030745

To link to this article: https://doi.org/10.1080/14724049.2022.2030745

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Published online: 30 Jan 2022.

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JOURNAL OF ECOTOURISM
https://doi.org/10.1080/14724049.2022.2030745

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The economic impact of recreational trails: a systematic literature review

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ABSTRACT
Recreational trails are a type of nature-based tourism providing various activities such as hiking, biking, rafting or horseback riding. Increasing investment in infrastructure and touristic services development has resulted in higher visitor expenditure and thus contributed to economic development. This study aims to review the current economic impact assessment studies on recreational trail tourism and to extract the main economic impact determinants. A systematic literature review analysis was applied in a quantitative approach about economic models, study cases of nature-based tourism, comparison of economic impacts. A qualitative analysis was then applied with an inductive approach to compare the economic impacts of nature-based tourism forms and identify the main determinants of economic impact. This study suggests that I-O is the most suitable theoretical approach to study the economic impact of long-distance trails, while the Keynesian multiplier approach and Ad hoc model are the most suitable approaches to study the economic impact of short-distance trails.

ARTICLE HISTORY
Received 5 January 2021
Accepted 13 January 2022

1. Introduction

According to the World Tourism Organisation (2018), tourism is growing globally, with increasing arrivals at destinations at an average of 4.3% per year. Within tourism, outdoor recreation – also known as nature-based tourism (NBT), which includes hiking, trekking, rock climbing, mountain biking, birdwatching, canyoning, rafting, kayaking, and other activities dependent on natural features and touristic purpose – has become the most rapidly expanding sector within tourism across the globe (Bell et al., 2007; Hardiman & Burgin, 2016; Tyrvainen et al., 2014). NBT in protected areas, especially in national parks, is usually associated with ecotourism oriented towards minimal impact management, environmental education, contributions to conservation and benefits to the local community, or conservation tourism (Buckley, 2010).

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The sustainable tourism principles mostly determine the increasing popularity of outdoor recreation, chiefly directed towards the modern urban resident who has a desire to escape the pressures of everyday life and get back in touch with nature through activities that respect host cultures, have a minimum environmental impact, maximize the benefits to local people and maximize tourist satisfaction (Arnegger et al., 2010).

Trail-related recreation is affordable for most people because it does not require much physical or technical training or specialized equipment. The concept of NBT was portrayed for the first time in the early 1990s (Sherman & Dixon, 1991). Recreational trails are the most fundamental tool for various activities, such as walking, jogging, hiking, trekking, horseback riding and biking, depending on a variety of trail characteristics, motivations and preferences (Hall et al., 2017; Mowen et al., 199). Today, these trails are still followed by the traveler experiencing various landscapes and historic sites (Collins-Kreiner & Kliot, 2017).

Due to the multiple benefits of recreational trails to human health and well-being (Wolf & Wolhfart, 2014), and learning and education through an understanding of other cultures or countries (Tangeland & Aas, 2011), the number of trail-users has become one of the fastest-growing of nature-based recreationists around the world contributing significantly to nations' economies (Outdoor Industry Association, 2017). Among physical and mental health benefits, trail infrastructure, facilities and services are some of the salient determinants of visitor satisfaction and memorable experience (Kelley et al., 2016).

Trail development is inevitably linked to the issue of nature conservation. Previous studies agree that there is increased pressure on wildlife, ecosystem integration and biodiversity caused by intensive trail visitation (Newsome & Davies, 2009; Sutherland et al., 2001). Wolf et al. (2019) have stressed that environmental conservation and trail-related activities can be compatible if there are investments allocated for infrastructure development and accessibility control. They lead to proper trail design and maintenance, which is essential for reducing conflict between multiple trail users and landowners (Neumann & Mason, 2019). An increasing interest in access to recreational trail networks (e.g. Inca in Peru, Troltunga in Norway, the Grand Canyon in the USA, Montblanc in France, and others) required capital investments in trail infrastructure development. Also required is establishing new services through contributions to the local industries with which NBT has an economic relationship (Kyle et al., 2004). Nevertheless, Theobold (1987) was one of the first to highlight the significance of monitoring nature attractions' economic performance to understand the consequences of investments made in nature-based recreation destinations and whether recreational outdoor activities play a propulsive role locally, regionally or nationally as well as to provide evidence for local managers on which sectors they should focus on and invest in more.

Increased demand for recreational trail access and investments in its infrastructures indicate that the money injections from trail visitors may create an economic impact (Manton et al., 2016). Moore and Schafer (2001) recognize that there are still significant gaps in the literature concerning trail-related topics, and economic impact assessments are scarce. However, since NBT's economic impact does not occur within a single industrial sector, it is challenging to assess the economic effect. Therefore, it is crucial to assess how recreational trail tourism contributes to economic development locally, regionally, or nationally. This study aims to review the state-of-the-art of trail tourism economic impact and its contribution to local and regional economic development and identify the main determinants of NBT's economic impact.

2. Theoretical framework

2.1. Trail development

The concept of the trail is as old as travel itself, originating from ancient paths that marked the routes of pilgrims, smugglers, or shepherds searching for new pasture, and the trail has long helped to shape patterns of human movement on foot, by car, or other types of transportation (Ermagun et al., 2018). Trails are essential elements in the natural and cultural landscape, developed from ancient pathways into routes of great significance for recreation and tourism in contemporary societies (Kling et al., 2017). Trail development has become a primary tool in ecotourism management due to environmental concerns from a rising demand for access to trail networks (McNamara & Prideaux, 2011). Moreover, trail development is crucial to mitigate the impacts of mass tourism by creating sustainable and responsible tourism destinations, and enhancing tourism experiences through engagement and connection with nature (Lee et al., 2018).

Today, there are thousands of kilometers of recreational trails worldwide. They arose from diverse types of ideas such as heritage trail revival (Al-hagla, 2010), cycling on abandoned railways (Reis & Jellum, 2012), mountain biking (Symmonds et al., 2000), cultural routes (Bozic & Tomic, 2016), wine routes and themed tourism (Bruwer, 2003). The investments of government agencies and private organizations are often combined. Like many other tourism industries, trail development is based on the three main sustainability pillars: social, environmental, and economic. There is broad recognition that recreational trail sites might optimally contribute to tourism-based job creation, economic growth, environmental sustainability, rural development, and income diversification (Ahtikoski et al., 2011; Arabatzis & Grigoroudis, 2010; Bennett et al., 2003; Stoeckl et al., 2010). However, little attention has been given to economic impact assessment from trail development.

Trails are predominantly developed and funded by local authorities, economic development agencies, and tourist boards, involving various stakeholders. Trails are diverse in infrastructure, geographic location, nature, and purpose. They are at different development stages: from minimally developed to fully developed. Oh et al. (2019) identified three main recreational trail facilities and services directly linked to the level of development and affecting visitor experience, satisfaction and economic expenditure patterns: (1) trail path itself; (2) provision of information and sign features, including staff assistance, information centers and booking services; and (3) provision of campsites, cabins and picnic facilities. Concerning infrastructure and costs, several types might be considered: the costs of creating, maintaining and signposting paths, promotion, management and the land designated for recreational trail use.

Trail planning and development strategies leading towards sustainable trail-related tourism have already been discussed globally (Nordbo et al., 2014; Olafsson & Skov-Petersen, 2013). Therefore, data on the economic impact of recreational trail development would significantly contribute to preparing and implementing a successful long-term trail destination management plan. Economic data have been acknowledged as one of the key elements of a destination long-term sustainability (European Commission, 2016) and allows identifying the leading local and regional economic contributors. Consequently, this data is essential for decision-makers and sustainable NBT planners because it helps to clarify the relationship between tourism, resource protection, and economic benefits and serves as an indicator of successful and profitable trail-related tourism development in the local area.

2.2. Economic impact

The economic impact is financial, stimulated by tourists' expenditures that cause changes in income, employment and the output value described in direct, indirect and induced effects of tourists' spending on obtained travel services. The direct effect refers to the initial tourists' expenditures in the local area received as revenue by hoteliers, shopkeepers, taxi drivers and others. The indirect effect refers to the tourism industry's need to obtain products or services from other local industries within an economy to produce its outputs. The induced effect refers to the increased wages and salaries of households due to the tourists' spending paid on final goods and services produced within the local economy. The indirect and induced effects are together called the secondary effects, while the sum of direct, indirect and induced effects is termed the total effects of visitor spending (Archer, 1982; Cooper et al., 2005; Crompton et al., 2016; Fletcher & Archer, 1991).

Economic impact analysis describes the interrelationship between economic sectors through direct and secondary effects, where the multiplier occurs as a measure of total direct and secondary effects. The multiplier effect refers to the total effects of recreational spending per unit of direct effect in terms of output, income, sales and employment (Archer, 1982). The multiplier effect theory was proposed by Maynard Keynes, also known for proposing the Keynesian multiplier model. Later this model was extended to a new version called the Ad hoc model, which for the first time was applied by Archer and Owen (1971) and later by other researchers the field of tourism (Chase & Alon, 2002; Horwath & Frechtling, 1999; Zhang et al., 2007). Input-output (I-O) analysis is widely recognized as the most comprehensive method for studying tourism's economic impact and multiplier effect at national and regional levels (Fletcher, 1989). Wasley Leontief originally developed the I-O model to assess the economic impact (Leontief, 1936) and laid the foundation for the development of other models such as social accounting matrixes (SAM) and computable general equilibrium (CGE) models.

One of the economic impact analysis applications mentioned by the economist Larry Dwyer was understanding the effects of public and private investments on tourism activity (Dwyer et al., 2010; Fletcher, 1989). Fredman and Tyrvainen (2010) highlighted the importance of NBT's economic impacts in theory and practice for future research. Authors have also stressed how to ensure that visitors have minimal impact on the natural environment while economic impacts are maximized. An economic impact analysis is essential for achieving agreement and satisfaction among stakeholders, ranging from landowners to business operators and nature conservationists leading to the long-term sustainable trail destination development, considering the equal distribution of maximized economic benefits as well as the protection and the enhancement of the natural environment. Research data can help planners understand trail-use economic changes, which is essential for policy and the management of tourism destination development strategies (Torre & Scarborough, 2017).

The rate of economic impact is always influenced by determinants that differ depending on the study case. For instance, the number of visitors and the level of spending were the main determinants identified for small-scale events (Ryan, 1998). Besides, Böcker et al. (2019) and Li and Lin (2011) found that weather is a crucial determinant of the volume of nature-based tourists, which can potentially affect the magnitude of the economic impact. The authors found that mild wind could enhance the dissipation of heat by the human body and increase trail visitor feeling of comfort on hot summer days, which finally influence the number of visitors, while during the cold days and especially in northern countries wind becomes a disadvantage for outdoor recreation negatively affecting human thermal comfort. Furthermore, infrastructure development was found to be a crucial determinant for Tanzania's international tourism economy (Wamboye et al., 2020). Due to diverse stages of development, trail visitor expenditures and direct use values, trail-related recreation creates an economic impact on sales, output, income and employment. 2020). As previous literature confirms, there are several determinants that differently affect the magnitude of economic impact of nature-based recreation and recreational trails are not an exception. Consequently, Figure 1 aims to summarize a theoretical framework of the economic impact of recreational trails.

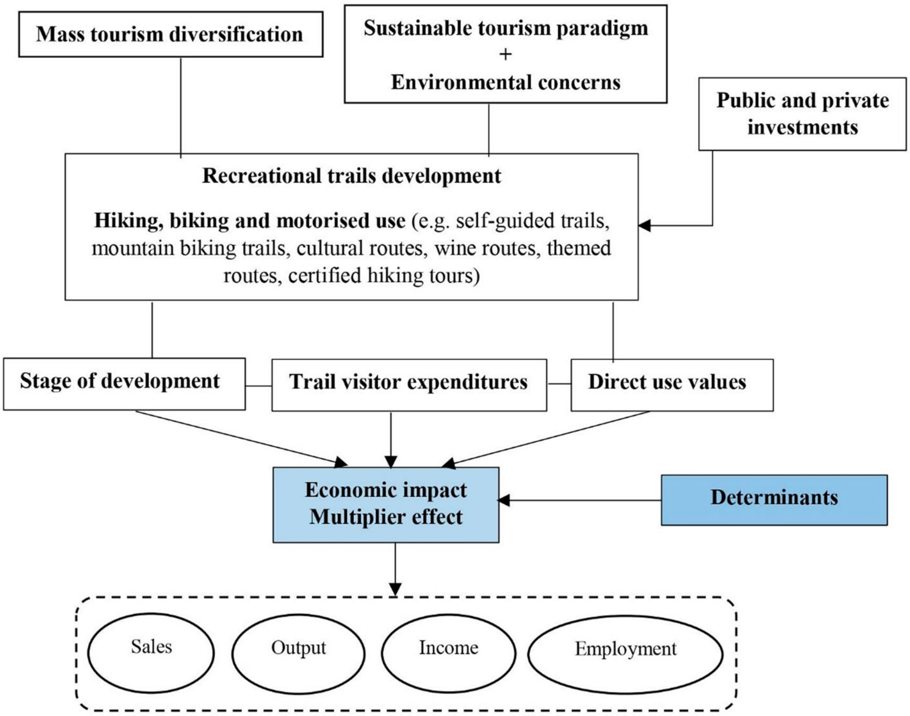
Mass tourism diversification
Sustainable tourism paradigm + Environmental concerns
Public and private investments
Recreational trails development
Hiking, biking and motorised use (e.g. self-guided trails, mountain biking trails, cultural routes, wine routes, themed routes, certified hiking tours)
Stage of development
Trail visitor expenditures
Direct use values
Economic impact Multiplier effect
Determinants
Sales
Output
Income
Employment

Figure 1. The theoretical framework of the economic impact of recreational trail tourism.

3. Methodology

A systematic literature review (SLR) method was applied. The method was introduced by Sweet and Moynihan (2007), one of the first researchers to suggest this technique in order to minimize bias and gather studies on a specific topic. A structured literature review provides a panorama of the most advanced multiplier effect calculation methods, with the required key data derived from economic impact assessment studies confirming or rejecting our formulated predictions, supporting newcomers in targeting identified research gaps within the context of sustainable tourism development and allowing the linking of recent research to our SLR results. Systematic reviews differ from traditional narrative reviews by providing objective, replicable, systematic and comprehensive coverage of a defined area (Pickering & Byrne, 2013).

Initially, a descriptive quantitative analysis was performed to understand how tourism's economic impact models have evolved throughout the years and identify the leading journals and the countries that publish those studies. A qualitative analysis was then applied with an inductive approach to compare the economic impacts of NBT forms and identify the main determinants of economic impact.

3.1. Search criteria

The research was conducted on Scopus and Web of Science bibliographic databases to identify the relevant papers addressing the objective, which are the most commonly used citation databases for field delineation (Strozzi et al., 2017). As Richie et al. (2014) pointed out, literature review analysis requires high-quality original data to avoid misleading results. These databases search API supports a Boolean syntax, which is a type of search allowing the combination of keywords with operators such as 'AND', 'OR' and 'NOT' to produce more relevant results. For a successful search, we looked for all possible synonyms of the search objective words; therefore, keywords were extracted from Ballantyne and Packer (2013), Fennell (2015) and Weaver (2001) books. In this case, all possible activities on recreation trails were selected with a combination of economic impact assessment synonyms.

The following search string was applied for titles, abstracts and keywords: ('Economic Impact' OR 'Socio-Economic Impact' OR 'Socio* Economic Yield' OR 'Economic Multiplier' OR 'Multiplier Effect') AND ('Nature-based Tourism*' OR 'Ecotourism' OR 'Bushwalking' OR 'Backpacking' OR 'Mountaineering' OR 'Hiking' OR 'Walking Trail' OR 'Hiking Trail' OR 'Trekking' OR 'Recreation* Trail' OR 'Park Trail' OR 'Greenway*' OR 'Mountain* Bike' OR 'Gravel Cycling' OR 'Protected Area*' OR 'National Park*' OR 'Nature Reserve' OR 'Natural Monument*' OR 'Wilderness Area*' OR 'Protected Landscape*'). The research was focused on the papers published from 1989 to 2019. In the Scopus and Web of Science database document type tab, all possible document types were selected.

3.2. Data extraction

The search resulted in the identification of 802 papers exported to Microsoft Excel spreadsheets for quantitative analysis. The following data were collected to execute the extraction analysis rigorously: authors names, names of the journal, the title of the paper, year, abstract and author keywords. We analyzed how the field has evolved over the years. Case study countries and journals mostly publish articles on 'NBT' and 'economic impact assessment' topics were identified. We searched the reference list of each appropriate paper was searched for additional relevant articles as well.

After checking the two databases for duplicates, 380 papers were excluded, and thus the number of papers found potentially relevant was reduced to 422. Non-English articles were excluded because the authors are not able to read and analyse publications written in other languages. After reading the titles and abstracts, 363 articles were eliminated from further analysis if the research objective was not related to NBT's economic impact assessment. Fifty-nine papers were downloaded and thoroughly screened. The reference list of each appropriate paper was searched for additional relevant texts. The cross-checking resulted in 10 additional papers. Three were selected for a detailed analysis of the economic impact of trail usage. The resulting publications were quantified to provide an overview of the published research characteristics on NBT and economic impact assessment. The process of paper selection is presented in Figure 2. The final yield of 30 studies was included in the SLR and the main summary is presented in Table 1.

Nineteen papers that focused on multiplier analysis, applying the economic models and using primary source data were elaborated and presented in a separate Table 2. Fletcher and Archer (1991) mentioned that understanding the meaning, implications, and limitations of multiplier effect calculation is crucial to study how models have been developed.

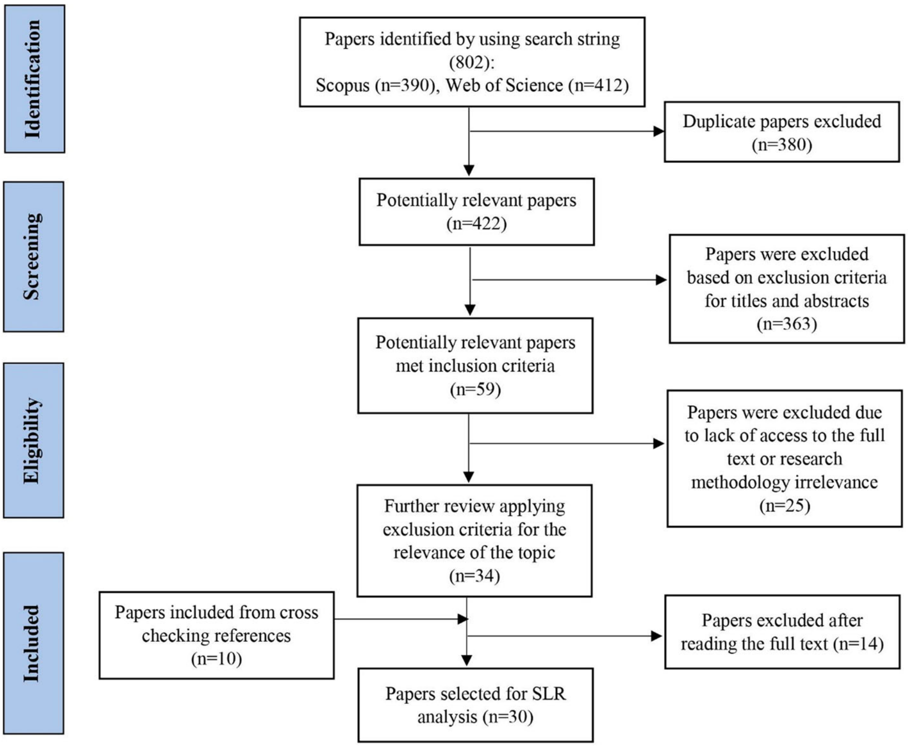
Identification
Screening
Eligibility
Included
Papers identified by using search string (802): Scopus (n=390), Web of Science (n=412)
Duplicate papers excluded (n=380)
Potentially relevant papers (n=422)
Papers were excluded based on exclusion criteria for titles and abstracts (n=363)
Potentially relevant papers met inclusion criteria (n=59)
Papers were excluded due to lack of access to the full text or research methodology irrelevance (n=25)
Further review applying exclusion criteria for the relevance of the topic (n=34)
Papers included from cross checking references (n=10)
Papers excluded after reading the full text (n=14)
Papers selected for SLR analysis (n=30)

Figure 2. Flow diagram of the systematic literature review.

Table 1. Summary of SLR papers.

		Number of papers	%
Publications per year	1989–1993	2	7
	1994–1998	0	0
	1999–2003	4	13
	2004–2008	5	17
	2009–2013	6	20
	2014–2019	**13**	**43**
Publications by journal	**'Journal of Sustainable Tourism'**	**4**	**13**
	Project report	**3**	**10**
	'Tourism Economics'	**2**	**7**
	'African Journal of Wildlife Research'	1	3
	'Annals of Tourism Research'	1	3
	'Asia Pacific Journal of Tourism Research'	1	3
	'GeoJournal'	1	3
	'Global Business Review'	1	3
	'Journal of Ecotourism'	1	3
	'Journal of Nature Conservation'	1	3
	'Journal of Travel and Tourism Marketing'	1	3
	'Koedoe'	1	3
	'Landscape and Urban Planning'	1	3
	'Leisure/Loisir'	1	3
	'Scandinavian Journal of Hospitality and	1	3
	Tourism'	1	3
	'Science for Conservation'	1	3
	'Sustainability (Switzerland)'	1	3
	'Tourism Management Perspectives'	1	3
	'Tourism Planning and Development'	1	3
	'Tourism Review'	1	3
	'Economic Development Quarterly'	1	3
	'Journal of Environmental Management'	1	3
	'Journal of Outdoor Recreation and Tourism'		
Publications per continent	**North America**	**13**	**43**
	Europe	**6**	**20**
	Africa	5	17
	Oceania	3	10
	Asia	2	7
	South America	1	**3**
Geographic distribution of publications	**USA**	**12**	**40**
	South Africa	**3**	**10**
	Spain	**1**	**3**
	Australia	1	3
	Austria	1	3
	Brasil	1	3
	Canada	1	3
	China	1	3
	Finland	1	3
	Germany	1	3
	Indonesia	1	3
	Ireland	1	3
	New Zealand	1	3
	Nigeria	1	3
	Rwanda	1	3
	Switzerland	1	3
	Taiwan	1	3

4. Results

Very few publications exist in the literature related to the economic impact assessment of NBT. Researchers have mainly conducted systematic literature reviews in the field of

Table 2. The main summary of papers focused on multiplier effect calculation.

Authors	Journal	Regional focus/ Country	Publication title	Objective of the paper	Model	Multiplier	Regional or local economic impact
Rinne and Saastamoinen (2005)	Scandinavian Journal of Hospitality and Tourism	Europe/ Finland	Local economic role of nature-based tourism in Kuhmo municipality, eastern Finland	To quantify direct, indirect and induced income and employment impacts of nature-based tourism on a local, municipality level	Nordic tourism model	Income	Local
Hjerpe and Kim (2007)	Journal of Environmental Management	North America/ USA	Regional economic impacts of Grand Canyon river runners	To ascertain the regional economic impacts of Grand Canyon river runners and to examine attributes of these economic impacts in terms of regional multipliers, leakage, and types of employment create	SAM	Output, employment, income	Regional
Cordell et al. (1990)	Journal of the American Water Resources Association	North America/ USA	Economic effects of river recreation on local economies	To estimate the economic contribution of recreational rivers visitor spending	I-O	Output, income, employment	Local
Bergstrom et al. (1990)	Economic Development Quarterly	North America/ USA	Economic impact of recreational spending on rural areas: a case study	To present the results of a study that examined local economic development effects of recreational spending on selected rural areas	I-O	Output, income, value-added, employment	Regional
Saayman and Saayman (2006)	Journal of Sustainable Tourism	Africa/ South Africa	Estimating the economic contribution of visitor spending in the Kruger National Park to the regional economy	To estimate the economic contribution of visitor spending in the Kruger National Park to the economy of the Mpumalanga Province in South Africa	I-O	Output	Regional
Souza et al. (2019)	Journal of Sustainable Tourism	South America/ Brasil	Economic impacts of tourism in protected areas of Brazil	To estimate the economic impacts of tourism in the federal system of PAs of Brazil	I-O	Output, income, value-added, employment	Regional
Chhabra (2007)	Leisure	North America/ USA	Determining spending behavior of female travellers in nature-based tourism	To identify the socio-economic characteristics of travellers, to investigate determinants of travel expenditures and calculate economic impact	I-O	Output	Regional
Mitchell and Gallaway (2019)	Tourism Review	North America/ USA	Dark sky tourism: economic impacts on the Colorado Plateau Economy, USA	To examine the economic impact from dark-sky tourism in national parks	I-O	Output, employment, value-added	Regional
Li et al. (2018)		Asia/China			I-O		Regional

(*Continued*)

Table 2. Continued.

Authors	Journal	Regional focus/ Country	Publication title	Objective of the paper	Model	Multiplier	Regional or local economic impact
	Global Business Review		The Economic Impact of Ecotourism on Regional China: Further Evidence from Yunnan and Sichuan Provinces	To shed light on the economic impact of ecotourism on regional China		Income, value-added, employment	
Koontz et al. (2017)	Journal of Sustainable Tourism	North America/ USA	Visitor spending effects: assessing and showcasing America's investment in national parks	To discuss the methods used to effectively communicate the economic return on investment	MGM	Output, income, value-added, employment	Local
Stynes and Sun (2003)	Report	North America/ USA	Economic impacts of national park visitor spending on Gateway communities: systemwide estimates for 2001	To assess the economic impact of national park visitor spending	MGM	Sales, employment, income, value-added	Local
Bowker et al. (2007)	Tourism Economics	North America/ USA	Estimating the economic value and impacts of recreational trails: A case study of the Virginia Creeper Rail Trail	To estimate the net economic value to trails users and the local economic impacts	I-O	Output, employment, value-added	Local
Venegas (2009)	Report	North America/ USA	Economic impact of recreational trail use in different regions of Minnesota	To estimate total trail-user spendings in each of Minnesota's region's and the economic impact on the local economy	I-O	Output, value-added, employment	Regional
Mayer et al. (2010)	Landscape and Urban Planning	Europe/ Germany	The economic impact of tourism in six German national parks	To estimate the economic impact of tourism in a sample of six German national parks	Keynesian multiplier model	Income	Regional
Saayman et al. (2010)	South African Journal of Wildlife Research	Africa/ South Africa	The economic impact of hunting in the Northern Cape province	To evaluate the economic impact of hunting in the regional economy	SAM	Output, income, employment	Regional
Poudel et al. (2017)	Journal of Outdoor Recreation and Tourism	North America/ USA	Economic contributions of wildlife watching recreation expenditures (2006& 2011) across the U.S. south: An input-output analysis	To compare the economic contribution of wildlife watching expenditures across the thirteen southern states	SAM	Output, employment, income, value-added	Regional
Raya et al. (2018)	Journal of Travel and Tourism Marketing	Europe/ Spain	Economic and social yield of investing in hiking tourism: the case of Berguedà, Spain	To estimate both the economic impacts and the social costs and benefits of investing in hiking tourism	SAM	Value-added	Regional
Hsu (2019)	Tourism Management Perspectives	Asia/ Taiwan	Economic impact of wetland ecotourism: An empirical study of Taiwan's Cigu Lagoon area	To evaluate how the different economic impact analytical models could be utilized to estimate the multiplier effects of ecotourism	Ad hoc model	Income	Local

tourism focusing on economic impact of tourism (Comerio & Stronzzi, 2018), sustainable tourism development and competitiveness (Streimikiene et al., 2021), rural tourism development (Rosalina et al., 2021), while NBT has been only reviewed as the concept of risk (Gstaettner et al., 2016), a tool to restore the number of visitors due to COVID-19 pandemia (Qiu et al., 2021) or the use of social media to identify NBT issues (Mota & Pickering, 2020). However, none of the above reviews have addressed the topic of economic impact assessment in relation to NBT. One of the main reasons why until now very few studies have been conducted on NBT and economic impact might be the unavailability of statistical data such as the number of visitors entering recreational sites unless there is an entrance fee, data of nature-based visitor expenditures and other statistics required as an input for most of the models to assess the economic impact. This is particularly evident for small rural areas, such as recreational trails. Consequently, researchers are reluctant to collect all data by themselves, which is also expensive and time-consuming. Moreover, until now, recreational trails have not achieved a high development in terms of infrastructure and establishment of various economic sectors around the site since the main focus was given to traditional sun-and-sea recreation. Only recently, the United Nations World Tourism Organization (UNWTO) has acknowledged that NBT is a powerful regional development tool due to social and economic benefits for local businesses and communities (UNWTO, 2019). Besides, a fundamental consideration that TRT utilizes natural, rural, or in some cases undeveloped areas with a lack of proper infrastructure and businesses might have influenced the scarcity of economic impact assessment studies.

Nevertheless, SLR is essential on this topic, focusing on recreational trails, to understand what has been done so far and which methods were chosen. The first stage of analysis was to examine publication trends by year, journal, geographic distribution and economic impact analysis models. After a detailed analysis of each paper, 27 peer-reviewed papers and three project reports were selected due to relevance to the search topics. There was an upward trend during the last 30 years, demonstrating received scientists' attention.

The journals that most commonly feature articles on NBT and economic impact assessment topics were examined. In our sample, the 'Journal of Sustainable Tourism', focusing on relationships between tourism and sustainable development, is leading, followed by reports and the journal 'Tourism Economics'. The rest of articles are distributed among various tourism-related journals, which are the preferred outlets for publications on this topic. The papers derived from the search have a wide geographical spread. The majority of research has been conducted in North America, closely followed by Europe. The European Union (EU) and the USA are the leaders.

The spatial scale is an essential factor defining the boundaries of the study area and methodological steps to distinguish between self-supply and purchases outside the study area. Traditionally, researchers tend to choose research boundaries of administrative-territorial units (villages, municipalities, regions) that are affordable for individual research budgets to collect required data.

Table 3 shows that 20 papers were conducted at a regional level and ten papers at a local level. The majority of the research studied national parks. Seven papers studied larger scale destinations, such as states, municipalities, provinces. Five papers studied recreational trails; two studies were conducted on islands and lagoons. Two papers studied natural heritage and two studies conducted at river recreation sites and one study at rainforest sites. Very few articles contain economic impact analyses of recreational trails.

Surprisingly, local case studies faced the issue of incomplete or unavailable data, notably lacking accurate financial accounts (Rinne & Saastamoinen, 2005; Walpole & Goodwin, 2000). However, without primary data collection, secondary data collection is inevitably incomplete as well. Primary data collection has some limitations and depends directly on the research budget – the larger the study area's size, the more expensive the surveying becomes. Nevertheless, big datasets are avoided if it takes resources and time to generate the required data.

In contrast to local case studies, a regional scale requires sectoral supply linkage data, which in many European countries and Africa are available only at the country level (Getzner & Jungmeier, 2002; Saayman & Saayman, 2006). Meanwhile, this data was available through the National Statistical and Accounting Agencies in Canada (Honey et al., 2016), the USA (Hjerpe & Kim, 2007; Koontz et al., 2017; Poudel et al., 2017; Stynes & Sun, 2003) and Brazil (Souza et al., 2019).

4.1. Economic impact analysis models

There are four main types of multipliers: the output multiplier, measuring an increase in outputs by one unit of tourist spending; the income multiplier, measuring an increase in income by an extra unit of tourist spending; the sales multiplier, measuring a change in sales as generated by an extra unit of final demand; and the employment multiplier, measuring direct and secondary employment generated by additional tourism expenditure to direct employment (Archer, 1982). Relatively rare the value-added multiplier, measuring a change in output generated by an extra unit of final demand, might be found in the tourism context as well (Dwyer et al., 2010). The most common approaches to measur the multiplier are the I-O analysis from which further the SAM and CGE models were developed and the Keynesian type approach, from which the Ad hoc model was developed. Independent of the economic model, NBT industries are of different types and sizes, which also affect the multiplier value.

4.1.1. I-O model

Usually, the I-O model is applied in large-scale studies, combining several regions or even states, due to the model structure that requires a vast amount of various industries' data. The model requires I–O tables and secondary data of supply linkages between the firms, which official statistics centers do not publish at lower than the national level in most countries in Europe (Huhtala, 2007). It is possible to collect these data at the regional level through surveys. However, this data collection task is usually complicated and expensive. Consequently, the I-O model has a limited application at local small-scale sites.

Thirteen studies on ecotourism chose the I-O model. The majority applied on a regional scale in the USA and applying IMPLAN (IMpact analysis for PLANning) software due to regional data availability and low calculation costs. The software performs the calculations and the databases, which are updated annually, provide the basic information needed to create the IMPLAN I-O models. However, the use of software is available only in the USA due to the provision of data for the entire USA. A manual

Table 3. Research spatial scale and study case demonstrated by published papers.

Research spatial scale	Country (number of study cases)	
Local	Indonesia, Finland, USA (3), South Africa, Ireland, Switzerland, Taiwan, New Zealand	
Regional	USA (9), Spain (1), South Africa (2), Germany, Australia, Canada, Rwanda, Nigeria, Austria, Brasil, China	
Study case	**Number of papers**	**%**
National parks	**11**	**37**
States, municipalities, provinces	**7**	**23**
	5	**17**
Recreational trails	2	7
Islands and lagoons	2	7
River recreation	1	3
Rainforest	1	3
Marine National Monument Nature heritage	1	3

calculation process was applied in China (Li et al., 2018), Austria (Getzner & Jungmeier, 2002), South Africa (Saayman & Saayman, 2006) and Brazil (Souza et al., 2019).

In NBT sites, the I-O model application is useful for national parks, islands, lagoons, rainforests, river recreation or states. Concerning recreational trails, Bowker et al. (2007), McDonald and Brown (2015) and Venegas (2009) have studied long-distance trails (from 34 to 44 miles) situated within several counties. Therefore, the regional I-O model was the easiest and most effective method. Nevertheless, it strongly depends on individual trail characteristics. The spatial investigation is crucial to identify industries most affected by touristic activity and define the most suitable economic model, leading to more accurate results. Studies calculated economic multiplier based on I-O tables containing data of the total number of touristic-site visitors, their total expenditures per economic sector, how much the tourism sector produces, and its contribution to other sectors.

4.1.2. SAM model

SAM is an extended version of the I-O framework, representing the economic and social structure at a particular time. It was chosen by Hjerpe and Kim (2007), Poudel et al. (2017), Raya et al. (2018) and Saayman et al. (2010) for regional studies in North America, South Africa and Spain investigating the impacts of ecotourism and recreational trail tourism. Like the I-O model, the SAM multiplier calculation requires a vast amount of statistical data, which is not available at lower than national level in countries outside the USA. Consequently, application of the SAM model at small-scale studies and outside the USA is limited mainly due to data collection task, which is usually complicated and expensive. The SAM model was criticized by Dwyer et al. (2004) as exaggerating tourism's economic impact due to ignorance of key aspects of the economy and estimates of general economic activity, very often by large margins. Later, Dwyer et al. (2010) remarked that one of the SAM features is that this method can be extended for regions or areas. However, it still requires big economic datasets, which are rarely available in rural tourism destinations; therefore, an application at recreational trails is limited (Lindberg, 2001).

4.1.3. CGE model

CGE is descended from the I-O model but is much more complex and dynamic, since it requires extensive datasets. The application of CGE model is available at the national level due to the need of I–O tables and secondary data of supply linkages between the firms, which official statistics centers do not publish at lower than the national level. Therefore, the availability of data is the major limitation of model application at the local level. The majority of empirical studies in the field of tourism have applied the CGE model at the national level to assess the economic impact of events such as the Olympic Games or the Football World Cup, inbound tourism, and the effectiveness of tourism policies (Cheng & Yang, 2010; Li et al., 2011; Meng et al., 2013). The model's main advantage is that it allows for interactive effects between industries, for the reality of resource constraints, relative price changes and the feedback from them. However, the model's advantages are much less pronounced at the local level (Loveridge, 2004) and this might have influenced the scarcity of the CGE application at NBT.

4.1.4. Money Generation Model

The U.S. National Park Service developed the Money Generation Model (MGM) to help parks to estimate local economic impacts of visitor spending in 1990s (National Park Service, 1995). The MGM estimates what park visitors spend in the local area and the impacts of this spending in terms of sales, income, jobs, and local tax receipts. The calculation process is not time-consuming or expensive because it utilizes an Excel spreadsheet interface with all statistical data, such as regional multipliers from the IMPLAN model (Stynes & Sun, 2003). However, since the model is linked with the IMPLAN software, which is available only in the USA, it limits the MGM model application outside the USA. Besides, the limited model basis limits application only at national parks excluding other NBT destinations. Consequently, the MGM has been used only to estimate the economic impacts of national parks and on local regions (Koontz et al., 2017; Stynes et al., 2000).

4.1.5. Tourism Satellite Accounts

Tourism Satellite Account (TSA) is a method of measuring the direct economic contributions of tourism consumption to a national economy. The TSA approach is easy to apply for a national scale study because the approach comprises a unique set of interrelated tables that show the size and distribution of the different forms of tourism consumption in a country and contributions to gross domestic product (GDP), national income, employment and other macroeconomic measures of a national economy (Frechtling, 2010). Therefore, the TSA approach is not appropriate to study the local economic impact of recreational-trail tourism due to the lack of statistical data required for analysis. Moreover, the approach limits measurement to the direct economic contributions of tourism only, excluding indirect, induced and multiplier effects. As a result, the TSA approach is not commonly used in NBT due to its limitations and was mainly applied to study direct economic contributions of tourism at the country level (Diakomihalis, 2007; Diakomihalis & Lagos, 2008).

4.1.6. Nordic model

The Nordic Council of Ministers developed the Nordic tourism model in the late-1970s, specifically for Nordic countries (Nordisk projektgrupp, 1980). It is not based on Keynesian or I-O approaches and only one study in Finland utilized this method. The Nordic tourism income model is easy to apply. It covers the whole tourism income-receiving industry and does not depend on massive statistical data. However, since business profits are included, it might become challenging to achieve high quality and accurate results. Moreover, some statistical data are needed to track tourism companies' turnovers and estimate the tourism demand volume (Rinne & Saastamoinen, 2005).

4.1.7. Keynesian multiplier approach

The Keynesian multiplier approach was developed by Lord Keynes (Archer, 1977), representing the multiplier value as the ratio of exogenous expenditure to the economy's proportion of leakages. Indeed, the Keynesian multiplier approach is simple and relatively straightforward in providing a quick way of assessing a change in tourism expenditure (Dwyer et al., 2010). However, the approach is applicable only in the tourism sector because it does not require sectoral supply linkages between different economic sectors. Nevertheless, significantly reduced empirical costs compared to the I-O approach to calculate multiplier from secondary sources enable the Keynesian multiplier approach application at local and regional scale studies. The approach did not require heavy statistical data and was utilized by Mayer et al. (2010) to study recreational trail users at national parks in Germany.

4.1.8. Ad hoc model

The Ad hoc model is a direct offspring of the Keynesian multiplier model and is constructed on a study-by-study basis (Fletcher & Archer, 1991). Recently, a study in Taiwan chose the Ad hoc model for a local lagoon case (Hsu, 2019). The author derived the multiplier from data on the number of tourists and their expenditures by each economic sector, residents' income and expenditure, tourism business revenue, cost, net profit and local expenditure.

The method calculates the income multiplier based on spending and leakage patterns. It is useful for small-scale studies with limited statistical data compared with the I-O model, due to the exclusion of sophisticated resources and might be applied at regional or even national scale studies, utilizing statistical data. It includes single consumption as it is simpler to apply (Wanhill, 1983). This model is the most suitable for describing NBT's economic impact in rural areas, particularly recreational trails. It is simpler than I-O model since it allows to use data collected only by surveys and excludes massive statistical inputs. Nevertheless, it should be noted that it is time consuming to collect all data by surveys.

4.1.9. Nef´s local multiplier

Nef´s local multiplier (LM3), based on the Keynesian multiplier model, was developed by the New Economic Foundation for use at the local level (Nef Consulting, 2021). LM3 measures three rounds of spending – the first measures a source of income, the second determines how much of income was spent locally, and the third determines how much of this spent income was re-spent within a defined geographic area. The

Table 4. The comparison of five main different theoretical economic impact assessment models.

Criteria	I-O model	SAM model	CGE model	Keynesian-type model	Ad hoc model
Data requirements	I-O table	I-O table, national income statistics, household income and expenditure statistics	I-O tables, the National Accounts as well as other data on taxes, income and expenditure	Employment, income or output data, touristś expenditure, data on taxes, direct and indirect multipliers for all tourism economic sectors	Employment, income or output data, touristś expenditure, residents income and local expenditure
Spatial scale	Up to spatial scale of available I-O table	Up to spatial scale of available I-O table and supporting data	Up to the spatial scale of available I-O table and supporting data	No limit	No limit
Operational cost	High	High	High	Low	Medium
Time required for analysis	It is not time-consuming unless I-O table or sufficient data is not available	It is not time-consuming unless I-O table or sufficient data is not available	It is time-consuming because it requires highly skilled, specialized and experienced economists to develop CGE model	It is time-consuming to collect all required data	It is time-consuming to collect all required data
The magnitude of multiplier	SAM multiplier > I-O multiplier > CGE multiplier			Keynesian multiplier < Ad hoc multiplier	
Economic sectors covered	All economic sectors	All economic sectors	All economic sectors	Tourism sectors	Tourism sectors

LM3 method simplifies the more complex econometric I-O analyses and has been criticized for its lack of precision (Mitchell & Lemon, 2019). The LM3 model was not usual in NBT economic impact assessment since it is relatively new. On the contrary, recently, Silovská and Kolaříková (2016) have tested LM3 application for the analysis of local economic development and recommends it for future research on trail tourism.

Table 4 compares five main types of economic impact assessment approaches using six criteria based on Hsu (2019) recommendations: data requirements, spatial scale, operational costs, time required for analysis, the magnitude of multiplier and economic sectors covered.

4.2. The economic impact of different NBT forms

Multipliers derived from different types of models (e.g. I-O and Ad hoc) are not comparable (Crompton et al., 2016) due to different theoretical assumptions and data collection behind different models. The comparison of multiplier values derived from the same technique was introduced by Archer (1982) and Fletcher (1989) and was applied to compare and discuss this study's results. The authors claim that it is reasonable to measure income generation in terms of average rather than marginal units of tourist spending. The primary determinant is tourist expenditures within the particular touristic

Table 5. Comparison of economic impacts of different NBT forms.

Form of NBT	Method	Multiplier	Reference
Recreational trail tourism	I-O	Output – 1.35, employment – 1.00-1.33	Bowker et al. (2007)
Boating, watercraft and fishing	I-O	Employment – 1.29-1.45Output – 1.30, employment – 1.26, income – 1.28	Chhabra (2007) Hjerpe and Kim (2007)
Ecotourism in protected areas	I-O	Employment –1.79	Iverson (2010)
Wildlife viewing	I-O	Income – 1.11-1.15	Saayman and Saayman (2006)

sector. Table 5 shows the comparison of economic impacts among different NBT forms in terms of multipliers, obtained from researches, conducted in similar years and applying the same I-O model, which has been the most popular choice among NBT researchers.

Iverson (2010) has determined the highest employment multiplier value of 1.79 of ecotourism in the protected area in the marine sanctuary in Hawaii, encompassing 14 islands compared to recreational trail tourism or boating and watercraft tourism. A 1.79 employment multiplier means that for each job that springs from visitor expenditures in ecotourism, another 0.79 jobs are generated in the Hawaii economy as a whole. While the quantifiable visitor spending in the parks and forests seems relatively small, ecotourism significantly affects a regional economy in employment creation. Tourists spend money in industries providing necessities such as gasoline, food and activity licenses. These industries often make purchases from labor intensive local companies, thus adding to the multiplier impact (Mitchell & Gallaway, 2019). Therefore, external sub-suppliers are needed, which decreases the multiplier impact. Meanwhile, Chhabra (2007) and Hjerpe and Kim (2007) have determined much lower employment multiplier values of 1.29 and 1.26 of water activities in California (USA) and Arizona (USA). The authors have discussed that comparatively low employment multiplier values were due to a large amount of tourist expenditure on slip and mooring fees, sailboat or fishing-raft costs, fishing equipment rental that were leaked from the surrounding region. Nevertheless, water-based activities involve fixed expenditures and create a more significant income multiplier effect due to intersectoral linkages.

Studies conducted in national parks showed that wildlife-viewing activities had a comparatively low income multiplier value of 1.11, meaning that for every €1 spent by wildlife watchers, an additional €0.11 of income is generated in the local economy. Concerning recreational trail tourism, Bowker et al. (2007) determined a comparatively low employment multiplier value of 1.00-1.33 in Virginia (USA) and a higher output multiplier of 1.35, meaning that for every €1 of direct total output resulting from recreational trail-related tourism expenditures generates an additional €0.35 of total output in the economy. A similar output multiplier value of 1.5 was determined in a previous study on hiking activities (Woodfin, 2010). The output multiplier is higher because trail visitors spend more in local restaurants and guide labor-intensive services. Thus, recreational trail tourism might be number one in output generation and number two in job creation. However, the variety of trails in terms of infrastructure ranging from primitive to highly developed (U.S. Forest Service, 2011) and the strong influence of location on expenditure patterns should be considered. For instance, Bowker et al. (2007) reported that Creeper

Trail day users spent $10 per person per trip in local communities, while overnight users spent $90. MacLeod (2017) assumes that trail development can increase visitor spending and build strong networks to improve local business performance by increasing the income multiplier effect.

The reason why the multiplier values differ so much is mainly because NBT might encompass several activities within various spatial-scale sites such as large urban areas, smaller protected areas or wild undeveloped areas. Nevertheless, despite the size of the study area, the larger multiplier values might be obtained because of lower taxes, lower import propensity, availability of local human resources, lower resident saving propensity due to the rising cost of living or the presence of local businesses owned by residents. This is particularly evident within highly developed touristic sites with various services and entertainment provided, where visitor expenditure directly enters the economy.

However, it should be noted that greater multiplier values in ecotourism depend mainly on the economy size and economic behavior of visitors, which are the most critical variables in terms of intersectoral linkages and leakage (Archer and Fletcher, 1996). According to Wall (1997) the larger the area, the more likely economic activity will occur, so the more significant the multiplier. Nevertheless, there are several determinants of NBT's economic impact and multiplier effect.

4.3. NBT's economic impact determinants

It is commonly known that the main determinants for economic impact and, specifically, the multiplier effect are the number of tourists, their expenditures, and circulation of these expenditures through the countries. The factors affecting tourists' expenditure can be divided into destination area factors, tourism demand factors, and tourism supply factors (Paajanen, 1994). However, little is known about specific determinants of economic impact, which have been poorly investigated in the NBT field. Different nature-based activities generate different magnitudes of expenses. Therefore, the economic impact determinants that have been commonly used in SLR papers were extracted.

Changes in tourism demand are a critical determinant of outdoor recreation activities' economic impacts positively associated with site development and investments (Banerjee et al., 2018). Li et al. (2018) concluded that transportation linkages could attract more visitors if government agencies invest more money in NBT destination improvement. Such budget allocations for recreational opportunities and other services would provide people with the highest net economic value and increase tourist expenditures. Raya et al. (2018) found that every euro invested in hiking trails generates a €5 value for the community. Souza et al. (2019) found that investments of approximately $220 million for infrastructure development in protected areas would significantly increase visitation and generate $1 billion in total added value. Banerjee et al. (2018a) determined that investment in a national park could generate an increase of $1million. Another study at an ecotourism marine monument site shows that increased funding attracted a 7.5 times higher number of visitors (Iverson, 2010). Investing in outdoor recreation sites is one of the key determinants of economic impact.

The size of the group is one of the factors determining economic impact due to a share of expenses. Commonly, outdoor recreationists travel in groups of an average size of 2–4 people, with the primary purpose of staying overnight (Mayer et al., 2010). By contrast, Hsu (2019) found that the majority were individuals among the visitors at an ecotourism site in Taiwan, while group visitors comprised only 28% of the total visitor population. However, the author found that group visitors in total spent 1.6 times more than individual visitor. Besides, Chhabra (2007) claims that nature-based female group travelers tend to travel in slightly larger groups and spend more. Also, it was observed that campers generally tend to travel in larger groups when visiting national parks and spend more per group. Therefore, it is essential to consider traveler group sizes since expenditures and the magnitude of the economic impact might differ when compared to a single visitor's expenses (Rinne & Saastamoinen, 2005).

Travel distances from visitor's location of stay and times are important for computing travel costs per trip (for example, petrol or bicycle rent) within a defined study area, a significant part of total primary visitor expenditures associated with the trip. Travel cost to the trail was a key parameter for economic impact estimation conducted by Manton et al. (2016). The distance between tourist stay and recreational site impacts the transportation costs because the farther the visitors are from their location of stay the larger per day per person expenditures they incur (Leones et al., 1998). Consideration of these costs depends on whether these expenditures fall within the study area's boundaries or not and is particularly crucial for countries where tourists tend to travel long distances to reach NBT sites, which adds to total travel expenses. Studies that considered these costs found significantly positive economic expenditure results (Oberholzer et al., 2010).

Actual average tourist spending associated with outdoor recreation activity is the primary economic impact determinant. The most frequently used categories of expenditures included accommodation, gas and oil, food, drinks and alcohol, souvenirs, tours/guides, transportation, rentals and retail. However, average expenditures and the magnitude of economic impact depend on the level of site development and activity preference. Several categories of nature-based tourists' behavior and activities exist at the touristic site that determines final average expenditures. For instance, Honey et al. (2016) mention that bears viewing was more popular and provided 16 times greater source of revenue to the region than guided bear hunting. Hjerpe and Kim (2007) found that water-based recreationists spend a large part of expenditure on water equipment, while Bowker et al. (2007) determined that recreational trail visitors staying only for a day spend the largest part on food and drinks (Bowker et al., 2007). Nevertheless, even if expensive equipment is the main nature-based visitor's expense, but was made outside of the area due to low site development, recreationists' expenditures are transacted outside of the region and have minimal economic impact on the local economies because recreational site does not contain more industry transactions and though has a high leakage.

Determinants of stay duration are important in the assessment of economic impact, but are dynamic and not necessarily associated with higher expenditures. In general, the average recreational trail visitor's length of stay is two nights (Wesley & Gaarden, 2004). Daily trail trippers spend mostly on food/drinks and petrol. In contrast, overnight tourists spend more on lodging, food, entertainment and additional expenses, including tips, souvenirs and transportation (Manton et al., 2016). Usually, overnight visitors spend much more than day visitors due to accommodation expenses. For instance, Mayer et al.

(2010) have determined that day-trippers of national parks spent between €7–13 per day, whereas overnight visitors spent between €37 and 57. Stynes and Sun (2003) found that non-local day visitors of national park in total spent $42, of which the largest part was for souvenirs, whereas overnight visitors in total spent $260, of which the largest part was for accomodation. Consequently, increasing the percentage of primary-purpose overnight trips would generate relatively hig local economic impacts.

Local and non-local visitors have different behaviors at the same touristic site and different expenditure patterns. These variables were considered in recreational trail tourism studies since non-local visitors' expenditures are more important from an economic development standpoint because these expenditures represent 'new money' coming into the economy. Souza et al. (2019) found that local visitors spent five times less per visit on average than non-local visitors on meals, local transportation, activities, and guided tours. Banerjee et al. (2018b) estimated significant increases in non-local visitors to national parks, with higher contributions to additional national park revenue. The study of Stynes and Sun (2003) found that non-local national park visitors spent 1.4 times more than local visitors. By contrast, Li et al. (2018) found that local ecotourists bring more income than international tourists in China. Finally, previous studies' findings confirm the need to include an annual income variable (Manton et al., 2016).

Raya et al. (2018) found that men and women went to recreational trails in almost equal numbers. However, mountainous trails for sports were significantly dominated by males that are likely to take more trips than females (Duglio & Beltramo, 2017). The same gender equality was determined in German national parks (Mayer et al., 2010). Meanwhile, the direct economic impact depends on trail visitors' expenditure profiles, which can vary depending on the season and weather (Mitchell & Gallaway, 2019). Chhabra (2007) found that repeat outdoor recreation visitation is a crucial determinant of economic impact. The number of times a NBT site is visited has a significant positive correlation with expenditures, indicating that repeat visitors tend to incur higher expenditures.

The size of NBT and recreation industries might be the most critical variable in intersectoral linkages that determine tourists' expenditure multiplier effect. Higher local and regional multiplier effects might occur in ecotourism due to other local industrial sectors. In contrast, a smaller multiplier effect was determined in wildlife-viewing destinations due to a lower degree of self-sufficiency in the area and more out-of-area imports (Walpole & Goodwin, 2000). In general, regarding the size of the area, it is crucial whether most of the tourism services and products are locally sourced or not and whether employers in those industries are local people. According to Hsu (2019) in theory, the boundaries that separate the inside and the outside of the study area should be consistent within the activities of tourists. Unlike national parks or protected areas, recreational trails do not have clear boundaries of the area around and it becomes an issue of calculating economic multiplier due to boundary ambiguity. Trail visitor expenditures stretch across a broad area and it becomes difficult to identify commercial entities directly affected by trail visitor expenditure. Previous scholars studying long-distance trails usually chose administrative units as the main area of the recreational trail such as county or city (Bowker et al., 2007; Raya et al., 2018). Meanwhile, Bowker et al. (2007) suggested defining the local area by a radius of a certain number of miles from the trail, ensuring that most commercial entities are captured when the study includes a short-distance recreational trail.

5. Conclusions

The present research underlines the importance of economic impact assessment of recreational trail tourism since it contributes to local or regional economic development. The findings of this research provide a panorama of the most commonly applied models to assess economic impact and multiplier effect of NBT and indicates that recreational trails have not been extensively studied, and therefore lack theoretical frameworks that help with a better understanding of the economic impact assessment. This paper tried to fill the gap by proposing a comparative analysis of the application of the main theoretical economic impact assessment approaches, analysing the magnitude of economic impact with the multiplier effect of different NBT forms and identifying the main determinants. This study suggests that I-O is the most suitable theoretical approach to study economic impact of long distance trails situated within several counties due to statistical data availability and simpler calculation process, while Keynesian multiplier approach and Ad hoc model are the most suitable approaches to study economic impact of short distance trails due to easy application, and the use of primary source data.

Regarding the contribution to local economic growth, recreational trail tourism follows the principles of ecotourism in protected areas. Nevertheless, unlike sun-and-sea tourism, where the main economic impact determinants are the number of visitors, more economic determinants play significant roles in NBT. The following determinants were identified: the number of visitors; the size of the group; distance traveled to trail site from location of visitor’s stay and travel costs per trip; average per person expenditures; duration of stay; local or non-local visitor; gender; annual income; season; the size of study area and frequency of visitation.

The results of this study might be used as a basis for further theoretical development by testing the I-O, Keynesian and Ad hoc model approaches on various types of trails located in different spatial scales. Moreover, this study suggests applying artificial intelligence to forecast the economic impact and the multiplier effect under different visitation scenarios and stages of development of the recreational trail. Finally, identified determinants of the economic impact of NBT could be used by practitioners as a useful tool to design economic impact methodologies based on questionnaires applied to trail visitors, residents and local businesses, leading to more accurate economic impact analysis. Regarding managerial implications, the development of a methodology to capture economic impact data will help to calculate the economic multiplier of trail tourism and help trail managers to optimize investment for sustainable trail development.

A limitation of this study was the exclusion of non-English language literature. Future research should consider analyzing publications written in non-English language from economic impact assessment of NBT articles from academic journals.

Acknowledgements

The present paper has been financed by the European Union’s Interreg Atlantic Area through project EAPA_797/2018 - TrailGazersBid: ‘An analytical & technical framework to measure returns from trail investment' and by FCT-Foundation for Science and Technology. The authors are thankful for support from the Research Centre for Tourism, Sustainability and Well-being (CinTurs) [FCT Grant Number UIDP/SOC/04020/2020].

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by European Regional Development Fund [grant number EAPA_797/2018], Portuguese Foundation for Science and Technology [grant numbers: 2021.07472.BD and UIDP/SOC/04020/2020].

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