GODA LUKOSEVICIUTE

TRAIL-RELATED TOURISM AND SUSTAINABLE TERRITORIAL DEVELOPMENT

UNIVERSITY OF ALGARVE

Faculty of Economics

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Ph.D. in Tourism

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Statement of authorship of the work

I declare to be the author of this work, which is unique and unprecedented. Authors and works consulted are properly cited in the text and included in the listing of references included.

Goda Lukoseviciute

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ABSTRACT

Trail-related tourism (TRT) is major niche of nature-based tourism (NBT) that allows one to experience nature using a trail as the main recreation tool. The fundamental paradigm underlying contemporary TRT development is its sustainable development, which has been widely addressed in the literature. Sustainability comprises of three main pillars (environmental, socio-cultural, and economic), but the economic pillar in TRT has not been addressed from either theoretical or practical perspectives. The research gap on the economic performance of TRT is evident, raising doubts regarding the whole sustainability of TRT. Consequently, this thesis aims to develop a foundation for assessment of TRT economic impact and incorporate the economic dimension into the trail development and management framework, thus proposing optimization indications for a sustainable trail destination development and management plans. Applying a mixed method, stemming from inductive and deductive reasoning, the objectives of this thesis were achieved through conduction of six studies, which are presented as six separate scientific papers. The main outcomes of this thesis are: i) a roadmap of the most suitable theoretical approaches to study the economic impact of trails; ii) pioneering estimation of the income multiplier of TRT; iii) the first examination of the relationship between the stage of trail development and the income multiplier; iv) assessment of local trail-related business perceptions; v) development of a strategic management plan for trails developed in eco-cultural destinations. The major contributions of this thesis are providing the first comprehensive examination of the economic dimension of TRT and enrichment of the theoretical foundation of TRT development. The findings of this thesis provide trail-related stakeholders with theoretical, methodological and practical tools to design, implement and manage trails, which are economically successful, yet socially just and ecologically restorative, for a sustainable territorial development.

Keywords: trail-related tourism; economic impact; multiplier effect; sustainability; territorial development; trail-related stakeholders.

RESUMO

O turismo relacionado com trilhos (TRT), o qual é um nicho do turismo de natureza, é baseado numa atividade importante que permite experienciar a natureza utilizando um trilho como principal ferramenta de recreio. O paradigma fundamental subjacente ao desenvolvimento contemporâneo do TRT é o seu desenvolvimento sustentável, o qual tem sido amplamente abordado na literatura. Uma vez que a sustentabilidade compreende três dimensões principais (ambiental, sociocultural e económico), no TRT a dimensão económica não tem sido abordada do ponto de vista teórico nem prático. O défice de conhecimento acerca do desempenho económico do TRT é evidente, por isso existem dúvidas quanto à sua sustentabilidade. Tendo em conta o défice de conhecimento acima mencionado, esta tese tem como objetivos desenvolver uma base para a avaliação do impacto económico do TRT e incorporar a dimensão económica no quadro de desenvolvimento e gestão de trilhos, propondo assim recomendações baseadas em indicadores e planos de gestão para um desenvolvimento sustentável do destino onde se localiza o trilho.

Esta tese aborda um tema complexo e pouco explorado no desenvolvimento do TRT, com ênfase no impacto económico e no desenvolvimento territorial sustentável, pelo que exigiu a aplicação de um método misto, decorrente de um raciocínio indutivo e dedutivo. Os objetivos desta tese foram alcançados através da realização de seis estudos, que são apresentados em seis artigos científicos distintos. O primeiro estudo visou sistematizar uma base de conhecimento para a avaliação do impacto económico de vários trilhos e identificar os principais determinantes do impacto económico. Através de uma revisão sistemática da literatura, este estudo concluiu que o modelo input-output (I-O) é a abordagem teórica mais adequada para estudar o impacto económico dos trilhos de longa distância, enquanto a abordagem do multiplicador Keynesiano através do modelo Ad hoc é a mais adequada para estudar o impacto económico dos trilhos de curta distância.

Com base nos resultados obtidos no primeiro estudo, foi realizado o segundo estudo com o objetivo de avaliar o impacto económico de um trilho com o multiplicador do rendimento, validar o modelo Ad hoc proposto para um trilho de curta distância e fornecer uma compreensão clara do papel do TRT no desenvolvimento da economia local e na geração de rendimento. Foi estimado um multiplicador do rendimento de 0,72. Multiplicando a despesa turística total pelo multiplicador do rendimento, estimou-se um

impacto económico local de 1 001 198 euros por época alta de turismo. Os resultados revelaram um papel propulsor significativo do TRT no desenvolvimento das economias locais, na geração de rendimentos e no desenvolvimento das comunidades rurais, quando comparado com o impacto económico de outras formas de turismo de lazer.

O terceiro estudo aprofunda o conhecimento sobre o impacto económico dos trilhos pedestres e examina a relação entre a fase de desenvolvimento do trilho e o multiplicador de rendimento. Este estudo constitui uma referência significativa para a teoria e a prática do desenvolvimento de trilhos pedestres, uma vez que explica como a fase de desenvolvimento se correlaciona com o multiplicador do rendimento com base em quatro percursos representativos e diversificados em Portugal, Espanha e Irlanda. O estudo encontrou uma forte correlação entre o desenvolvimento de percursos recreativos e o multiplicador do rendimento, revelando que as fases mais elevadas de desenvolvimento de trilhos estimulam maiores rendimentos nas áreas locais devido ao aumento das despesas dos visitantes dos trilhos.

Ao planear e desenvolver trilhos economicamente bem-sucedidos, as consultas aos utilizadores dos trilhos são cruciais, especialmente para os trilhos que pretendem avançar para uma fase superior de desenvolvimento. Além disso, essa informação pode permitir que sejam tomadas medidas para melhorar as experiências e a lealdade dos utilizadores, o que, por sua vez, promoverá as despesas dos visitantes na zona do trilho. Por conseguinte, o quarto estudo teve como objetivo examinar as perceções dos visitantes do trilho sobre a conceção e o desenvolvimento atuais dos mesmos e identificar prioridades de gestão, para melhorar a conceção sustentável do trilho e melhorar a experiência dos visitantes. O mais popular e recentemente desenvolvido trilho dos “Sete Vales Suspensos”, localizado no sul de Portugal, foi escolhido como caso de estudo. Primeiro, a fase de desenvolvimento do trilho foi determinada através da aplicação do Espectro de Oportunidades Recreativas. Depois, os determinantes da lealdade dos utilizadores foram identificados através de um modelo de regressão logística. A recolha de dados dos utilizadores do trilho foi efetuada através de inquéritos presenciais. Foi determinado o elevado grau de desenvolvimento do trilho, mas o acesso ao trilho, a sinalização, a gestão dos visitantes e as características construídas do trilho são os fatores mais preocupantes da oferta de recreação sustentável e da proteção do ambiente natural. Além disso, a idade, o sexo, o país de origem, a frequência de visitas ao trilho e o tempo passado no trilho

foram identificados como os principais fatores determinantes da lealdade e da disponibilidade para pagar dos visitantes do trilho. Este estudo fornece um panorama mais holístico com um conjunto de indicadores do visitante do trilho, do desenho do trilho e da sua gestão ambiental, centrando-se nos atributos do trilho que influenciam a lealdade do visitante e a interação positiva com o ambiente adjacente.

As empresas relacionadas com os trilhos beneficiam diretamente das despesas dos visitantes dos trilhos e são tão importantes para o impacto económico como os próprios utilizadores dos trilhos. Consequentemente, o quinto estudo teve como objetivo estudar as perceções das empresas locais sobre os ambientes naturais e recreativos dos trilhos, as prioridades em termos de atributos de investimento em trilhos e explicar os benefícios para as operações e a rentabilidade das empresas locais através de multiplicadores do investimento. As perceções das empresas foram examinadas aplicando a abordagem da hierarquia analítica e a abordagem do comportamento real e pretendido, enquanto os benefícios potenciais devidos aos investimentos foram calculados aplicando a abordagem da análise custo-benefício. A recolha de dados foi efetuada junto de empresas ligadas aos trilhos na Irlanda do Norte, uma vez que os trilhos são um recurso importante no turismo de lazer em todo o país. Este estudo concluiu que as empresas avaliaram com elevada qualidade os ambientes naturais e recreativos dos trilhos. As empresas locais preferem investimentos no atributo branding e marketing, o que melhoraria consideravelmente as suas operações e a sua rentabilidade. Estimou-se que com o investimento de um milhão de libras se teria um aumento das receitas totais superior a 10 milhões de libras na área de estudo, uma vez que o multiplicador do valor do investimento em branding e marketing foi estimado como sendo de 10,14. Consequentemente, os resultados ilustram que a alavancagem das perspetivas de empresas relacionadas com os trilhos é significativa para aumentar as receitas globais na área local onde o TRT é uma atividade importante. Este estudo foi o primeiro a abordar as empresas locais relacionadas com os trilhos, pelo que lança luz sobre a importância das empresas e a integração da sua perceção no quadro teórico do desenvolvimento económico dos trilhos.

O último estudo desta tese teve como objetivo desenvolver um plano de gestão estratégica para trilhos desenvolvidos em destinos eco-culturais com base nas perceções das principais partes interessadas nos trilhos. Neste estudo foi utilizada uma abordagem qualitativa em várias fases e uma análise das partes interessadas para desenvolver um

plano estratégico. Os dados foram obtidos a partir de dois grupos de discussão e de um workshop que envolveu quatro representantes das principais partes interessadas. Este estudo desenvolveu uma estratégia de gestão a longo prazo que inclui as seguintes dimensões (cada uma das quais com várias subdimensões): paisagem cultural, infraestrutura do trilho, experiência do visitante do trilho e marketing e colaboração. Portanto, acredita-se que a base teórica para os destinos turísticos de trilhos eco-culturais e a sua gestão é enriquecida pelo presente estudo. Tendo em consoderação os esforços de diversificação das atividades recreativas de massa associadas ao sol, à praia e ao mar, o plano de gestão quadridimensional a longo prazo que foi proposto pode ser um recurso útil para as teorias de desenvolvimento sustentável dos trilhos costeiros.

O principal contributo desta tese consiste em fornecer a primeira análise abrangente da dimensão económica do TRT e enriquecer a base teórica do desenvolvimento do TRT. Os resultados desta tese fornecem às partes interessadas nos trilhos instrumentos teóricos, metodológicos e práticos para o desenho, a implementação e a gestão de trilhos economicamente bem-sucedidos, mas socialmente justos e ecologicamente reparadores, para um desenvolvimento territorial sustentável.

Palavras-chave: turismo relacionado com trilhos; impacto económico; efeito multiplicador; sustentabilidade; desenvolvimento territorial; partes interessadas nos trilhos.

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1. CHAPTER ONE

GENERAL INTRODUCTION

1.1 Research background and overview

The World Tourism Organization reports that tourism is expanding globally, experiencing a 4% upturn per year, and is one of the largest contributors to global trade and, at the same time, one of the major sources of revenue for many developing nations (UNWTO, 2022). Sustainable tourism development is now a mainstream tourism paradigm primarily based on the balance between economic, environmental and socio-cultural sustainability. The potential of tourism to contribute to sustainable development has been widely studied on a theoretical level (Mihalic, 2020; Simão & Partidario, 2012; Sharpley, 2009); however, historically tourism has been too slow to adapt sustainability in practice, leading to the recognition of a gap between theoretical sustainability and its practical implementation (Buckley, 2012; Sharpley, 2020). The gap is exacerbated because there are many different sectors of tourism, some of which have received scant attention in the literature from the holistic perspective of sustainability (Streimikiene et al., 2020).

One of these tourism sectors is nature-based tourism (NBT) characterized as encompassing all tourism activities that depend on the natural environment; such as hiking, trekking, rock climbing, mountain biking, birdwatching, canyoning, rafting, and kayaking. In academic literature NBT did not appear to a significant degree prior to the early 1990s (Whitlock et al., 1991). Early on in its development, NBT was viewed as a justification for environmental conservation grounded in the environmental paradigm (Luzar et al., 1995). Therefore, the vast majority of early NBT studies focused on sustainable exploitation of natural resources (Gardner & McArthur, 1995; Henning, 1993; Lee, 1997), how and if NBT contributes to natural environment conservation (Pickering & Weaver, 2003; Spenceley, 2005; Weiler, 1993) and raising environmental awareness of NBT consumers (Brookes, 1999; Orams, 1997; Weiler & Davis, 1993). NBT is also crucial in providing socio-cultural benefits to individuals who visit natural areas (Fredman et al., 2012). Due to the multiple aforementioned benefits, recently NBT became the most rapidly expanding type within tourism across Europe and elsewhere

(Cordell et al., 2008; Gartner & Lime, 2000). In addition, climate change threats for mass tourism accelerated the search for mitigation tools, where NBT demonstrated its potential to contribute to non-mass, sustainable and alternative recreation development (Nelson, 2006; Samora-Arvela et al., 2020). Consequently, NBT is frequently used interchangeably with concepts including eco, sustainable, green, alternative, and responsible tourism (Weaver et al., 1998; Weiler & Hall, 1992).

For a long time NBT has traditionally been associated with natural environments without artificial infrastructure and where business profit is not a priority, almost non-existent destination development including touristic service provision as well as visitor expenditures, therefore prompting a lack of interest from an economic point of view. Therefore, from a holistic sustainability perspective, not knowing the economic effects of NBT, challenges the development of such type of tourism in social capitalism. Although there have been attempts to understand the economic effects of NBT (Oberholzer et al., 2010; Poudel et al., 2017; Rinne & Saastamoinen, 2005; Sandbrook, 2010) as more sophisticated NBT destination developments with service provision have been observed (Cordell et al., 2008; Fredman et al., 2008); due to a low number of studies, the role of NBT in economic development is still understudied, in particular, when so many different forms of NBT exist.

As NBT comprises of various recreation forms, one of the most fundamental ones, allowing diverse outdoor activities connected with nature, is trail-related tourism (TRT), where the trail is the key element. The concept of a trail originates from ancient roads or paths that marked the journeys of pilgrims, smugglers, or shepherds looking for new grazing. Trails have long influenced patterns of human mobility, whether it is by motorized or non-motorized means (Lucas, 1971). Since the beginning of the 20th century, when NBT first arose, trails have been addressed in literature as a separate category (Wheeler, 1991). The main emphasis has been on categorizing and conceptualizing trails, as well as understanding the many types of trails, their purposes, different types of trail users, and the factors that led to the growth of trail tourism (Frost, 1999; Lucas, 1971). The conceptual framework of trails identifies the following types of trails: 1) backcountry trails, 2) recreational greenways, 3) multiple-use trails, 4) water trails and 5) rail-trails (Moore and Ross, 1998). Following the general trend, researchers found that trail tourism had a major decline in the 1950s and 1960s before beginning to increase once more in the

1970s. Recently trails have grown in popularity as more people take advantage of their ability to facilitate reconnection with nature (Davies et al., 2012), familiarize tourists with cultural and natural heritages (Hayes & MacLeod, 2007), as well as local communities and nations (Barber, 2018). The benefits of trails regarding health have also been outlined, as they encourage physical activity (Bedimo-Rung, 2005) and improve mental health by reducing anxiety and stress, as well as fostering relaxation (Mau et al., 2021). The aforementioned advantages were the primary drivers for a growth in trail users worldwide (Schipperijn et al., 2010; Trans Canada Trail, 2021). Countries such as the United States of America, Canada, Australia, Ireland and Sweden have reported a dramatic increase in natural area visitation through recreational trails during the last 40 years (Parks & Trips, 2023; Peel Development Commission, 2019; Power et al., 2023; Sverige Radio, 2019; Trans Canada Trail, 2021). Moreover, a significant increase in the number of trail users was observed during and after the COVID-19 pandemic (Hansen et al., 2023; Venter et al., 2020) as recreational trail areas are recognized as a resilience tool, easily compatible with social distancing requirements while still facilitating social interactions (Humagain & Singleton, 2021). Finally, TRT development was strongly encouraged by the World Tourism Organization as a strong regional and rural development tool bringing social and economic benefits to residents and communities if properly developed and managed (UNWTO, 2019). However, the statements of the economic benefits of TRT have been based on the very early NBT and economic impact research which did not specify what type of NBT activity was addressed (Mayer, 2014; Rinne & Saastamoinen, 2005; Saayman & Saayman, 2006).

The benefits of TRT development that authorities choose to target may differ from country to country, depending on the region and what type of recreation is dominant. Over the European Atlantic Area, which connects the northern British Isles to the southern Canary Islands, an increasing number of TRT activities have been seen within Europe (Madden et al., 2021). The Atlantic area merges various countries with its geographic and climatic differences and therefore the pattern of TRT is contrasting. For instance, in countries such as Ireland and Northern Ireland, located in northern Atlantic area, where TRT has a long tradition and is a form of philosophy, recreational walking is the number one activity and therefore trail development and management are the key recreation priorities (Boyd, 2013; Varley & Semple, 2015). In Ireland and Northern Ireland, there are several TRT development strategies implemented, one of them is to provide sport and

physical activity opportunities to people of all ages and backgrounds (The Irish Sports Council, 2023). In general, Irish trail planners and developers are focused on creating, nurturing and maintaining a world class recreational trail network that is sustainable, integrated, well utilized and highly regarded; that enhances the health, well-being and quality of life of all citizens and that attracts visitors from around the world. Recently, the strategies were linked towards regional development balance and strengthening connections between urban and rural communities, thus requiring a knowledge in trail development and management that brings not only social, health and environment protection benefits, but also contributes to rural economies and sustainable territorial development (Beeton, 2006; MacLellean, 1999; Reis & Jellum, 2012). Trail development and management with the aim to sustainably develop territories has been advocated in Atlantic areas of Spain (Relaño et al., 2021; Torbidoni et al., 2005). By contrast, in countries, located in Southern Atlantic area, such as Portugal, TRT has been only recently targeted as an alternative sustainable recreation form mainly to diversify seasonal coastal sun and sea tourism (Ntshona & Lahiff, 2003; Samora-Arvela et al., 2020). According to Sharpley (2002), nations where seasonal sun and sea recreation is a substantial economic driver and where coastal resources are in scarcity due to climate change and overcrowding, must diversify mass recreation in order to minimize seasonality and generate economic benefits from alternative tourism during the low tourism season. Thus, finding alternative sustainable recreation forms would allow to spread the economic benefits of tourism away from the coastal resorts into the hinterland, protect both natural and cultural environments, revitalize cultural identities, re-populate and develop rural areas. More importantly, TRT development in coastal touristic regions creates a relationship between tourism in hinterlands and sustainable tourism (Lane, 1994). The region of Algarve located in the southern part of Portugal has been seen as sun and sea tourism destination since the 1970s. Algarve is a destination for more than 30% of Portugal's international tourists (INE, 2022), therefore the region's economy is mainly driven by tourism, concentrated in fragile coastal areas (Antunes, 2000) and where tourism benefits are not equally distributed (Andraz et al., 2007). However, being the main tourism type in the region, mass sun and sea tourism created a strong tourism seasonality pattern and has contributed to erosion of coastal sandy beaches due to overcrowding during high tourism season and unsustainable management practices (Semeoshenkova & Newton, 2015). Coastal erosion in Algarve is also encouraged by climate change events, such as frequent flooding and sea level rise (Martínez-Graña et al., 2016), leading to a retreat of sandy beaches of more than one

meter per year (Ferreira et al., 2008). According to Samora-Arvela et al. (2018), sea level rise and beach area reduction could have a disruptive impact in the region of Algarve. Considering the aforementioned threats, regional government authorities acknowledged that TRT development is an opportunity to diversify intensive sun and sea tourism and strengthen regional resilience to climate change, particularly in the face of sea-level rise and flooding that significantly change the image of sandy beaches. Shifting tourists towards visiting hinterlands and encouraging NBT via recreational trails is a crucial transition and a differentiation from mainstream sun and beach touristic activities to alternative and sustainable types of tourism (Samora-Arvela et al., 2018). As a result, trail development became essential for enhancing NBT experiences, diversification of coastal tourism, and rural communities' economic revival (Sharpley, 2002). Sustainable rural territories development is one of the objectives of Algarve Tourism Board, which can be achieved by successful development of TRT (Turismo do Algarve, 2020). Today there are over 30 official trails with various themes in Algarve, of which the "Seven Hanging Valleys" is the most popular one, being selected as one of the best hiking destinations in Europe (European Best Destinations, n.d.). The Canary Islands, and more precisely La Palma, stand out in the southern Atlantic region in terms of trail construction and development when compared to other touristic sun and sea destinations, because La Palma has stunning volcanic topography that draws nature lovers and makes it difficult to get to the shore. As a result, sun and sea activities are far less common than TRT (Jiménez-Barreto et al., 2022). Trail development has garnered special attention as most of the island's trail network runs through national parks, which are under special management programmes to achieve sustainable development, while the entire island was declared a Biosphere Reserve. Taking into consideration various trail developments in the contrasting regions of the European Atlantic area in Ireland, Portugal, and Spain; this thesis addresses trail development in these areas and sets them as study cases to accomplish the specific objectives of this research.

Growing trail user populations and increased access to trail networks have caused ecological disturbance, which is accelerated due to a lack of trail infrastructure, design, engineering, construction, and proper development (Hill & Pickering, 2006; Newsome & Davies, 2009). Natural area managers have widely discussed that without investments in trail design, infrastructure, facilities and surrounding area development (Creany et al., 2021; Farrell & Marion, 2010; Leung & Marion, 1996; Rowe et al., 2018), TRT

contribution to sustainability is impossible. Consequently, the first trials of infrastructural trail development began as numerous countries have reported significant financial investments in trails (Downward & Lumsdon, 2001; Kelley et al., 2006; McPadden, 2003). Trails are predominantly developed and funded by local authorities, economic development agencies and tourist boards, involving a range of stakeholders. Concerning infrastructure and costs, several types might be considered: the costs of creation, maintenance and signposting paths, promotion, management and opportunity cost of the land used for trails. Among investments in trail infrastructure, trail development has also spurred new business developments along trails (Davies et al., 2012; Schasberg et al., 2009), leading to opportunities for trail visitor expenditure.

Financial injections from investments and trail visitor expenditures stimulate an economic impact (Archer, 1982), that has to be studied in order to understand the consequences of investments on tourism activity (Dwyer et al., 2010). The abovementioned stimulated economic impact results in a change in an outcome variable such as income, employment, output, and value-added (Dwyer et al., 2010). The ratio of change in one of the outcome variables to the change in tourist expenditure is referred to as the multiplier (Fletcher & Archer, 1991), which can be of four types: income, employment, output and value-added. The income multiplier has been the most significant in the field of tourism, being pioneered since the 1970s by tourism economists Brian H. Archer and John Fletcher (Archer, 1977; Archer & Fletcher, 1996). Scholars have concluded that the income multiplier is the most useful mechanism from the policy and development viewpoints (Lindberg, 2001; Slee et al., 1997) and it has been widely studied by tourism economists due to its prioritization of income maximization (Archer, 1977; Heng & Low, 1990; Hsu, 2019). The concepts of economic impact and multiplier effect have been studied for the past 140 years, ever since Bagehot (1882). However, as previously mentioned, applications for economic impact analysis in the field of NBT did not appear until the late 1990s, and the effects of the development of recreational trails on local economies were not addressed until the late 2000s, leaving the literature with only a small number of studies (Bowker et al., 2007; Manton et al., 2016; Raya et al., 2018) and a lack of fundamental knowledge of economic impact of trail developments. Lack of economic impact studies of recreational trails may have been influenced by the lack of an established method or roadmap for selection of an appropriate economic model to apply since there are several approaches to analyse the economic impact and to

calculate the multiplier effect of tourism activities, encompassing two main concepts - input–output (I–O) analysis, developed by Leontief (1936) and the Keynesian multiplier, developed by Keynes (1936). However, each approach differs in terms of data required (e.g. secondary or primary), statistical records, or inclusion of intersectoral linkages (Crompton et al., 2016). For instance, I-O analysis incorporate the sectoral interdependencies and international relationships in an economy and allow disaggregating the economic impact of tourist expenditure across sectors. Meanwhile Keynesian multiplier approach does not incorporate international relationships and focuses on the relationshop between a conceivable level of investment expenditure and of income. Therefore, there is a need for a study explaining their applications since trails vary in their distance, purpose of use, location, and thus the availability of data needed for an economic impact analysis. Successful economic trail development also requires knowledge of the income multiplier, which is the most crucial indicator for destination developers. Decision-makers, investors and policy makers are concerned with income generation effects of financial injections; requiring improved information upon which to base their choice of policies, management decisions and investments (Sinclair & Sutcliffe, 1988). Thus, there is a need for finding the most appropriate income multiplier analysis method for recreational trails, stemming from the current literature and its practical application since, until now, no research has been conducted on the income multiplier effects of recreational trails. According to pioneer of multiplier effect in tourism Brian H. Archer, there is more misunderstanding about multiplier analysis than almost any other aspect of tourism research due to failure to explain the theoretical basis and practical nature of multiplier analysis (Archer, 1982). In addition, researchers have used different and conflicting concepts of the multiplier itself, failing to properly use methodologies and interpret results. As a result, because of an extreme level of misunderstanding, the application of income multiplier analysis in general lacks clarification, while in TRT it is even absent.

As mentioned previously, the network of recreational trails encompasses various levels of development, which leads to varying trail scales, development stages, included itineraries and themes. For instance, just to mention a few exemples, 3531 km “Appalachian Trail” in the eastern U.S.A., which runs through 14 states and receives about 3 million visitors annually although being minimally developed (Meadema et al., 2020), 8 km cultural “Chemin De Mémoires” trail in the northern part of France with few

investments for infrastructure and comparatively low visitation rate (Madden et al., 2021), 88 km minimally developed greenway "Taff", which is a flagship cycle route along the river in the Central Valleys of Cardiff in Wales (Cooper, 2018), or the 7 km "Monon" rail-trail in Indianapolis (U.S.A.), being the crown jewel of the city's trail system with high investments in trail development (Rails to Trails Conservancy, n.d.). When referring to trail developments and income multiplier, several factors, determining the magnitude of multiplier effect as per Archer & Fletcher (1996), have to be considered: the economy size, economic behaviour of visitors, intersectoral linkages and leakage. Long-distance trails passing through multiple jurisdictions are expected to create larger economies with intersectoral linkages when allocating investments for development. However, there exists the risk of high leakage due to intersectoral linkages covering multiple jurisdictions (Fletcher, 1989). When referring to economic behaviour of trail visitors, higher trail development aiming to provide memorable TRT experiences and recreational services prompts the expectation that trail visitor behaviour will include substantial expenditures (Archer, 1989). Some researchers have suggested that additional trail development features may increase accessibility and cost effectiveness (Turner et al., 1996). However, there are non-economic features such as scenery, wilderness, weather and geographic location which determine the volume of trail visitors and their economic behaviour. Previous studies found that very high temperatures, humidity and sunshine might decrease the "pleasantness" of TRT (Falk, 2013) activities. Other scholars argue that nature visitors primarily focus on exploring nature's beauty and developing an appreciation for the natural and wild environment rather than purchasing recreational services (Priskin, 2010; Wang et al., 2018). These assumptions lead to the hypothesis that higher trail development may not necessarily result in higher income generation and local economic impact, in particular in rainy and humid places such as northern Atlantic area countries. Considering the interplay between economic and non-economic features, there is a high level of risk for investors as the relationship between trail development and economic impact is unclear. Therefore, a study explaining the relationship between the stage of trail development and an income multiplier is essential, which would shed light on the topic from both theoretical and practical points of view.

When referring to NBT development, the influence of neoliberalism, however, is inevitable in capitalistic societies, prompting that from a sustainability point of view, it is crucial to develop trails that are not just financially viable but also compatible with social

justice and ecological restoration goals. Even though there is a wide range of trail developments, mostly they are not in line with sustainability principles as trails are viewed as an opportunity to commercialize nature, and trail design and destination management plans are not based on the holistic key stakeholder perspectives. As per literature, the theoretical trail development and management framework are based on one or few of several stakeholder groups and usually consisting of the trail users, community, and/or managers (Marion & Wimpey, 2017; Newsome et al., 2016; Stevenson et al., 2022; Symmonds et al., 2000). Due to lack of stakeholder collaboration on trail planning, unsustainable trail developments lead to land use and environmental conflicts, resulting in a change of ecosystems, including their landscapes and even threaten species in unprotected natural areas and developing nations where NBT is increasingly popular (Ballantyne & Pickering, 2015). Scholars have acknowledged that due to the inevitable neoliberalisation of NBT development in various forms where the economic dimension plays an important role, sustainability principles have to be addressed holistically (Bakker, 2010). To implement sustainable trail design, the trail destination and its surrounding areas must not be viewed as commercial arenas (Duffy, 2015), and engagement of all stakeholder groups is inevitable (Kent et al., 2012), allowing stakeholders to influence the decision-making process (Healey, 1998). Understanding the perceptions of key stakeholders would allow for the extension of the current theoretical framework of trail management; so that it can play a significant role in rural areas economic revival, sun and sea recreation diversification and making trails an attraction in cultural landscapes; as no prior studies have been conducted in this regard.

Taylor (2015) have categorized the main TRT stakeholders into the following groups: local community, trail users, trail operators (businesses), destination management organization/local managing council, and landowners. From the perspective of sustainable tourism and territorial development through recreational trails, where the trail is considered as a tourism market commodity, the most important stakeholders are primarily trail users (Gyimóthy & Meged, 2018). Without trail users, TRT would not exist, and the number of trail users is a key indicator of effective trail development and design (Reis & Jellum, 2012), in particular when trails are chosen as strategic sustainable territorial development tools. Therefore, trail user perceptions in the TRT management theoretical framework have been applied primarily to design trails that satisfy visitors, provide high-quality experiences and potentially contribute to higher visitor expenditure

(Kelley et al., 2016; Oh et al., 2020; Zhang et al., 2019). Current research indicates that the most crucial element affecting long-term sustainability of TRT is trail design, namely how a trail is positioned and aligned in relation to satisfying visitor and cultural and natural landscape protection. From a practical perspective, the methods to assess long-term sustainable TRT management aspects are mixed, usually comprising of trail user questionnaires and Trail Rating Systems, the Importance-Performance Analysis or the Recreation Opportunity Spectrum (ROS) framework (Gundersen et al., 2015; Keith et al., 2018; Marasinghe et al., 2021; Marion & Wimpey, 2017). The ROS framework was developed by American academics to classify recreational sites along physical, social and managerial settings based on a wide range of key performance indicators (KPIs) (Clark & Stankey, 1979). The framework is based on the link between natural setting, the recreation forms and desired experiences (Brown et al., 1987). NBT researchers have concluded that the ROS framework application is a beneficial tool to design tourism products based on the information obtained through the ROS and visitor perspectives at a very early development stage (Harshaw & Sheppard, 2013; McCool et al., 2007). Finding a balanced trail design and management plan requires taking into account the perspectives of all stakeholder groups. The outcomes of ROS and trail visitor perceptions regarding trail design assessment are particularly useful in this context, facilitating the implementation of further sustainable trail design and management strategies based on perceptions of different stakeholder groups. Unfortunately, there have been very few applications of the ROS framework for managing trails, with the literature containing only one study carried out in Japan (Oishi, 2013). Touristic destinations like Algarve, relying on fragile natural and cultural ecosystems with extensive trail networks must design and manage trails sustainably. Therefore, the application of the ROS framework and assessment of trail visitor perceptions to find the first indicative steps towards more sustainable coastal trail design and management is crucial, as no prior studies have yet accomplished this. It is especially important for well-known trail the “Seven Hanging Valleys,” whose design was based only on the views of the local management council.

Another important trail stakeholder group is trail operators (businesses). They can generally be described as micro businesses, lying outside the mainstream of the travel industry. Their operations tend to be small and usually run by owner/operators (Meredith, 1995). A wide range of TRT services, including lodging, food and drink, transportation, guided tours (like safaris), outdoor recreation equipment rentals, golf, and local retail, can

be found at trail sites as a result of the increased number of trail visitors and business owners' realization of the potential for profit from trail visitors. It is important to highlight, that without business establishments in TRT areas, the economic impact, which is prioritized by most of countries in terms of sustainable tourism and rural areas development, would not be stimulated, as trail visitors would not have services upon which to spend their money; and the business establishments, which are the primary recipients of tourist spending, would not re-spend the funds and thereby set in motion a further chain of economic activity and multiplier effect (Archer, 1982). As trends in NBT and TRT recreation show its recent popularity, most businesses established do not have professional management. According to McKercher & Robins (1998), most new NBT businesses have no formal business or marketing background and prior experience in the tourism industry; therefore, they highly depend on successful trail development, around which their businesses are established. This prompts that investments in trail design and management have potential to affect business profitability and operations (Mäntymaa et al. 2021). However, previous literature demonstrates that decision-makers of investments in TRT have not considered business perceptions of the attributes of trail investments. According to the sustainable trail management (Gotra & Boyle 2006) and stakeholder theories (Freeman 1984), the perceptions of key stakeholders of a given trail or trail network must be considered in order to satisfy their requirements, which in this case would be business profit and operations increase. From what was found in the literature, neither a theoretical nor an empirical study has been executed on the potential for investments in TRT based on local business perceptions. Therefore, a study explaining business perceptions on investments in TRT and those investments' potential to increase business operations and profitability is fundamental. Understanding TRT business perceptions would allow to extend the traditional TRT framework adding an additional key stakeholder group as no prior studies considered businesses as stakeholders in trail management and development. From a practical perspective, business perceptions allow to optimize investments in trails with limited funds, helping to achieve the best trail management practices when trails act as key economic drivers in rural areas (Breiby et al., 2022). For northern Atlantic nations like Ireland and Northern Ireland, where TRT development has a long history and the network of trails subsequently comprises a range of established enterprises with more expertise collected than in southern European Atlantic nations where TRT is relatively young, it is especially crucial to understand how businesses perceive trail investments and development. The findings could serve as a

springboard for more in-depth theoretical and practical TRT business development since this is the first study to analyse local trail-related business opinions on trail investments and their potential for greater profitability and operations.

Stakeholder involvement is necessary for participatory trail design and destination management; therefore, it cannot be avoided. Knowing and taking into account each stakeholder group's perspectives on trail design and development issues is crucial, but participatory trail destination management enables consensus-building and assists in resolving frequently occurring stakeholder conflicts (Benveniste, 1989). The benefits of participatory management are well publicized—sharing responsibility, negotiating benefits, incorporating professional knowledge, enhancing capacity for implementation, increasing trust between stakeholders, improving understanding and awareness, facilitating policy integration and increasing public commitment (Selman, 2007). As was previously indicated, little research has been done on the topic of managing recreational trails in a way that encourages economic growth and preserves natural and cultural landscapes (Cerveny et al., 2022; Viveiros de Castro et al., 2021; Wolf et al., 2015). As aforementioned, the studies found in the literature are not grounded on the inclusion of all key stakeholders since the exclusion of local businesses, which are crucial in the creation of economic impacts, was noticed. In addition, as trails are targeted to revitalize rural areas economically, diversify sun and sea tourism, and introduce visitors into natural and cultural landscapes, it is important to draw inspiration from the concept of an eco-cultural trail destination, which combines ecological and cultural aspects to create experiences for tourists and develop sustainable tourism (Sörlin & Wormbs, 2018). Since there were no studies on participatory management of trails, which meet the criteria for an eco-cultural tourism destination, it is crucial to develop a management strategy for trails, which meet the criteria for an eco-cultural destination, based on the perceptions of all stakeholders.

In conclusion, it should be mentioned that research on TRT and its concept of development is rather recent in the academic literature, receiving increased attention now that TRT has been recognized as an alternative recreation form due to its numerous benefits. Notwithstanding the theoretical frameworks for TRT development that have been put forth by earlier researchers, none of them considered the economic factor or highlighted the economic benefits of trail development, which resulted in incomplete and

maybe unsustainable trail destination management models. Considering various trail developments within diverse geographic contexts within the European Atlantic area and the influence of neoliberalisation, understanding the role of recreational trails in economic development in line with social justice and environmental restoration will enhance sustainability adoption by trail development in both theory and practice. Moreover, it will support TRT developers, investors, policy makers, trail managers, local planning authorities, and broader tourism industry professionals in sustainable trail development planning and management in terms of finding the best model to assess the economic impact of trail development; understanding the potential of TRT to generate income for local communities and how such income generation can be stimulated; allocating sustainably profitable investments; designing trails that are environmentally friendly and satisfying visitor needs; and preparing trail destination management plans based on all trail stakeholder perspectives that allow to further develop the benefits derived from trails.

1.2 Research aim and objectives

Considering the thorough examination of existing literature, the general aim of this thesis is twofold: 1) to develop a foundation for assessment of TRT economic impact and estimate the income multipliers of trails, that enables 2) to incorporate the economic dimension into trail development and management framework and propose a pathway for optimization of sustainable trail destination development management plans. In particular, the objective is to pioneer the examination of income generation by recreational trail development, explain the propulsive role of trail development on local economic impact, and show how it can contribute to local communities, rural territory revival and sustainable territorial development. This thesis addresses key stakeholder perceptions of trail design, investments, and development attributes, as well as management priorities in order to propose a plan for developing sustainable trail destinations that has minimal environmental impact, respects host cultures, maximises economic and social benefits to local people, and maximises tourist satisfaction in a broader context. This thesis is based on six articles, each of which addresses the aforementioned research gaps with specific objectives, which are:

1. To review the state-of-the-art of trail tourism economic impact, its contribution to local and regional economic development and propose the most appropriate model(s) to estimate economic impact throughout the income multiplier for various types of trails. In

addition, this study aims to identify the main determinants of NBT's economic impact **(Study 1)**.

2. To validate the appropriateness of the selected model for local scale, calculating the local economic impact of a trail, and further investigating the significance of TRT in local income generation **(Study 2)**.

3. To examine the relationship between the stage of trail development and the income multiplier and explain how the stage of development affects the income multiplier based upon four representative trails in Portugal, Spain, and Ireland **(Study 3)**.

4. To investigate trail visitor perceptions of sustainable trail design, describe recreational trail opportunities, determine the stage of trail development and identify trail management priorities **(Study 4)**.

5. To investigate local TRT business perceptions of natural and recreational trail environment, priorities in trail investment attributes and explain the benefits to local business operations and profitability through investment multipliers **(Study 5)**.

6. To propose a management strategy for trails developed in eco-cultural destinations that are economically viable, socially just and ecologically restorative **(Study 6)**.

1.3 Significance of the study

The significance of this study is centered around its novelty in addressing the topic of economic impact and income generation due to TRT development and incorporating the economic dimension in a holistic and sustainable trail management plan. This study pioneers the conjunction of two theories of economic impact and income multiplier in tourism and sustainable recreational trail development, thus advancing and synergizing both theories and leading to a set of novel contributions from methodological, theoretical and practical perspectives. As the economic dimension and its role in trail recreation is the crux of this study; aiming to understand the economic effect of trail recreation and its development on local communities, businesses and other stakeholders and how those effects can be altered in a sustainable way; this investigation provides a holistic view of sustainable trail planning and management in natural and cultural settings based on perceptions of key stakeholders.

From a methodological standpoint, this research's value added is its multidisciplinary approach. An innovation is the selection, proposal, and assessment of the most appropriate method for assessing the local economic benefits for small-scale trail destinations in terms of an income multiplier effect. In addition, this thesis combines techniques to assess the economic impact, the stage of trail developments and recreational opportunities provision integrating key stakeholder perceptions in order to develop and propose the methodology for a holistic trail management plan development in natural and cultural settings, where trails are targeted as a local income generation tool.

From a theoretical perspective, this body of work brings novelty to the recreational trail design, development and management arena by adding a new economic dimension and further explaining its role not only in a trail destination but also in the surrounding areas and sustainable territorial development. This thesis contributes to the limited knowledge of economic impact of recreational trails and expands the theoretical framework by improving understanding of the economic models, their application and identification of the main determinants of the economic impact. This investigation adds a new paradigm in recreational trail development and economic impact theories and enhances them through the cross-linking of concepts of economic effects in terms of income multiplier and the development of recreational trail opportunities, providing a clear understanding of the propulsive role of trail recreation in local economic development, how the stage of trail development alters the magnitude of the income multiplier, and how the economic benefits can be enhanced through good governance, coordinated funding, and investments in partnership and consultation with key stakeholders. Finally, this study forms a valuable reference for the theoretical framework of trail destinations and their management in natural and cultural settings by adding the key planning and management dimensions of sustainable trail destinations.

From a practical perspective, this thesis provides empirical evidence of the great potential of TRT to provide new income and sustainably expand underdeveloped trail networks. In order to serve as a model for plans for the revival of economically depressed areas and sustainable territorial development, this study proposes a roadmap of trail recreational opportunities, development stages with their appropriate KPIs, and investment attributes that ensures economic success for key stakeholders as well as planning and management dimensions. It enables better trail development planning and more effective modification of present trail investments, planning, and management

techniques by describing the economic implications of trail developments within various geographic locations and how these effects can be improved. This research proposes a set of practical implications for trail managers, seeking to properly develop trail destinations in natural and cultural settings, empower trails as local economy drivers, provide alternative recreation forms, and thus enrich the local spectrum of nature-based activities.

1.4 Study design

A pragmatism paradigm for designing this research methodology, which is shaped by the real-world operational constraints and existing systems used in the tourism industry, is applied in order to achieve the objectives of this thesis. According to Morgan (2014), the pragmatism paradigm refers to a worldview that rejects the use of a single approach and is based upon the premise of utilizing the best methods to investigate real-world problems, allowing for the use of a mixed method approach, multiple sources of data and knowledge to answer research questions (Johnson & Onwuegbuzie, 2004). The pragmatism paradigm is typically associated with inductive and deductive reasonings that moves back and forth between them and aims to transform a complex problem moving it from a general theory of understanding to its practical implementation. Therefore, guided by the pragmatism paradigm, researchers are free to use both quantitative and qualitative approaches in order to find the best techniques and research procedures that can solve a given problem statement (Tashakkori & Teddlie, 1998). The pragmatic approach is the most suitable because this thesis engages with the challenging and understudied topic of sustainable territorial development via recreational trails with a strong focus on economic impact, stakeholder perceptions and strategy for sustainable trail destinations (Caffyn, 2002). Finding the theoretical underpinnings of the role of the economic dimension of sustainability in the development and management of recreational trails requires the use of an inductive approach; however, the deductive approach allows for further validation of theoretical hypotheses and theoretical framework expansion of recreational trails' potential to be key economic drivers for sustainable territorial development as well as key stakeholder perceptions of trail design, investments, and development, thus building a practical trail planning and management strategy.

Data collection methods in this thesis are complex, combining search of literature in databases, questionnaire-based surveys, sensor-based measurements, focus groups, and in-depth interviews to achieve the specific objectives of the research in the most

practically appropriate way. Since NBT typically lacks statistical data regarding the number of users, visitor profiles, and their behavior - because it typically lacks any measurement options, such as entrance fees or reservations - this research was designed to collect primary data of trail users, and other TRT stakeholder profiles, their behavior, and their perceptions through multiple mixed methods in accordance with previous study designs of economic impact assessment (Hsu et al., 2019; Raya et al., 2018) and NBT destination planning and management strategies (Coban & Yildiz, 2019; Tyrväinen et al., 2014).

In order to systematically explore, critically evaluate, and generate an overview of the state of the art of the research issues, a systematic literature review was first carried out, which is a crucial stage in pragmatic research design (Burgers et al., 2019). The literature review included a quantitative approach to uncover the economic importance of recreational trails, an analysis of the relationships between NBT activities with a focus on recreational trails and economic impact assessment models; and a qualitative approach to identify the most significant variables determining economic impact and suggest an appropriate model for calculating it with an income multiplier. The data collected through literature review was used to accomplish objective 1 and execute Study 1. The detailed methodological design is presented in Chapter 2.

Following the results of a systematic literature review, three stages of data collection of quantitative and qualitative data were performed to evaluate the appropriateness of the proposed model, assess local economic impact of trails, investigate the significance of TRT in local income generation, examine the relationship between the stage of trail development and the income multiplier and identify trail management priorities through trail visitor perceptions. Based on the previous studies of economic impact assessment, trail development and trail destination planning and management, the first stage of data collection applying questionnaire-based surveys was performed on the following populations in Portugal, Spain, Ireland, and Canary Islands: trail visitors, businesses, residents and TRT stakeholders. Data collected in this stage was used to accomplish objective 2, objective 3, objective 4 and execute study 2, study 3, and study 4. In this stage, to consider the degree of money leakage and accuracy of economic impact estimation (Archer, 1982), administrative boundaries were used to delimit the study area and define the local area. Therefore, the smallest administrative units such as parishes and municipalities which each study case trail falls within, covering major NBT activities and

attractions, were defined as study areas. Moreover, due to a lack of statistical data in TRT, it was necessary to determine the total population of trail visitors by counting footfalls. For that purpose, footfall counters were installed at various sites of trails to measure footfalls during one-year period (2020 to 2021 and 2021 to 2022). Knowing the total trail user population, the first stage of data collection from trail visitors, residents, businesses and local stakeholders was performed over the period of 2020-2022. The quantitative data from trail visitors was collected, applying a structured questionnaire, designed for the research objectives and based on the literature review. Surveys of trail visitors were administered through face-to-face interviews on each trail site, choosing a systematic sampling approach to keep the sampling process simple, increase representativeness and obtained unbiased samples (Taherdoost, 2016). After a random start point, every fifth trail visitor was selected. Surveys were conducted in all seasons as well as on different days of the week to increase the representation of the samples. In total, a sample size of 395 trail visitors in Canary Islands, 454 trail visitors in Portugal, 211 trail visitors in Ireland and 461 trail visitors in Spain were obtained. The quantitative data from residents was collected, applying a structured questionnaire, designed for this research. Surveys to residents were administered through face-to-face interviews, choosing a random route sampling approach to increase sample representativeness since this technique is used when no complete list of households is available (Bauer, 2014). The target resident population was defined as people who lived within the defined administrative unit for a continuous period of at least 12 months before the time of sampling. In total, sample size of 123 residents in Spain, 62 residents in Portugal, 63 residents in Ireland and 27 residents in the region of Spain was obtained. The quantitative data from local businesses was collected through surveys, applying a questionnaire designed for this research and based on previous studies. The questionnaires were administered through face-to-face or phone interviews. The convenience sampling technique was chosen since there is no sampling frame for the target population and due to a tendency of businesses to refuse to participate in the survey (Oberholzer et al., 2010). The target population was defined as TRT businesses falling within the defined administrative unit and business sectors from which a subset matches trail visitor expenditure categories. In total, a sample size of 31 businesses in Canary Islands, 14 businesses in Spain, 18 businesses in Portugal and 23 businesses in Ireland was obtained. The quantitative data from stakeholders was collected through surveys administered by email. Stakeholders were identified based on their expertise, familiarity with the study case trails, and professional knowledge, ensuring

accurate assessment, identification of issues with trail development, and development of recommendations. In total, 26 stakeholders from local trail management, governmental and municipal units, NBT field and academia in Spain, Northern Ireland, Ireland, Scotland, Portugal and Canary Islands were involved. Several statistical techniques, using the IBM SPSS Statistics 26.0 as well as economic impact and trail development assessments, were applied for data analysis. The detailed methodological research design is presented in Chapter 3, Chapter 4 and Chapter 5.

The second stage of quantitative data collection using questionnaire-based surveys was performed on trail-related businesses in Northern Ireland to investigate local TRT business perceptions, calculate TRT investment multipliers, and explain the benefits to local business operations and profitability. A structured questionnaire was designed for this research and administered by face-to-face or phone interviews, applying a snowball sampling approach due to the low number of trail-related businesses and the tendency for low business participation in surveys. The data collection was within summer time (2022), which is a high outdoor recreation season in Northern Ireland. Data collected at this stage was used to accomplish objective 5 and execute study 5. The trail-related business population was defined, considering the official administrative boundaries of the study area and extracting the list of businesses by study area within the official administrative unit, rural/urban locations, and industry groups. In total, a sample of 30 businesses was obtained. Statistical analysis, an analytical hierarchy approach and cost-benefit analysis using the IBM SPSS Statistics 26.0 and STEPS 2.0 software were applied for data analysis. The detailed methodological research design is presented in Chapter 6.

The third stage of qualitative and quantitative data collection was performed on various groups of stakeholders in southern Portugal through a workshop and focus groups to develop a planning and management strategy for trails developed in eco-cultural destinations that are economically viable, socially just and ecologically restorative. Focus groups were held online and at the trail site, and the workshop took place online. Data was collected applying questions pre-defined in an interview guide that were distributed throughout the workshop and focus groups, as well as audio recordings of the roundtable conversations that took place during the workshop and focus groups. Stakeholders were selected based on their knowledge, experience, and professional vision and classified into representative groups. In total, 43 stakeholders took part in the focus groups and 15 in the

workshop. Data collected at this stage was used to accomplish objective 6 and execute study 6. Statistical analysis and qualitative data analysis approaches using the IBM SPSS Statistics 26.0 and NVivo 12 software were applied for data analysis. The detailed methodological research design is presented in Chapter 7.

Data collection was approved by the ethics committee of the University of Algarve with the reference number CEUAlg Pn°52/2021 (see Appendix A). The content of the interviews and questionnaires was treated anonymously. The surveys were applied only to adults (>=18 years old). The respondents were fully informed about the aims of each survey, and only with consent, surveys were initiated. There was no discrimination on the basis of ethnicity, colour, gender or age.

1.5 Definitions of key terms

The following definitions, theoretical concepts and key terminology serve as a solid foundation for the conceptual frameworks that are proposed for the six studies that make up this thesis.

Direct economic effect: is the business owner's revenue from tourist expenditures on products and services (Archer, 1982).

Eco-cultural destination: a destination developed for recreational and educational purposes that uses and simultaneously respects ecological and cultural aspects of a landscape (Wallace & Russell, 2004).

Economic impact: in the field of tourism, the economic impact is a short-term financial impact, stimulated by tourists' expenditures that cause changes in income, employment, added-value, and output (Dwyer et al., 2010). It is quantified in terms of the direct and secondary effects resulting from visitor expenditure on chosen tourism activity.

Economically viable, socially just and ecologically restorative trail: a trail which generates greater economic benefits than the trail's implementation project costs; provides equal economic, social and political rights and trail recreation opportunities; and is developed and managed in a way that assists the recovery of the ecosystems as a means of sustaining ecosystem resilience and conserving biodiversity (Martins & Lyons, 2018; Pratte, 2006; Schellhorn, 2010).

Employment multiplier: in the field of tourism, employment multiplier is the ratio of the sum of direct and indirect employment generated by tourist spending to direct employment (Archer, 1982).

Income multiplier: in the field of tourism, income multiplier is the marginal increase in income per unit of tourist spending (Archer, 1982).

Input–output (I–O) model: is a quantitative economic model that represents the interdependencies between different sectors of a national economy or different regional economies. I-O model was first developed by Wassily Leontief (1936) and is a fundamental approach for economic impact assessment and estimations of the multipliers, from which social-accounting matrices (SAM) and computable general equilibrium (CGE) models were later developed (Crompton et al., 2016).

Investment multiplier: is the ratio of an increase in national income to an increase in investment (Keynes, 1936).

Keynesian multiplier approach: is a quantitative economic model asserting that an increase in private consumption expenditure, investment expenditure, or net government spending raises the total Gross Domestic Product (GDP) by more than the amount of the increase. Keynesian multiplier was first developed by John Meynard Keynes (1936) and is one of the fundamental multiplier approaches from which the Ad hoc multiplier later was developed.

Multiplier effect: is a measure of total direct and secondary effects of spending. In the field of tourism, the multiplier effect refers to the total effects of recreational spending per unit of direct effect and is determined as a ratio by which multiplying a change in tourists' expenditure an impact can be estimated on the economy's output, income, value-added, or employment (Fletcher & Archer, 1991). It is rooted in the economic theories of John Meynard Keynes.

Nature-based tourism (NBT): tourism sector, based on the use of natural resources and occurring when visiting nature areas outside of the individual's neighbourhood (Lundberg & Fredman, 2012).

Output multiplier: in the field of tourism, output multiplier is the marginal increase in output per unit of tourist spending (Archer, 1982).

Recreational Opportunity Spectrum (ROS) framework: pioneering classification system for recreational sites created in the United States by academic and Forest Service researchers (Clark & Stankey, 1979; Brown et al., 1978) with the aim of providing high-quality recreation through the provision of a variety of settings, which includes physical, biological, social, and managerial.

Rural area: is an expanse of landscape with a low population density and often with declined economies. According to Li et al. (2018), current rural areas can be divided in four categories: 1) villages and the surrounding areas that become populated due to natural population growth and in-migration; 2) rural areas that are a component of metropolitan areas, which are made up of a variety of land uses and activities; 3) "intermediate" rural regions which border urban areas and have a capacity to interact more closely with the cities; 4) the large peripheral rural areas that are located outside of the domains of (positive) impact of the urban areas. This thesis considers all four types of rural areas and their revival by sustainable trail development.

Secondary economic effect: refers to a general rise in the output of the area, such as demand for sufficient resources and employment, and increased personal incomes due to the tourists' spending that will be re-spent on final goods and services (Archer, 1982).

Stakeholder approach: engages stakeholders (individuals and organizations that can have an impact on or are impacted by the purpose of the organization) to better understand their needs and concerns and to develop strategies (Freeman, 1984).

Sustainable territorial development: according to Medeiros (2020), it is the development linked with three essential policy dimensions: (i) economic—to avoid extreme imbalances that damage industrial or agricultural production; (ii) environmental—to avoid overexploitation of renewable resource systems and to maintain a stable resource base; and (iii) social—adequate provision of social services and equality in distribution.

Sustainable trail development: refers to trail development that considers the main sustainability pillars (economic, socio-cultural, and environmental) and incorporates a holistic stakeholder involvement approach.

Trail: is a travel way established either through construction or use and is passable by at least one or more of the following, including but not limited to: foot traffic, stock, watercraft, bicycles, in-line skates, wheelchairs, cross-country skis, off-road recreation vehicles such as motorcycles, snowmobiles, or 4-wheel drive vehicles (American Trails, 2021).

Trail destination: an area of a trail and its surroundings comprised of constituent entities and developments, such as trail infrastructure, nearby landscape amenities, tourism services, and businesses (Line & Costen, 2017).

Trail recreation opportunities: based on the framework of the Recreational Opportunity Spectrum (ROS), developed by the United States Forest Service researchers Clark & Stankey (1979), trail recreation opportunities provide the quality of trail recreation through a combination of diverse settings.

Trail-related tourism (TRT): NBT niche, focused on using trails for different recreational activities including walking, running, hiking, trekking, horseback riding, and biking, depending on a range of trail characteristics, motivations and preferences (Mowen et al., 1998).

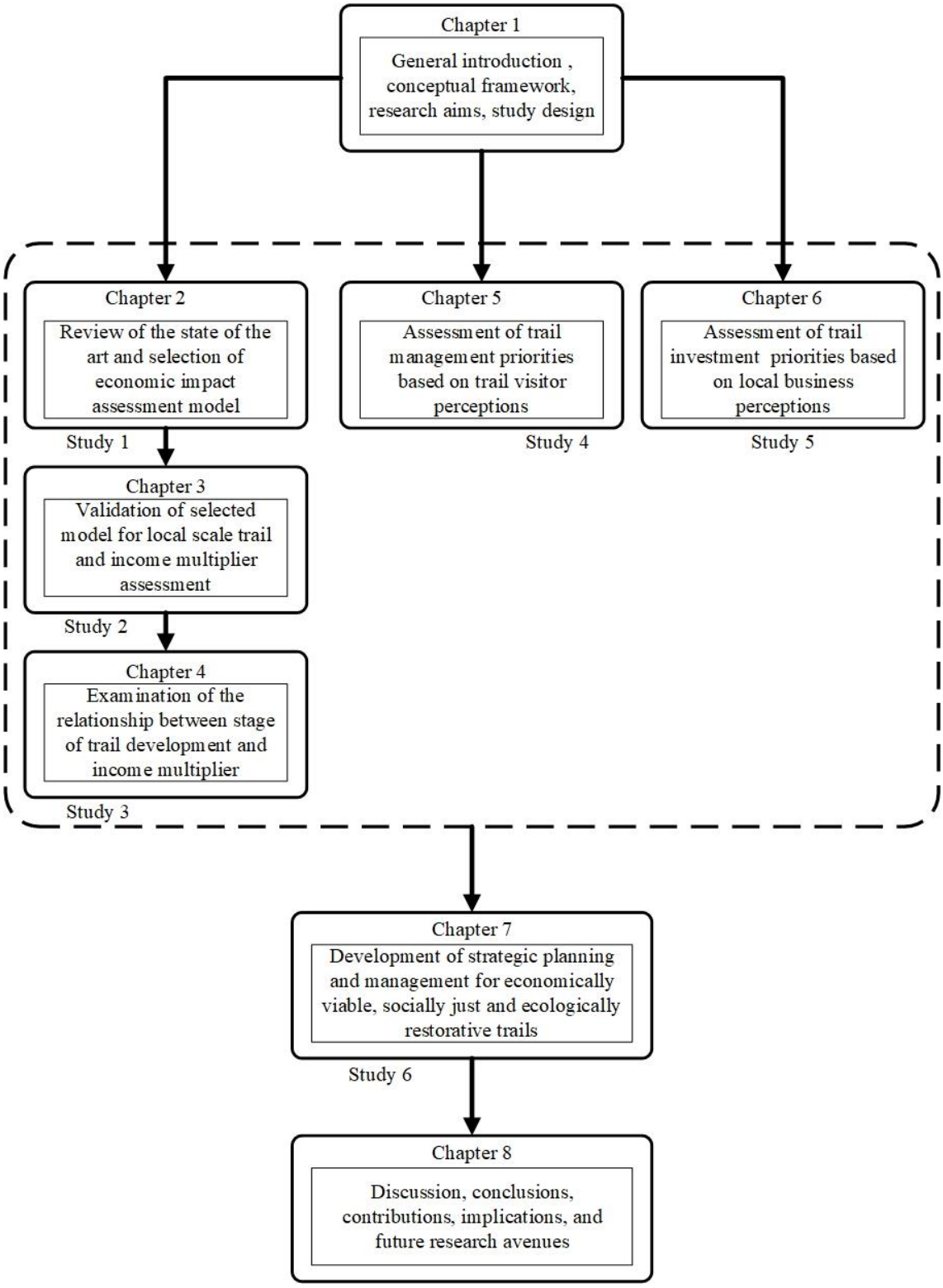
Value-added multiplier: in the field of tourism, value-added multiplier refers to a change in output generated by an extra unit of final recreation demand (Dwyer et al., 2010).

1.6 Outline of the thesis

Figure 1.1 demonstrates the outline of this thesis, which is composed of eight chapters and incorporates six scientific papers written in English. Chapter 1 represents the general introduction and conceptual framework formation, in which a comprehensive literature review is presented addressing key research gaps and issues, uncovering and underpinning key concepts and theories, which form the main research objectives of this thesis. Chapter 1 is finalized by the representation of methodological research design, including data collection techniques, survey design and administration, and data analysis methods, as well as key terminology. Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6 and Chapter 7 present research findings corresponding to scientific papers accordingly. The final Chapter 8 addresses research conclusions with emphasis on key findings,

contributions and implications. Limitations and future research avenues finalize this chapter.

Figure 1.1 The outline of the thesis



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2. CHAPTER TWO

STUDY 1: 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.

2.1 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 (Bel 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).

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 traveller 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.

2.2 Theoretical framework

2.2.1 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 (McNamar & 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 kilometres 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 centres 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.

2.2.2 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, shop-keepers, 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).

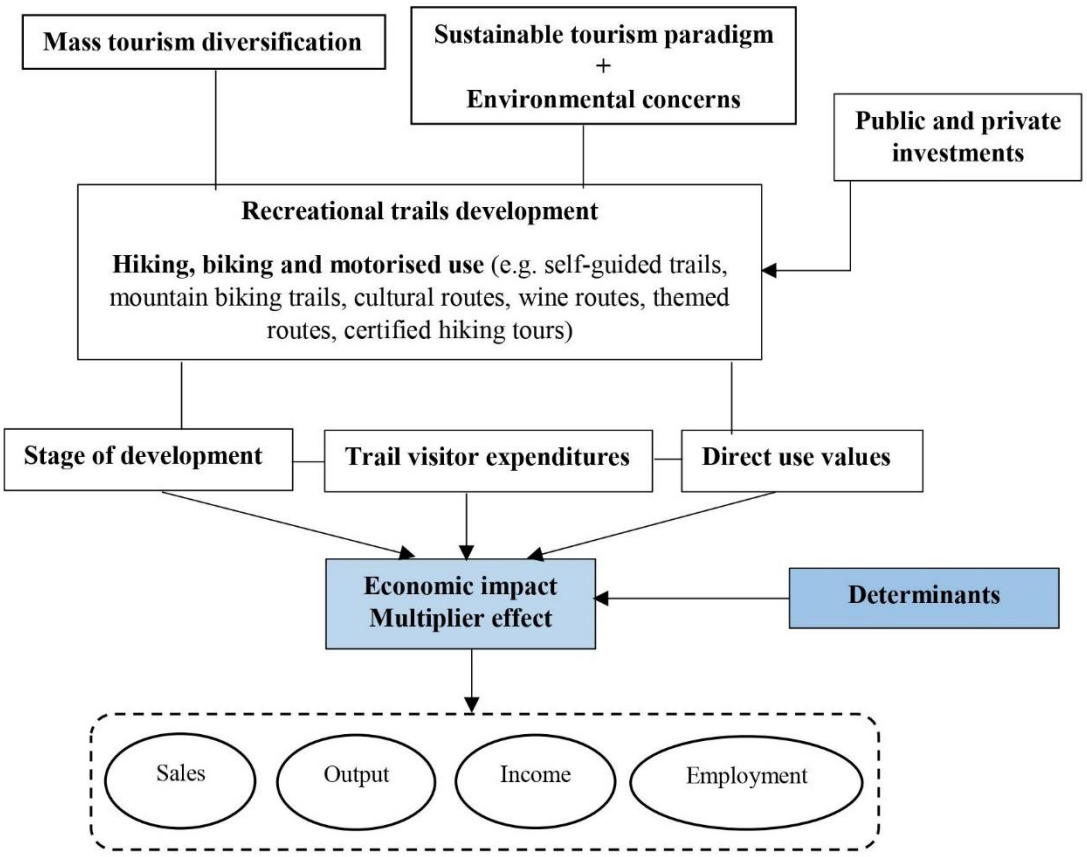
Economic impact analysis describes the interrelationship between economic sectors through direct and secondary effects, where the multiplier occurs as a measure of total direct and secondary effects. The multiplier effect refers to the total effects of recreational spending per unit of direct effect 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 2.1 aims to summarize a theoretical framework of the economic impact of recreational trails.

Figure 2.1 The theoretical framework of the economic impact of recreational trail tourism



2.3 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.

2.3.1 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.

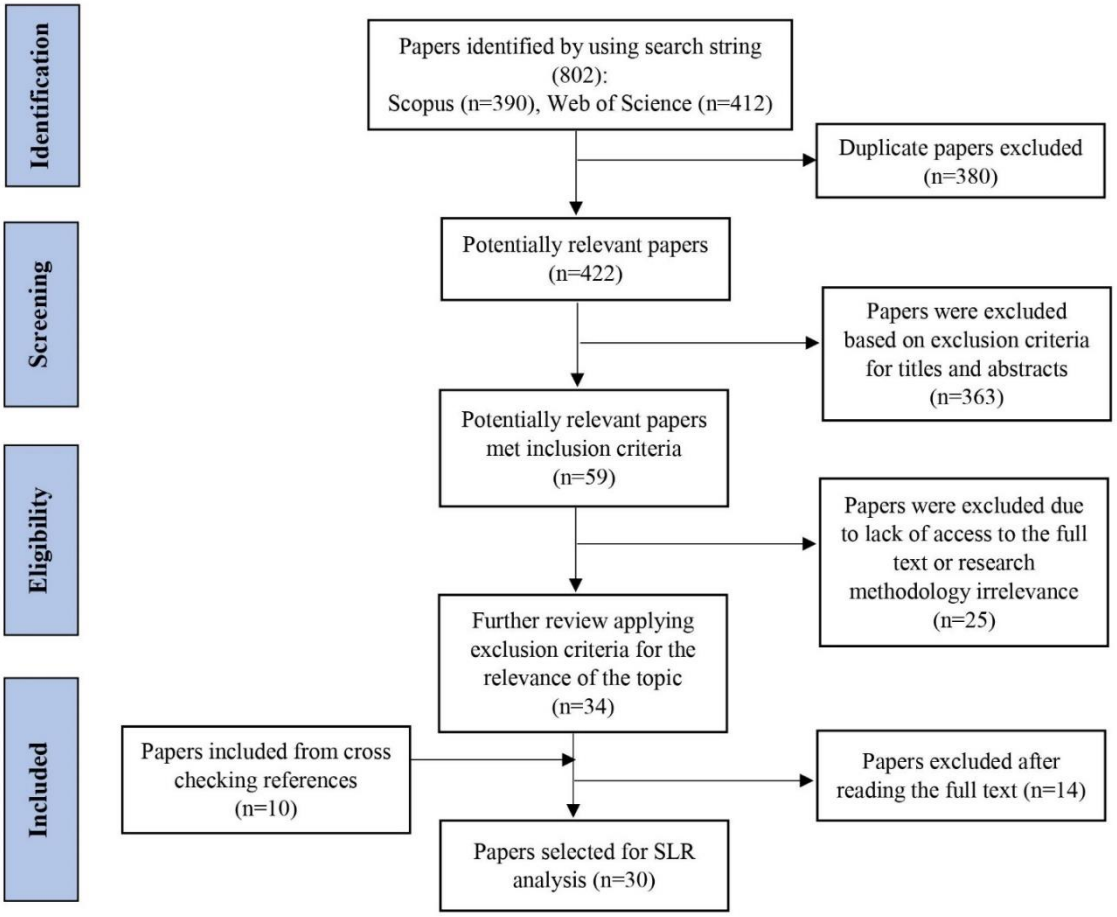
The following search string was applied for titles, abstracts and keywords: ('Economic Impact' OR 'Socio-Economic Impact' OR 'Socio* Economic Yield' OR 'Economic Multiplier' OR 'Multiplier Effect') AND ('Nature-based Tourism*' OR 'Ecotourism' OR 'Bushwalking' OR 'Backpacking' OR 'Mountaineering' OR 'Hiking' 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.

2.3.2 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 analysed 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 2.2. The final yield of 30 studies was included in the SLR and the main summary is presented in Table 2.1.

Figure 2.2 Flow diagram of the systematic literature review



Nineteen papers that focused on multiplier analysis, applying the economic models and using primary source data were elaborated and presented in a separate Table 2.2. 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.

2.4 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 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 toCOVID-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.

Table 2.1. 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 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"	1	3
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

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 2.3 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).

Table 2.2. 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 P, Saastamoinen O (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 EE, Kim YS (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 HK, Bergstrom JC, Ashley GA, Karish J (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 JC, Cordell HK, Ashley GA, Watson AE (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 M, Saayman A (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 T, Thapa B, Rodrigues CGDO, Imori D (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 D (2007)	Leisure	North America/USA	Determining spending behaviour 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 D, Gallaway T (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 Y, Sun Q, Bandara YMWY, Sharma K,	Global Business Review	Asia/China	The Economic Impact of Ecotourism on Regional China: Further Evidence from	To shed light on the economic impact of ecotourism on regional China	I-O	Income, value-added, employment	Regional

Hicks J, Basu PK (2018)			Yunnan and Sichuan Provinces				
Koontz L, Thomas CC, Ziesler P, Olson J, Meldrum B (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 DJ, Sun YY (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 JM, Bergstrom JC, Gill J (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 EC (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 M, Müller M, Woltering M, Arnegger J, Job H (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 M, Van Der Merwe P, Rossouw R (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 J, Munn IA, Henderson JE (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 MJ, Martínez-Garcia E, Celma D (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 PH (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

Table 2.3. 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**
Recreational trails	**5**	**17**
Islands and lagoons	2	7
River recreation	2	7
Rainforest	1	3
Marine National Monument	1	3
Nature heritage	1	3

2.4.1 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 measure 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.

2.4.1.1. 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 centres 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 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.

2.4.1.2. 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).

2.4.1.3. 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 centres 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.

2.4.1.4. 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).

2.4.1.5. 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).

2.4.1.6. 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).

2.4.1.7. 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.

2.4.1.8. 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.

2.4.1.9. 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 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 2.4 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.

Table 2.4. 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, tourists' expenditure, data on taxes, direct and indirect multipliers for all tourism economic sectors	Employment, income or output data, tourists' expenditure, resident 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

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 sector. Table 2.5 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.

Table 2.5. 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 – 1.29-1.45 Output – 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)

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 labour 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 behaviour 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.

2.4.3. 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 travellers 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 traveller 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 accommodation. Consequently, increasing the percentage of primary-purpose overnight trips would generate relatively high local economic impacts.

Local and non-local visitors have different behaviours 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.

2.5 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 travelled 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 analysing publications written in non-English language from economic impact assessment of NBT articles from academic journals.

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3. CHAPTER THREE

STUDY 2: ASSESING THE INCOME MULTIPLIER OF TRAIL-RELATED TOURISM IN A COASTAL AREA OF PORTUGAL

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Abstract

Rising demand for access to trail networks has encouraged local governments to invest in trail development. This study is the first attempt to estimate the local income multiplier effect of recreational trail tourism, applying an Ad hoc model. The most popular recreational trail in the Algarve region of Portugal was used as a study case to verify the relevance of the Ad hoc model application. The result acknowledges a significant trail-related contribution to the local economy and rural community development. This study suggests the use of the Ad hoc model to assess the economic impact of local-scale outdoor-recreation activities in terms of income generation.

Keywords: Ad hoc model; economic impact; income multiplier; local scale; nature-based tourism; recreational trail

3.1 Introduction

The United Nations World Tourism Organization (UNWTO) has recently declared that trail-related tourism (TRT) is a powerful regional development tool due to social and economic benefits for local businesses and communities (UNWTO, 2019). Walking tourism is inseparable from trails, essential elements in natural and cultural experiences, developed from ancient pathways into routes of great significance for recreation and tourism (Kling et al., 2017). Lately, TRT has become the outdoor activity the represents the most expansion within tourism worldwide (Davies, 2018; Outdoor Industry Association, 2017). This outdoor activity is affordable for most people because it does not require much physical or technical training or specialized equipment (Maples et al., 2020). Furthermore, its tremendous popularity is mostly due to minimal costs (Maples et al., 2020), benefits to human health and well-being (Wolf & Wolhfart, 2014), and a desire to get back in touch to nature (Hetzer, 1965). In addition, researchers have found that

TRT may increase learning and understanding of other cultures or countries (Tangeland & Aas, 2011) and raise environmental awareness (Dorwart et al., 2009).

Accelerated access to trail networks has resulted in the development of various types of trails: winery routes (Jaffe & Pasternak, 2004), cultural and heritage paths (Božic & Tomic, 2016), cycling (MacLeod, 2016), or biking trails (Symmonds et al., 2000). Well-known routes, such as the Trail of Roman Emperors in Serbia, the Inca Trail in Peru, the Trek to Petra in Jordan, and the Tour du Mont Blanc in France reveal a spectacular trail development, today found in urban, rural, coastal, and even underwater settings (MacLeod, 2017). They also demonstrate a high level of investment in trail-related infrastructure, facilities, and services (Oh et al., 2020) through contributions to the local tourism sectors with which TRT has an economic relationship (Arellano, 2011; Kyle et al., 2004). As a result, various tourism-related sectors (e.g., accommodation, restaurants and other food providers, souvenir shops, water sport activities, transportation services, and guided tours) have become the most rapidly expanding businesses in the trails' area.

It is well known that the higher the trail's development, the more satisfied is the visitor (Donovan et al., 2016; Kelley et al., 2016). It is also known that the injection of money from visitors and governmental or private institutions stimulates the local economy. However, what remains to be seen is what kind of economic contribution recreational trail visitors may make to the local area. Many authors recognize the importance of economic impact assessment of nature attractions (Banerjee et al., 2018; Hsu, 2019; Oberholzer et al., 2010). Much of the literature on the economic impact of nature-based tourism is devoted to national parks (Saayman & Saayman, 2006; Saayman et al., 2011), water-based activities (Hsu, 2019), and ecotourism sites (Li et al., 2018; Souza et al., 2019) since they encompass several activities within various spatial-scale sites and involve fixed expenditures, such as entrance fees, slip and mooring fees, and equipment rental. However, TRT comprises only a small part of the literature on economic impact assessment at the regional and national levels (Bowker et al., 2007; Manton et al., 2016; McDonald & Brown, 2015; Raya et al., 2018; Venegas, 2009). This is evidenced in earlier reviews of nature-based tourism research (Moore & Schafer, 2001). Much of the literature on TRT is devoted to the impacts on flora and fauna (Botsch et al., 2018; Miller & Hobbs, 2000; Wimpey & Marion, 2010), environment conservation issues (Ballantyne et al., 2016; Englin et al., 2006; Nepal & Way, 2007), trail user motivations

and priorities (Davies et al., 2012; Kelley et al., 2016; Kim et al., 2015), and maintenance and management (Kubo et al., 2018). 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, with regards to a new walking tourism demand trend and notable TRT infrastructure development, it is essential to have a relevant and validated approach to assess TRT's economic impact and understand its consequences (Dwyer et al., 2010). Although some regional and national studies on TRT economic impact have been published (Bowker et al., 2007; Manton et al., 2016; McDonald & Brown, 2015; Raya et al., 2018; Venegas, 2009), it has not yet been shown which model is the most suitable for a local scale. Besides, no prior studies of trail-related activities have assessed the income multiplier, decomposing the business sector's magnitude and providing evidence for local managers on which sectors they should focus on and invest in more regarding increased income and the development of ecologically responsible TRT. This is the first study that applies an Ad hoc model on a recreation trail to assess its economic impact on income and the model's relevance for a local scale trail destination. As a result, this study bridges the gap in methodological knowledge of economic impact assessment of local TRT attractions. Moreover, it investigates whether TRT can play a propulsive role in a local area regarding economic revival, residents' well-being, and entrepreneurial development.

This study aims to investigate the local economic impact of a recreational trail in the south-western Portuguese region of Algarve and to further examine the relevance of an Ad hoc model for local scale application. To the best of our knowledge, it is the first attempt to estimate the local economic impact of recreational trails and determine whether TRT development plays a propulsive role in the local area.

3.2 Literature review of models for estimating the multiplier effect of tourism

The economic impact is a short-term financial impact, stimulated by tourists' expenditures that cause changes in income, employment, and output value (Dwyer et al., 2010). It is measured in terms of the direct and secondary effects of tourists' spending on obtained travel services. The direct effect is the business owner's revenue from tourist expenditures on products and services. In contrast, the secondary effect refers to a general output of the area rise, such as demand for sufficient resources and employment, and

increased personal incomes due to the tourists' spending that will be re-spent on final goods and services (Archer, 1982; Cooper et al., 2005).

The value of the multiplier describes the total direct and secondary effects resulting from additional tourist expenditure. It is a ratio by which multiplying a change in tourists' expenditure an impact can be estimated on the economy's output, income, value-added, or employment (Fletcher & Archer, 1991). The income multiplier is the most useful mechanism from a policy viewpoint (Lindberg, 2001), and it has been widely applied in tourism studies since the 1990s (Archer & Fletcher, 1996; Heng & Low, 1990; Hsu, 2019; Tafel & Szolnoki, 2020) due to its priority on income maximization (Fennell, 1999).

There are several approaches to analyse the economic impact and calculate the multiplier effect, encompassing two main concepts: input–output (I–O) analysis, developed by Leontief (1936), from which social-accounting matrices (SAM) and computable general equilibrium (CGE) models were later developed (Crompton et al., 2016) and the Keynesian multiplier, from which the Ad hoc multiplier (Archer & Owen, 1971) and the local multiplier (LM3; Thatcher & Sharp, 2008) were developed. Among these, the Ad hoc multiplier and I–O analysis are the most frequently used multiplier approaches in the tourism area (Kim & Kim, 1998; Milne, 1987). Local-oriented approaches, such as the Nordic tourism model (Rinne & Saastamoinen, 2005), have limited application, adapted only by Nordic countries.

For a long time, economic impact assessment, and especially multiplier effect application, in nature-based tourism were ignored. But such assessment has recently been conceptualized as an independent part of tourism and an essential tool for decision-making to enhance rural economies' development (Rinne & Saastamoinen, 2005). The I–O, Keynesian, and Ad hoc models have been frequently used to study the economic impact in wetland ecotourism (Hsu, 2019), national parks (Koontz et al., 2017; Mayer et al., 2010), recreational trails (Bowker et al., 2007; Raya et al., 2018), hunting activities (Saayman et al., 2011), and ecotourism (Li et al., 2018; Souza et al., 2019).

The Ad hoc method is a direct offspring of the Keynesian multiplier model and was constructed to study the regional and local economic impact of tourism based on industry revenue. The model calculates the income multiplier based on spending and leakage patterns and covers only the tourism sector because it does not require sectoral supply

linkages between different economic sectors. Ad hoc method allows economic impact analysis at different geographical levels. However, one of the main model's limitations is that it covers only tourism sector and does not allow analysis on inter-sectoral level and therefore the possibilities for sensitivity analyses regarding the structure of the model are limited. Moreover, Ad hoc model is based on a selection of sectors related to tourism and if visitor spending takes place in sectors outside the tourism industries, it might therefore be impossible to calculate the economic impact (Milne, 1987). When compared with I–O and Keynesian multiplier models, the secondary data needed for the Ad hoc model is easier to obtain and cheaper to operate. However, it is mainly based on primary survey data from tourists, businesses, and residents. Nevertheless, it should be noted that it is time consuming to collect all data through surveys. However, the Ad hoc multiplier model is useful for small-scale studies when there are no clear operating boundaries or statistical data because it includes single consumption as it is simpler to apply (Drakakis et al., 2020; Hsu, 2019).

In contrast, the I–O and CGE multipliers are based on the open model and allow analysis on a sectoral level as they focus on inter-sectoral linkages (Crompton et al., 2016). However, the models require I–O tables and secondary data of supply linkages between tourism and non-tourism firms, which official statistics centers do not publish at lower than the national level in most countries in Europe (Huhtala, 2007). One of the main models' limitations can be addressed by constructing more sophisticated I–O models requiring big economic datasets, which are rarely available in nature-based tourism destinations as well as tremendous efforts in accounting and model simulation. Consequently, the I–O and CGE models have a limited application at local small-scale sites. It is possible to collect these data at the regional level through surveys. However, this data collection task is usually complicated and expensive. For these reasons, researchers are reluctant to implement it by themselves (Eadington & Redman, 2000). Nevertheless, the I–O model might be applied at a smaller than national level applying IMPLAN software (IMpact analysis for PLANning). The software performs the calculations and the databases of each region or state, which are updated annually and 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 country (Crompton et al., 2016). Besides, many critiques of the I–O model application have been made by tourism economists. For example, Larry Dwyer stressed that it is the

most demanding technique for data requirements and manual calculation to prepare and transform I–O tables into I–O models (Dwyer et al., 2005; Dwyer et al., 2010), while Fletcher stated that I–O application for a local and small site is not recommended due to the large bias generated by data disaggregation (Fletcher, 1989). Moreover, the model assumes that there exists a lack of resource limitation between the tourism and non-tourism sectors, ignoring labour mobility and trade from other markets. With regards to CGE model's advantages, economists stressed 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 due to usual data unavailability at nature-based recreation sites (Loveridge, 2004). Thus, we argue that the Ad hoc income multiplier model is the most suitable method for estimating nature-based tourism's economic impact in local-scale areas.

3.3 Research methodology

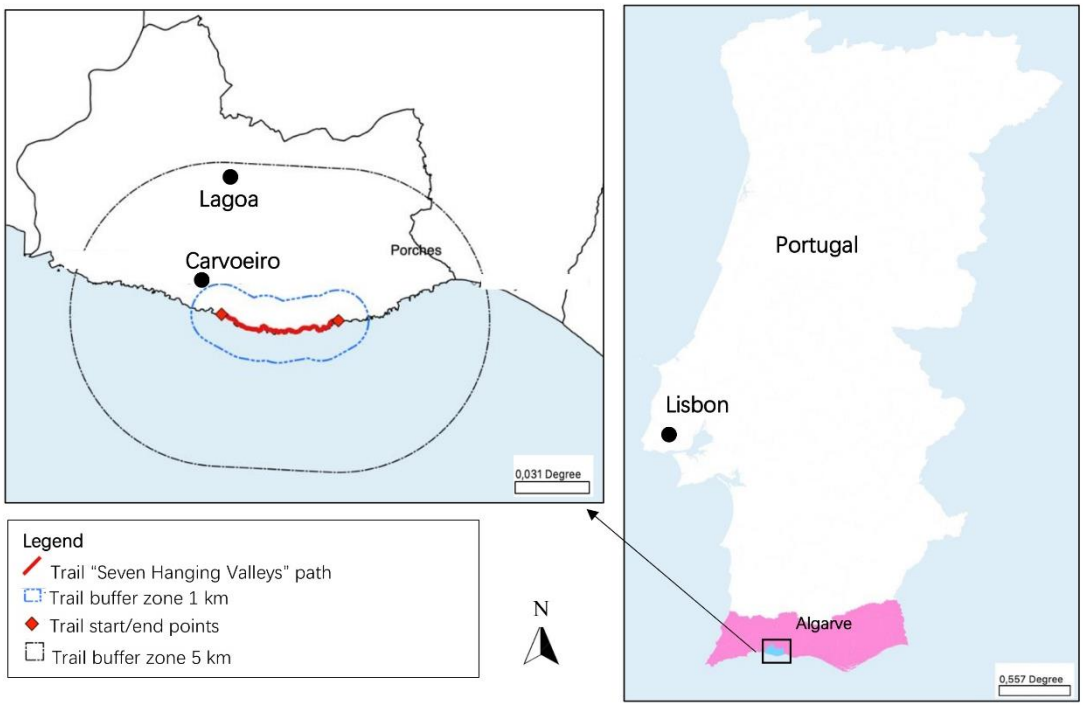
3.3.1 Study site

In economic impact analysis, it is essential to define the study's range in order to consider the degree of money leakage and collect accurate data (Archer, 1982). In the current case, the boundaries of the study area were chosen following previous studies where traditionally official administrative-territorial units such as village, parish, municipality, or even union of several municipalities were chosen (Hsu, 2019; Rinne & Saastamoinen, 2005; Walpole & Goodwin, 2000), covering major tourism activities and attractions.

The study case of this research is the trail called "Seven Hanging Valleys". It is a linear coastal hiking path with an 11.2 km length distance (out and back), located in the parish of Carvoeiro in the southern region of Algarve in Portugal (Figure 3.1). Located about 5 km from the city of Lagoa, the village of Carvoeiro is considered an excellent tourism destination due to golden sand beaches, spectacular cliffs and geological caves, and coastal trails. The Seven Hanging Valleys trail is the most popular in Europe and was recently nominated as one of the best hiking destinations in Europe (European Best Destinations, n.d.). Since 2010, the local municipality has invested in the construction of an intermediate difficulty level linear trail along stunning coastal cliffs connecting the cultural and natural assets between Vale Centianes and Marinha's beaches. The trail was constructed within the public territory and does not cross any reserves or protected areas.

According to the U.S. Forest Service (2011) classification, it is at a highly developed stage. There are fences for safety, route marking and signage, guidelines and information boards, and TOMI (total outdoor media interactive) dashboards. The trail was designed and constructed to mitigate damage to wildlife areas and habitats with various surface materials (stone tracks, raised wooden boardwalks). There is a provision of recreational areas with viewing points, benches, and picnic tables. The trail is wide and relatively smooth, obstacles are not common, and vegetation is cleared outside the trail. The chosen study case boundaries followed Lagoa and Carvoeiro's parish with a total population of 9987 inhabitants, encompassing a trail radius of approximately 5 km.

Figure 3.1 Location maps of "Seven Hanging Valleys" trail in Portugal



3.3.2 The Ad hoc multiplier model

The Ad hoc multiplier model estimates both direct and indirect economic effects from a change in tourist expenditure and calculates the income multiplier based on information obtained from surveys applied to the following populations: trail visitors, local tourism business operators, and residents. The local area in this study was defined as the territory of Lagoa and Carvoeiro's parish. The simplified Ad hoc multiplier formula and technical calculation were adopted by Archer and Owen (1971) and recently adjusted by Hsu (2019) for a local economic impact study of ecotourism in Taiwan. The author suggested transforming the difference between the residents' expenditure and leakage of

money out of the study area into residents' income. The income multiplier is calculated following the adjusted equation below (Hsu, 2019):

$$m = \sum_{i=1}^{n} K_i V_i \times \left\{ \frac{1}{1 - L \sum_{j=1}^{n} Z_j V_j} \right\}, \quad (1)$$

where *i* refers to different business sectors of (economic activity; $i = 1, \ldots N$); *j* defines household consumption categories ($j = 1, \ldots, n$); Ki is the proportion of tourists' expenditure spent in the *i*-th business sector; V_i is the proportion of revenue left in the local area in the *i*-th business sector; *L* is the average propensity to consume; Z_j is the proportion of household consumption in the local area in the *j*-th category; and V_j is the proportion of household consumption in the *j*-th category (obtained from a national country survey). The business sectors, *i*, that are directly or indirectly affected by the tourists' expenditures include various businesses linked with the TRT in the local area (e.g., accommodation, transportation, restaurants, etc.). Inclusion of business sectors in the multiplier effect calculations depends on whether a trail visitor spends money in a particular business that must be incurred. The household consumption categories, *j*, are obtained from a secondary data source—the European Classification of Individual Consumption, according to Purpose (see Table B1, appendix B). The local study area is well developed and adapted not only to international long and short-term tourism but also to residents, therefore there is a provision of products and services described in Table B1 as following: food and non-alcoholic beverages; alcoholic beverages, tobacco and narcotics; clothing and footwear; furnishing household equipment and routine household maintenance; health; transport; recreation and culture; education; restaurants and hotels; miscellaneous goods and services. However, the local consumption of housing, water, electricity, gas and other fuels excludes electricity, provided by the regional Portuguese Energy Services Regulatory Authority, while the local municipality provides water, gas and fuels. Moreover, the category of communication is excluded from local consumption because local connection operators do not exist. Regarding the category of education, it is important to note that local consumption falls under kindergartens, primary and secondary schools, but not universities. The K_i parameter is estimated through survey data from trail visitors as follows:

$$K_i = \frac{s_i}{S}, \quad (2)$$

where S_i is the tourist expenditure spent in the business sector *i* (€) and *S* is the total tourist expenditure in all selected sectors of businesses (€). The parameter V_i is estimated through data collected from a survey of local business operators through the following expression:

$$V_i = \frac{W+P+F+\sum_{a=1}^{n} M_{ia}V_a}{P_i} , \quad (3)$$

where *W* refers to net wages and salaries paid to residents in the local area; *P* refers to the net profits accruing to residents in the local area; *F* indicates net rent payments to residents in the local area; M_{ia} indicates cost payments for goods and services made by the *i*-th business sector to the *a*-th business category in the local area; V_a indicates a direct and indirect income coefficient for the *a*-th business sector; and P_i is the total turnover of the *i*-th business sector. The parameter Z_j is estimated from data collected through a residents' survey using the following expression:

$$Z_j = \frac{l_e}{t_e} , \quad (4)$$

where l_e is the residents' expenditure in the local area in the *j*-th category (€) and t_e is the total residents' expenditure in the *j*-th category (€). The parameter *L* is also estimated through data collected from the residents' survey as follows:

$$L = \frac{mC}{mY} , \quad (5)$$

where *mC* is the total household expenditure per month (€) and *mY* is the total household disposable income per month (€).

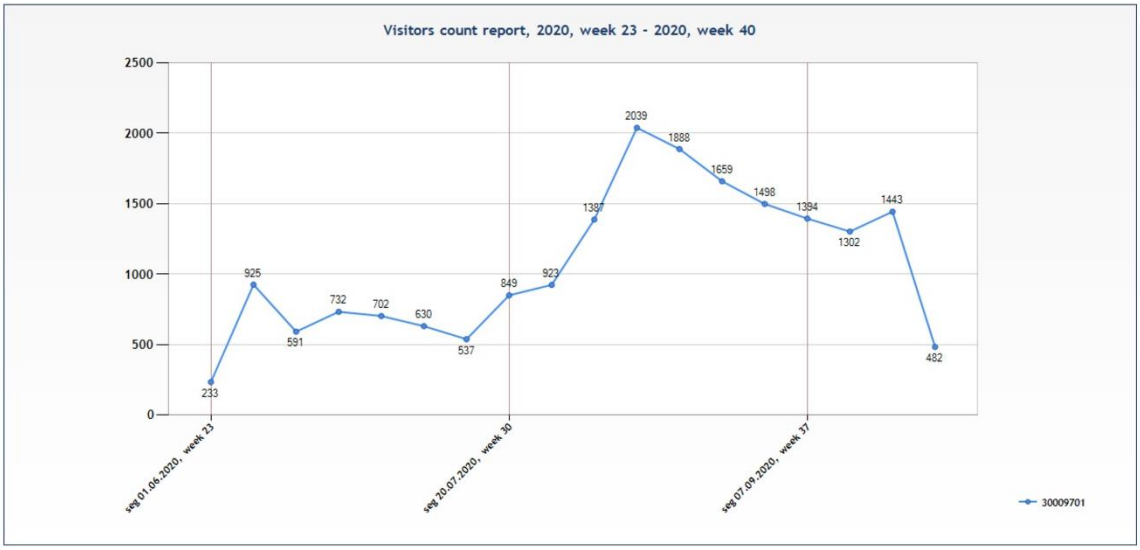
3.3.3 Data collection

Estimation of the total number of trail visitors

Trail visitor expenditure was estimated during the high tourism season, which in Algarve covers the period from June to September. To estimate the total number of trail visitors during that season, wireless bidirectional people-counting sensors (SensMax) were installed to detect visitor movement up to a range of 50 m. These sensors do not distinguish between adults and children, and therefore all trail visitors were counted. Sensors were installed at the waist level to not skew the counting by wildlife passing

through the sensor range. The device counts both directions of trail visitor movement. In total, three sensors were installed at different trail sites. It enabled us to ensure continuous data counting. In addition, to avoid counting tourists entering the trail to reach the beach or take a photograph without using the trail for recreation, the sensors were installed a sufficient distance from the trail entrance/exit. The analysis of collected data was performed using SensMax Easy Report 13.9 software (SensMax Ltd., Latvia). The results are presented in Figure 3.2. An average was computed and used for estimating the total number of trail visitors in the high season.

Figure 3.2 Number of trail visitors during the sampling period of June 1, 2020 to September 30, 2020 at the trail site of "Alfanzina lighthouse," Carvoeiro, Portugal



No.	Sensor Name	Serial	POSID	Time Gap	Visitors	Week No.
1		30009701		01.06.2020 - 07.06.2020	233	23
2		30009701		08.06.2020 - 14.06.2020	925	24
3		30009701		15.06.2020 - 21.06.2020	591	25
4		30009701		22.06.2020 - 28.06.2020	732	26
5		30009701		29.06.2020 - 05.07.2020	702	27
6		30009701		06.07.2020 - 12.07.2020	630	28

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Trail visitors' survey design and administration

To gather socio-demographic characteristics, visitor behaviour, and the average expenditure per visit of the trail visitor, a structured questionnaire was designed based on the literature regarding economic impact studies applied in nature-based tourism (Bowker et al., 2007; Hsu, 2019; Koontz et al., 2017; Maples et al., 2020; Raya et al., 2018). The questionnaire comprised two main parts: a socio-demographic profile and an economic impact assessment.

The first part contained 10 questions related to visitors' country of residence, age, gender, level of education, occupation, composition of the group, frequency and duration of trail visitation, mode of transportation to reach the trail, and if the trail was the main reason to be in the local area. The second part contained questions about trail visitors' expenditures in each business sector (food and drinks in restaurants, accommodation, transportation, car rental, guided tours, local products, and water sports).

The target trail visitor population was defined as all national and international trail visitors and not living in the study area. The estimated population size (N = 19,214) of trail visitors during the high season, obtained from bidirectional people-counting sensors, was considered to obtain a representative sample (Figure 3.2). The sample size was calculated using a simple random sampling formula for quantitative variables of interest (Bryman, 2015). Initially, a pilot survey (n = 20, selected by surveying every other trail visitor aged 18 or older) was conducted to ensure the questionnaire's consistency and clarity. Moreover, the pilot survey allowed us to estimate the average and standard deviation of trail visitor expenditure, chosen as a quantitative variable of interest to calculate the sample size. We estimated an average trail visitor expenditure per visit of €76 with a standard deviation of €12.16. Using a 95% confidence level and a 2% margin of relative precision, we computed a sample size of 240 trail visitors.

Surveys were administered face-to-face on the trail site, following a systematic random sampling method to keep the sampling process simple and increase representativeness (Taherdoost, 2016). After a random start point, every fifth trail visitor aged 18 or older was selected. In case of families or groups with children, a respondent aged 18 or older was selected. Additionally, we chose a variety of census days (including weekdays and weekends), different times of the day, and different weather conditions to reflect variations in trail visitation from June through September 2020.

Residents' survey design and administration

To learn how the trail visitor expenditure contributes to the local community's economy, it is necessary to estimate parameters Z_j and L. Since data required for this estimation have not been previously published in any local statistical source, data were collected through a survey of residents within Lagoa and Carvoeiro's parish. For this purpose, a questionnaire was designed, comprising socio-demographic questions (gender,

age, occupation, size of household) and economic expenditure questions: how much each resident spends per month in total, and in the local area, in each household consumption category. Finally, residents were asked to estimate their total household expenditures per month as a proportion of total income.

The target resident population was defined as a group of people who, regardless of being present or absent in a given accommodation at the time of sampling, lived in their usual place of residence, within the Lagoa and Carvoeiro's parish, for a continuous period of at least 12 months before the time of sampling (INE, 2020). The Lagoa and Carvoeiro parish's total resident population was considered to obtain a representative sample. The sample size was calculated using a simple random sampling formula using the resident monthly expenditures as a variable of interest. To estimate the average and standard deviation of resident monthly expenditures and calculate the sample size, a pilot survey (n = 10) was conducted. A sample size of 62 residents was estimated from a population of 9987 residents and using a standard deviation of €61.5, a 95% confidence level, and a 2% margin of relative precision.

Face-to-face interviews were conducted from August through October 2020. The random route sampling technique was used to select households for the sample (Bauer, 2014). Only one person in each household was invited to answer the questionnaire. Every other household was selected to be interviewed due to a low urbanization density. This also ensured a representative sample, but we faced several challenges in sample selection, such as encountering inaccessible, vacant, or holiday houses, and several households refused to participate in the survey. In total, 62 valid questionnaires were collected.

Businesses' survey design and administration

To determine the proportion of revenue left in the local area in each tourism business sector (V_i), it was necessary to conduct interviews with local business operators. Information about revenue, cost, net profit, and local expenditure was gathered through personal interviews with the business owners, applying the convenience sampling technique. This method was chosen because there was not a sampling frame of the target population (Oberholzer et al., 2010), and there was a high risk of some business owners refusing to answer some questions due to tax evasion problems (Hsu, 2019). Seven business sectors were selected that matched trail visitor expenditure sectors: guided tours,

accommodation, transportation, restaurant, local products, car rentals, and water sports. Since there was no target sample size, at least one company from each business sector was interviewed. The survey was administered from June through October 2020 using face-to-face and telephone interviewing methods.

The business survey was difficult due to issues of confidentiality. To receive responses from at least one enterprise in each sector, we involved the local municipality in the surveying process to increase business owners' trust in sharing the information. In total, 18 business were interviewed: three restaurants and small cafes, four accommodation units (hotels, hostels, Airbnb listing), five transportation companies (Uber, taxi, tourist transfer), one car rental enterprise, two guided tour enterprises, two local product shops, and one water sports enterprise.

3.4 Results

3.4.1 Trail visitor characteristics

A total of 219 trail visitors provided complete answers, since 12 respondents were dropped from the sample because they did not provide economic expenditures. Another nine respondents were excluded because they live within the study area.

Socio-demographic characteristics of trail visitors are presented in Table 3.1. It shows that the percentage of men (52.2%) and women (49.8%) visiting the trail was more or less equal. The average age of trail visitors was 40 years (min 18, max 69). The number of visitors from Portugal (17.4%) was significantly lower compared to international visitors (82.6%); of these, the greatest proportions of visitors were from France (17.8%), Spain (14.2%), England (13.2%), Germany (10.5%), and the Netherlands (8.2%). The results show that most respondents had a university degree (84.9%), followed by a minority of respondents with secondary school education (15.1%). Approximately 78% of trail visitors were employed, followed by a minority of respondents who were retired (8.2%), unemployed (7.3%), household managers (1.8%), and students (4.6%). For more than 73% of trail visitors, the trail was the main reason for being in the area. In comparison, the rest of the 27% of visitors were on the trail due to other reasons such as unplanned visit, a long-term stay in the local trail area for a holiday purpose, or a trail visit as a part of a more extended trip in the region.

The most common way to reach the trail was by car (68%). The second most frequent mode of transportation was walk/run (23%), and only a few respondents used a taxi/Uber (6.4%), bus (2.3%), or scooter (0.5%) to reach the trail. Surprisingly, in the group of walkers/runners, the average age was 48 years, which was higher than for other modes of transportation users.

Table 3.1. Socio-demographic profile of trail visitors (n = 219)

Variable	**Categories**	**%**	**Mean ± SE**
Gender	Female Male	49.8 50.2	
Age	*Continuous variable*	-	39.96 ± 12.1
Origin	International Portuguese	82.6 17.4	
Education	BSc MSc Secondary school PhD	54.3 27.9 15.1 2.7	
Occupation	Employed Retired Unemployed Self-employed Student Managing household	72.6 8.2 7.3 5.5 4.6 1.8	
The trail as the main reason to be in the area	No Yes	26.9 73.1	
Mode of transportation	Car Walk/run Taxi/Uber Bus Scooter	68 22.8 6.4 2.3 0.5	
Composition of the trail visitor group in persons	*Continuous variable*	-	1.98 ± 0.8
Duration of the stay on the trail site	Half a day 1-2 hours 30-60 min Less than 30 min All day Overnight	47.9 32.4 11.4 4.1 3.7 0.5	
Frequency of use of the trail	First time user Less than few times a year Few times a year Several times a week Every day	79.0 14.1 3.7 2.7 0.5	

The most frequent group size was two persons, which accounted for 60.7% of trail visitors. There were marked differences in the split between day-trippers and overnight visitors. Almost half of the day visitors (47.9%) spent half a day, representing the majority.

However, only 0.5% of visitors stayed overnight at the trail site. Almost four-fifths (79%) of the visitors visited the trail for the first time. The remaining one-fifth comprised repeaters, of whom 14% reported visiting the trail less than a few times a year; the majority of repeat visitors were local Portuguese. Everyday visitors accounted for the smallest number of visitors; these were usually long-term tourists who were staying within the Carvoeiro area.

3.4.2 Structure of expenditure

To accurately estimate the local economic impact, all visitor expenditures reported by both alone adult individuals and groups including children were recorded. This is a crucial step in multiplier effect estimation because previous studies have shown that visitors who are part of groups tend to spend less. In contrast, previous studies found that the group's real economic impact is higher than the individual visitor with higher personal expenditures (Rinne & Saastamoinen, 2005; Souza et al., 2019). Of the total sample, visitors who were part of groups accounted for the majority (75.7%), and individual accounted for 24.3%.

Visitors spent a large proportion of their expenditure on accommodation, restaurants, and car rental sectors, including staff employment taxes, which increased service prices by itself (see Table B2, appendix B). Even though the percentage of overnight trail visitors was only 0.5%, the comparatively high cost of overnight accommodation in the Lagoa and Carvoeiro parish for these visitors skewed the proportion of expenditure for the total sample. Guided tours and water sports constituted the smallest portion of visitor expenditures. In total, we estimated that an individual trail visitor spent €85 per visit, while a group visitor spent €73 per visit in the study area.

Overall, a few expenditures stand out. The smallest is car rental expense, which was almost double for individual trail visitors because the cost was not shared by a group. The second smallest portion is the expenditures for water-related activities, showing their lack of popularity among trail visitors.

3.4.3 The income multiplier

Trail visitor expenditure resulting from the activity is the initial direct income effect, which increases turnover in identified business sectors affected by trail visitor

expenditure. Based on the trail visitor population of 19,214 (Figure 3.2) and average individual (€85) and group visitor (€73) expenditure per visit, with a share of 75.7% of group visitors and 24.3% of individual visitors, it was estimated that trail visitors spent €1,390,553 in the study area when visiting the trail in the high season of 2020 (see Table B3, appendix B).

To identify the proportion of revenue left in the local area (V_i) and estimate the indirect income effect, we interviewed representatives from 18 significant businesses within the trail area: three restaurants and small cafes, four accommodation units (hotels, hostels, Airbnb listing), five transportation companies (Uber, taxi, tourist transfer), one car rental enterprise, two guided tour enterprises, two local product shops, and one water sports enterprise.

Overall, among trail visitor expenditures, the highest percentage of the final revenue left (52%) was for guided tour enterprises' income (see Table B4, appendix B). This is because of the usual structure of the enterprises: they do not typically have many employees, and commonly the business owner himself or herself is the tour guide. Therefore, wages and taxes are relatively low compared to other sectors, such as accommodation or car rentals. Consequently, money leakage is minimal, and the profit remains in the local area. The second sector with the highest percentage of revenue left was restaurants (48%), mostly due to the relatively small propensity to import. Most of the local restaurants buy food and beverage products from local areas and employ local staff. By contrast, the car rental sector generated the least percentage of revenue left. It represents the highest money leakage out of the study area because of the high level of taxes, non-local employees, and many goods and services imported from outside the local area. Moreover, the transportation and accommodation sectors represent large money leakage because, in general, these sectors have linkages with other non-local sectors and tend to supply inputs and demand outputs from outside the local area (e.g., cars, accommodation furniture, staff employment, non-local food and drink for a luxurious hotel restaurant).

Finally, to estimate the induced income effect stimulated by residents' consumption due to trail visitor expenses, 62 questionnaires from residents were obtained. Socio-demographic characteristics of the sample of residents are presented in Table 3.2. The results show that female respondents (53.2%) slightly outnumbered male (46.8%). The

average age of residents was 46 years. The majority of residents were employed (64.5%), followed by self-employed (22.6%), retired (11.3%), and unemployed (1.6%). The average number of people living in the household was three. Finally, Table 3.2 shows that average propensity to consume was 0.77.

Regarding the ratio of local expenditure to total expenditure in each household consumption category (Z_j), several categories stand out (see Table B5, appendix B). First is communication, which resulted in zero local expenses since most of the mobile network and Internet operators are not established locally. The second category was clothing and footwear, with meagre local expenses due to expensive touristic boutiques and limited market of clothing and footwear providers within the study area. Finally, education and health represent the lowest local expenditure category mostly due to private and expensive health and education services within the study area, targeted to wealthy long-term tourists, but not to the national resident population.

Table 3.2. Socio-demographic profile of residents (n=62)

Variable	**Categories**	**%**	**Mean ± SE**
Gender	Female Male	53.2 46.8	
Age	*Continuous variable*	-	45.92 ± 14.39
Occupation	Employed Self-employed Retired Unemployed	64.5 22.6 11.3 1.6	
Number of people living in the household	*Continuous variable*	-	2.66 ± 1.17
Average propensity to consume (*L*)	*Continuous variable*	-	0.77 ± 0.22

Based on findings of direct, indirect, and induced income effect, the final value of income multiplier was 0.72, which means that each euro spent by trail visitors will generate €0.72 as local income per high tourism season from June to September. In other words, an additional visitor expenditure of €1 million will yield €0.72 million for the local economy. Multiplying the total tourist expenditure by the income multiplier, a local economic impact of €1,001,198 per high tourism season from June to September was estimated. This shows a significant trail visitor contribution to the local economy and community development.

By decomposing the multiplier, the share of contribution of different business sectors was as follows (Table 3.3): 29% for restaurant, 22% for accommodation, 15% for

local products, 14% for transportation, 11% for car rentals, 7% for guided tours, and 1% for water sports. These results show that almost one-third of the total indirect effect falls to the restaurant sector. It is the most significant contribution to the local economy and, together with the accommodation sector, accounts for one-fifth of the total indirect effect.

Table 3.3. Economic impact and decomposition of the income multiplier by local business sectors

Local economic impact	**€ 1,001,198**	
Income multiplier	**0.72**	
Restaurant	0.21	29.2%
Accommodation	0.16	22.2%
Local products	0.11	15.3%
Transportation	0.10	13.9%
Car rentals	0.08	11.1%
Guided tours	0.05	6.9%
Water sports	0.01	1.4%

3.5 Discussion

Trail visitor expenses for accommodation, restaurant food and drinks, and car rentals were among the highest expenditure categories, corroborating previous studies of trail recreation (Bowker et al., 2007; Raya et al., 2018). This study found that most trail visitors used a private vehicle to reach the trail because the public transportation service is not well developed around the trail. Walkers staying near the trail were identified as the most senior visitors. This reflects the fact that the trail has become a luxury tourism destination in Algarve and is hardly affordable for younger and lower-budget visitors. Interestingly, expenses in the restaurant and transportation sectors were among the highest reported by most nature-based tourists: rock climbers in West Virginia (Maples et al., 2020), wetland ecotourists in Taiwan (Hsu, 2019), greenway users in the European cycle route network (Manton et al., 2016), national park visitors in Germany (Mayer et al., 2010), and marine park visitors in South Africa (Oberholzer et al., 2010). Only Chhabra (2007) found contrasting results, identifying that recreation equipment represented the highest expense of female nature travellers.

Nevertheless, trail visitor expenses have several determinants. First is the stage of trail development. Higher trail visitor expenses are expected to accompany higher stage of development due to various entertainment and touristic services. Raya et al. (2018) found that every euro invested in hiking trails generates a €4.92 value for the community, while Souza et al. (2019) found that investments of approximately $220 million for

infrastructure development in protected areas would increase visitation and generate another $1 billion in total added value. The "Seven Hanging Valleys" trail is a short distance and has reached a high development stage, which, according to this study, has resulted in over €1 million in income returns during the high tourism season. The results of this study support the previous findings of Sandbrook (2010) that TRT, as a nature-based tourism form, creates significant new income streams and benefits for local people.

The second determinant is the main activity on the trail. Previous studies have found that biking activities on the trail represent lower expenses than other outdoor activities. At the same time, walkers are likely to have better substitutes than bikes. Usually, they travel long distances to the destination and spend more on travel and other trail-related goods (Bowker et al., 2007; Manton et al., 2016). The majority of Seven Hanging Valleys visitors arrived by car (68%), and most of them used the trail only for walking/hiking (65%) since it is not adapted for biking. Therefore, a big part of their expenses was in the restaurant and car rental sectors. However, a combination of several activities on the trail would be tiring, since the trail is rated as a moderate difficulty level, and it takes approximately 6 h to walk both ways.

The group size is one of the critical factors because there is evidence that group visitors tend to spend more than individuals (Rinne & Saastamoinen, 2005; Souza et al., 2019). This study found that the most frequent group size was two persons, with slightly lower total mean expenses, mostly due to budget share. This finding is in good agreement with the results of Bowker et al. (2007), Luzar et al. (1998), and Oberholzer et al. (2010) that outdoor recreationists usually travel in groups averaging 2–4 people.

Finally, repeat outdoor recreation visitation is the crucial determinant of economic impact. It was indicated that repeat visitors tend to incur higher expenditures (Chhabra, 2007; Oppermann, 1998). Even the majority of Seven Hanging Valleys trail visitors were first-time trippers (79%); and the second most frequent group was trail visitors arriving a few times per year (14%). This implies a high potential to increase repeat visitors' attraction, their expenses, and the income multiplier effect through continuous trail site development.

The comparison of multiplier results is presented in Table 3.4. Crompton et al. (2016) determined the variations of economic impact multipliers, disclosing significant differences in their magnitudes due to different models applied from which multipliers

are derived. They found that the SAM multiplier is always larger than I–O and CGE, while Keynesian or Ad hoc multipliers are hardly comparable with I–O multipliers and their offspring. 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 income multiplier value of 0.72 estimated in this study was larger than for water-based tourism, wetland ecotourism, or local-scale ecotourism. The magnitude of the multiplier depends mainly on the economy size and economic behaviour of visitors, which are the most critical variables in terms of intersectoral linkages and leakage that determine tourists' expenditure multiplier effect (Archer & Fletcher, 1996). The reason why the income multiplier of TRT is the largest within the category is mainly because of lower taxes, lower import propensity, availability of local human resources, lower saving propensity due to the rising cost of living, and the presence of local businesses owned by residents. For instance, the total effect of the income multiplier of the water-based activities of scuba-diving and windsurfing in the area of Messia (Greece) is lower because of the higher import of equipment propensity and employment of non-local people (Drakakis et al., 2020). Almost the same income multiplier value was obtained by Hsu (2019) for wetland ecotourism in Cigu lagoon, mainly because most of the businesses are family-owned and small enterprises.

Table 3.4. Comparison of tourism income multipliers in various nature-based activities derived from the Ad hoc model

Country	Type of study area	Income multiplier	Reference
Greece	Water-based tourism	0.57	Drakakis et al. (2020)
Portugal	**Local TRT**	**0.72**	-
Greece	Local ecotourism	0.55-0.67	Baaijens et al. (1998)
Taiwan	Local wetland ecotourism	0.58	Hsu (2019)
Mauritius	Local ecotourism	0.42	Archer (1989)

The large income multiplier is essential for decision-makers and sustainable nature-based tourism planners because it helps clarify the relationship between tourism, resource protection, and economic benefits. It serves as an indicator of successful and profitable TRT development in the local area due to conditions to operate independently from external and multinational linkages. Table 4 shows the lack of application of the Ad hoc model in the field of tourism in recent years, as the I–O technique was the most frequently applied in recent studies (Koontz et al., 2017; Li et al., 2018; Raya et al., 2018; Souza et al., 2019). Nevertheless, this study demonstrates the relevance of the Ad hoc model to

estimate the local economic impact and the income multiplier effect of nature-based tourism destinations at a local scale, because the economic impact of nature-based recreation topic has not yet been widely investigated.

However, care should be taken while interpreting and comparing the results due to variations in study characteristics: the time when the multiplier was computed, the local economy's size, and the population size of the study area. The case of Mauritius perfectly demonstrates this issue because the study of income multiplier was conducted more than 30 years ago, and it is an island where most products are imported. As a result, the income multiplier for Mauritius ecotourism is comparatively low. Nowadays, due to society's gradually increasing economic well-being, as well as travel, tourism and leisure-related expenses, it is expected that income multiplier have grown accordingly (Balaguer & Cantavella-Jordá, 2002). This is adequately shown by the tourism-led growth hypothesis, which recently has been confirmed by the relationship between tourism and economic growth in most of the world's touristic countries (Shahzad et al., 2017). Partridge et al. (2009) pointed out that the indirect effect in rural areas is likely to be smaller than in urban areas due to the presence of relatively few businesses to supply inputs and demand outputs from the shocked sector, as is confirmed in the cases of local tourism in Lesvos island (Greece) and wetland ecotourism in Taiwan. The current study partially contradicts the general consensus in the tourism literature that local-scale tourism destinations have lower total multipliers than larger counterparts. Nevertheless, it is possible to assume that the smaller multiplier effect will likely occur in a range from underdeveloped destinations or regions to underdeveloped recreational trails. Aside from the fact that Carvoeiro is a comparatively small parish, the results of a large income multiplier demonstrate high development, where the trail is one of the main nature-based recreation attractions. The values of income and employment multipliers related to TRT found in previous studies (Bowker et al., 2007; Raya et al., 2018) have shown that the income multiplier is always more significant than the employment multiplier. According to MacLeod (2016), continuous trail development can increase visitor spending and build a strong network to improve local business performance by increasing the income multiplier effect.

Interestingly, the highest share percentage of income multiplier was determined for restaurants and accommodation. This implies that the restaurant and accommodation business should be supported to boost the local economy in Carvoeiro and Lagoa. The highest share percentage of the multiplier in restaurants was determined by wetland

ecotourism (Hsu, 2019). However, the water sports, guided tours, and car rental sectors contributed the least to the local economy because they are small businesses owned by non-local residents, operating only during the high tourism season and therefore generating high money leakage.

3.6 Conclusions

In this study, the economic impact of TRT was evaluated, offering evidence for a propulsive TRT role on local economic development. Comparatively little research has been dedicated to TRT economic impact and income multiplier. Our findings contribute to filling this gap by assessing local economic impact and income multiplier values per business sector. This contribution is unique because, as far as we know, no previous studies have been done, there is an increasing demand for trail-related recreation across the globe, and tourism economists have been trying to find the most relevant economic impact analysis model for local scale destinations.

By applying the Ad hoc model to calculate the income multiplier of the coastal trail visitor's expenditure in southern Portugal, it was found that the income multiplier is 0.72 per the high tourism season. In total, we estimate that visitors spent €1,390,553 per high tourism season and created an economic impact of €1,001,198. Compared to previous studies on the nature-based tourism income multiplier, this result represented the highest local TRT multiplier for local-scale range studies. It implies a very high TRT development level achieved at the local scale. Moreover, it implies that TRT might be highest in local income generation and rural community development. The development of TRT has diversified local employment opportunities and general nature-based tourism planning. Therefore, further continuous promotion of TRT should be supported through new policies and local government. The results might be used as a basis in the decision-making process, providing a strong emphasis on the great potential of TRT to generate new income. Additionally, this study may be well applied by relevant studies seeking to determine whether TRT plays a propulsive role in other local areas, and which sectors play a vital role.

Regarding managerial implications, this study suggests that TRT tourism marketers should use the results of this study to determine how economic impact can be enhanced in a manner that protects the natural and cultural assets that attract visitors in the first place. Therefore, TRT tourism marketers should target or focus more on restaurants and

accommodation sectors if they are aiming to increase income in their region. Moreover, this study suggests the primary avenue for trail managers and regional policymakers to increase recreational trails' economic leverage through qualitative upgrading by inducing visitors to increase their expenditure. Qualitative measures could increase expenditures and the services' quality, leading to an enhanced recreational outdoor experience. Qualitative upgrading has excellent potential to contribute to ecologically responsible outdoor recreation while creating income in local rural communities.

Regarding the methodology, our research proposes using the comprehensive Ad hoc approach to estimate the local economic impact and income multiplier effect of outdoor recreation activities. It is useful for local-scale destinations due to the exclusion of sophisticated statistical resources, which are rarely available for local areas. Admittedly, the proposed approach requires resources and time to generate the necessary data to meet the model's requirements; however, it is more relevant because it uses primary data collected only by surveys and excludes massive statistical inputs, which are often out of date and result in distorted results.

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4. CHAPTER FOUR

STUDY 3: RECREATIONAL TRAIL DEVELOPMENT WITHIN DIFFERENT GEOGRAPHICAL CONTEXTS AS A DETERMINANT OF INCOME MULTIPLIER AND LOCAL ECONOMIC IMPACT

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Abstract

The development of recreational trails has gained popularity in recent years and therefore many scholars have studied various aspects of them. However, the recreational trail theoretical framework lacks an understanding of the relationship between the stage of trail development and income multiplier value. This research aims to examine this relationship and thus advance the traditional theory of recreational trail economic impact by providing an explanation of the relationship between the stage of trail development and the income multiplier. This study applied a combined approach of Recreation Opportunity Spectrum (ROS) to assess the stage of trail development and the Ad hoc model to estimate the income multiplier and economic impact. The results of this study reveal that there is a strong correlation between the stage of trail development and income multiplier and provide a novelty in traditional recreational trail management and economic impact theory thus enriching the topical literature.

Keywords: stage of trail development; ROS framework; income multiplier; economic development; recreational trails; Ad hoc model

4.1 Introduction

Trail-related recreation (TRR) has been viewed as an offshoot of nature-based tourism (NBT) and is a strategic focus area from a local and regional development perspective (Tyrväinen et al., 2014). Recreational trails provide access to the largest array of nature-based activities in both urban and rural environments (Monz et al., 2013) and today are increasingly popular (UNWTO, 2019). The popularity of recreational trails has increased dramatically due to COVID-19 epidemic restrictions owing to perceived risk, social norms, authorities' recommendations, health benefits, and lifestyle changes

(Mateer et al., 2021). Hazlehurst et al. (2022) and Reid et al. (2022) showed that recreational trail areas are associated with various types of resilience during the COVID-19 pandemic as recreational trail usage is easily compatible with social distancing requirements while still facilitating social interactions, providing a family friendly environment and bolstering adolescents' resilience to stressors of pandemic restrictions (Jackson et al., 2021). According to recent studies, the increase in trail visitors in Italy, Spain, South Korea, Sweden and Japan was between 0 and 50% compared to the time prior to the COVID-19 pandemic, whereas the increase in park visits in the United Kingdom, Denmark and Canada was over 100% (Geng et al., 2021).

The theory of Archer (1989) states that economic impact stimulated by tourists' expenditures in tourism-related sectors causes changes in income, employment, and output value. Nature-based recreation scholars have adapted it to TRR as an alternative recreation form to sun and sea tourism, postulating that it has the potential to boost local, and more importantly, rural economies and provided supporting evidence (Bowker et al., 2007; Fredman & Tyrväinen, 2010; Huhtala, 2007; Lukoseviciute et al., 2022a; Raya et al., 2018). Consequently, trails became more important for NBT development resulting in more public and private investments by tourism providers, public agencies and landowners. At the European level, recreational trails have received a strikingly high share of the funds spent on tourism through co-financing programmes such as INTERREG (Stoffelen, 2018) and collaborations with private entities (Wilkes-Allemann et al., 2020). Meanwhile, outside of Europe, New Zealand recently launched a recreational trail development programme with a 10-year budget of €341 million (New Zealand Government, 2021).

With increases in trail funding and trail area developments, business owners see new business opportunities as trail visitors spend more money on purchasing their nature experiences, associated goods and services (e.g., safety, information, food and drink facilities, visitor centres, accommodation, guided tours, equipment rentals) and businesses can then benefit from such trends that best fit their local resources, location and skills (Bowker et al., 2007; Raya et al., 2018; Santarem et al., 2015; Taylor, 2015). However, decisions about investments, trail area developments and applications of trail management strategies depend on a trail's geographic location, natural setting, and purpose of use. Recreational trail development has recently been growing worldwide due

to a broad recognition that TRR might optimally contribute to economic growth, rural development and income diversification in line with environmental sustainability (Ahtikoski et al., 2011; Bennett et al., 2003). There is a wide recreational trail network, encompassing developments of diverse scales, and stages, and including itineraries with diverse themes (All Trails, 2022; Greenway, 2018). The stage of trail development indicates that recreational trail construction and development may range from minimally developed to highly developed depending on tread and traffic flow characteristics, obstacles, constructed features and trail elements, signs, and the recreation opportunity spectrum (ROS) class (U.S. Forest Service, 2011). When it comes to the development of a recreational trail area, especially one that requires substantial investment, the most important indicators of successful trail implementation and development are the economic impact and income multiplier, which explain how the economic benefit attained is dispersed in the local region (Hsu, 2019). Previous literature suggests that the income multiplier of recreational nature-based activities and destination developments should differ primarily due to site development and investments in recreational opportunities provision (Banerjee et al., 2018). In the case of recreational trails, previous research by Drakakis et al. (2021) and Lukoseviciute et al. (2022a) estimating income multipliers of horseback riding trails and recreational coastal trails yielded significantly different income multiplier values of 0.57 and 0.72, respectively, but with no explanation as to whether it is due to different development stages or other factors. According to nature-based recreation and economic scholars, besides the market features such as trail visitor demand, their expenditure and the size of NBT and recreation industries, there are non-market features such as scenery, wilderness and weather, and geographic location; which cannot be altered by higher trail development; thus destination popularity and trail visitor expenses are also functions of non-market features (Archer, 1989; Fredman et al., 2012; Lukoseviciute et al., 2022). Therefore, it remains unclear whether higher stages of trail development determine greater income multiplier. As such, the paradigm for developing recreational trails lacks information about economic performance and outcomes and if it can be improved and/or prevent financial losses. Unlike the sun and sea recreation research domain, there is a lack of prior research on recreational trails and their economic impact as nature-based activities. It wasn't until the beginning of the 2000s that NBT was considered as the primary economic impact drivers (Bowker et al., 2007; Cook, 2008; Raya et al., 2018). NBT practitioners and scholars have continued to express the need for an explanation of the dynamics between stages of trail development and the magnitude

of income multiplier, which would explain the TRR economic performance, as well as allowing implementation of improved trail development strategies and balanced distribution of trail funds (Kelley et al., 2016). Using the traditional theory of recreational trail economic impact as a foundation, this study aims to examine the relationship between the stage of trail development and the income multiplier, and to expand the traditional recreational trail development framework by attempting to explain how the stage of development alters the income multiplier.

4.2 Theoretical framework

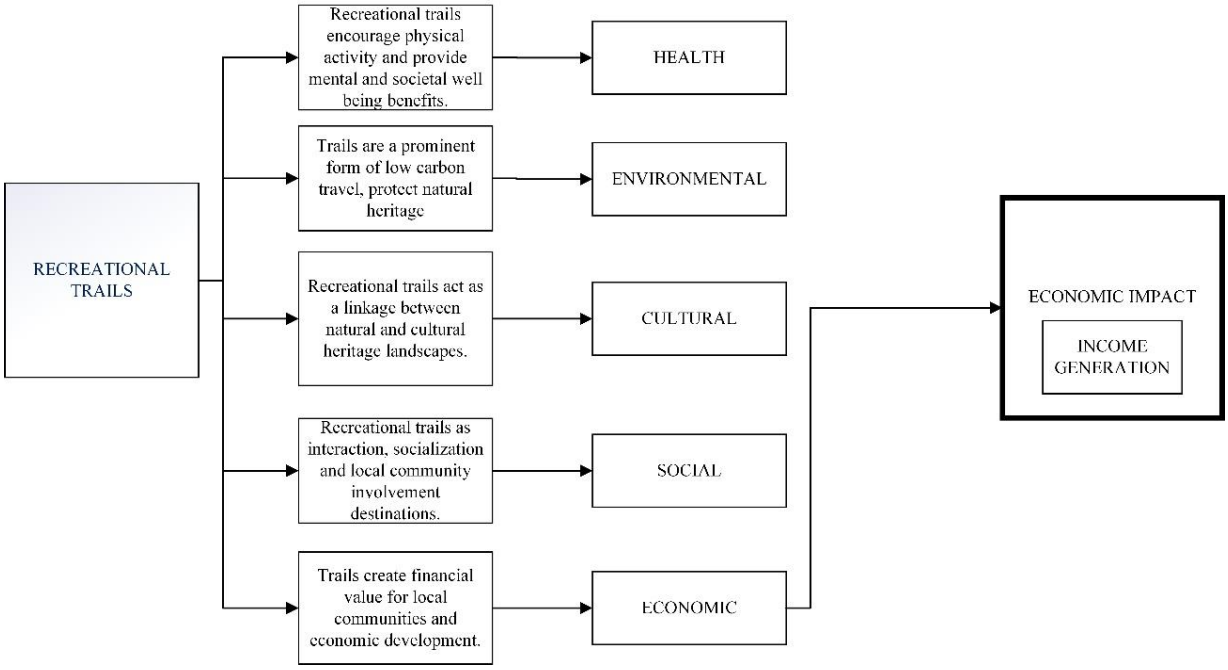
4.2.1 Recreational trail development framework

Travelling for outdoor recreational trail experiences has been connected to several factors such as nationalism, nature conservation, urbanization, environmental philosophy and well-being (Wall-Reinius, 2009). Among the most unique and famous ones, a Nordic *friluftsliv* tradition could be mentioned as a cultural practice or a form of TRR experienced as a philosophy of living of local Nordic people (Varley & Semple, 2015). Moreover, environmental philosophy and well-being trends further highlight an increasing appreciation among people that natural heritage can contribute to their sense of identity, leading them to connect more with nature through access to recreational trails and value their protection (Frost et al., 2014).

Countries rich in natural and cultural historic resources have shifted their tourism towards nature-based recreation and have adopted various strategies and policies in order to protect natural and cultural heritages, develop trails and increase the potential of local economic development through nature-based recreation in their local areas. For instance, the Irish Sports Council developed a strategy for recreational trail development "Building Sport for Life", which is focused on getting more people active and participating in all types of sport across the country (The Irish Sports Council, 2023). The "New Zealand Walking Access Act 2008" was established to provide access to the countryside for recreation whilst protecting the rights of landowners (New Zealand Government, 2021). In some countries, such as China or Sweden some products of NBT are viewed as an opportunity to commercialize the nature, consequently strategies and policies that have been applied, have led to the degradation of local ecological, economic, and social systems (Margaryan & Fredman, 2017; Wang et al., 2012).

Moore & Ross (1998) proposed that at least five broad types of recreational trails exist in the context of nature-based recreation: 1) backcountry trails, 2) recreational greenways, 3) multiple-use trails, 4) water trails and 5) rail-trails. The trail types can also be combined, or local trails can be networked to provide a mixed purpose trail. The theoretical framework of recreational trail development and its benefits incorporates five main pillars: 1) health, 2) environmental, 3) cultural, 4) social and 5) economic (Fig. 4.1). The health benefits associated with physical exercise and mental well-being due to presence of parks and trails are well established in literature (Cleary et al., 2019; Janssen & LeBlanc, 2010; Reiner et al., 2013; Saxena et al., 2005; Warburton et al., 2006; Wood et al., 2017). Trails can be an effective method of improving societal health as Wang et al. (2005) discovered that each dollar invested in trail development in the US state of Nebraska yielded healthcare-related savings of $3 per trail user. When assessing the literature from an environmental perspective, trails are recognized as a prominent form of low carbon travel (Chapman, 2007; Weston & Mota, 2012), and serve as an important means of protecting and conserving heritage (Tomczyk et al., 2017). Culturally recreational trails provide a resource for people to experience and enjoy the heritage and culture of the local community and landscapes (Santarem et al., 2015). Social benefits such as interaction, socialization and encouragement of local community involvement have been well established in the literature and particularly during the COVID-19 pandemic time when trails have been studied as destinations to ensure social cohesion at the same time as social distancing (Geng et al., 2021; Keith et al., 2018; Samuelsson et al., 2020). Finally, economic benefits of recreational trails have been acknowledged as one of the most significant in tourism economy business models. For instance, the Camøno trail was developed to increase the economic value of Møn Island in Denmark and generated €1.6 million in economic value during its introductory year 2017 (Gyimothy & Meged, 2018). Free walking tours have been provided as an element of a collaborative economy model in Barcelona, with notable success (Londono et al., 2018). Developing and maintaining trails can yield financial benefits for local residents – residential property near trails in the Denver, Seattle, and Minnesota areas of the United States have experienced property value increases in the range of 1% to 6.5% (National Park Service, 2000) and construction of the High Line in Manhattan raised adjacent housing values by 35% (Black & Richards, 2020).

Figure 4.1 Traditional theoretical paradigm

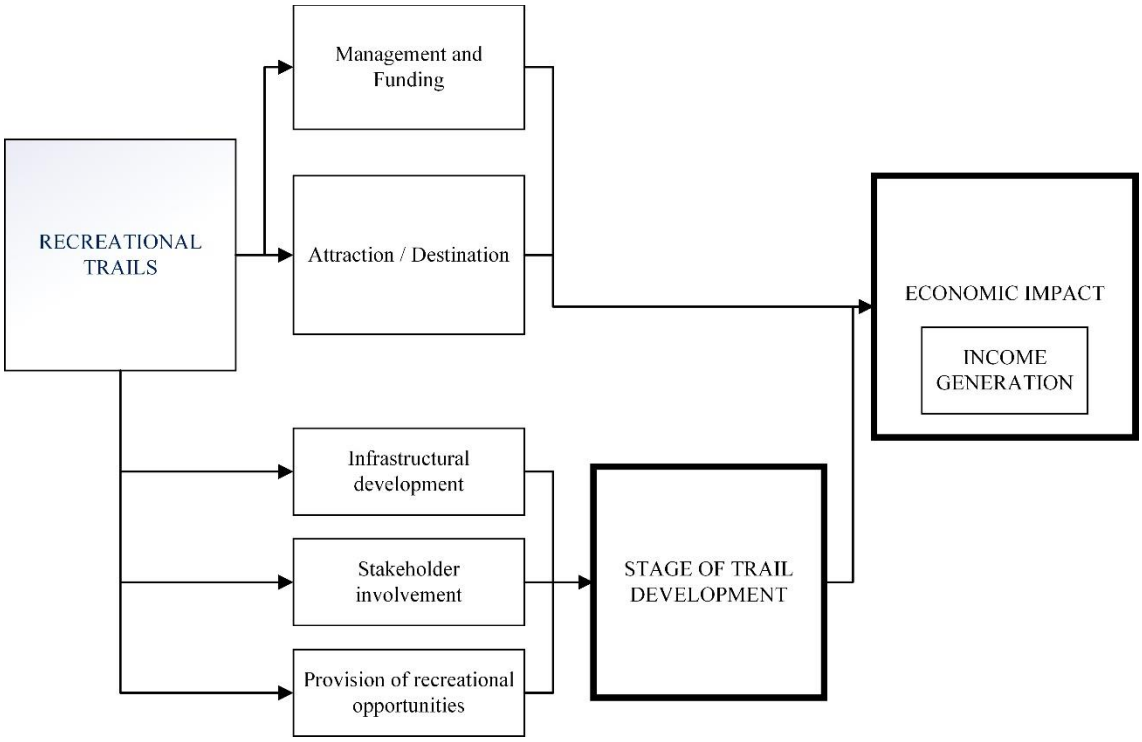


4.2.2 The economic impact of recreational trails

Published literature on recreational trails has recently tended to focus on economic impact assessment and especially the multiplier effect, applying economic theories from Archer & Owen (1971) and Dwyer et al. (2010) that tourists' expenditures on travel services cause short-term economic impact and adapting it to TRR, postulating that local or regional economic development can be stimulated through NBT products (Fredman et al., 2021; Gyimothy & Meged, 2018; Hall & Boyd, 2005; Lukoseviciute et al., 2022a). Different trail developments cover a wide range of physical settings and vary in terms of purposes of use, characteristics and their popularity, attracting different user profiles such as walkers, hikers, cyclists, off-road bikers, and birdwatchers (birders), with significantly varying trail-related expenses (Duglio & Beltramo, 2017; Hall et al., 2017; Mayer et al., 2010; Molokac et al., 2022). Trail developments require special considerations when planning a trail to accommodate different visitor profiles and more importantly to encourage spending, especially when trails have been selected as a vehicle to develop local economies. Moreover, any trail development may also require technical and environmental considerations – for example, soil has limitations, and can be prone to erosion or degradation over time; trails which have demand for particular uses, such as equestrian, may require the installation of a suitable surface such as crushed stone or gravel (Marion & Leung, 2009). However, trail planning and management strategies may

differ according to the purpose of application. For instance, multi-use trails located in protected areas are primarily planned and managed in a multi-use paradigm to reduce negative human impacts on protected natural areas and to allow the provision of both recreation and conservation (Tomczyk & Ewertowski, 2013). Trails passing through rural areas are primarily designed and developed to attract more visitors and thus improve economic and social well-being of local communities (Davies et al., 2012). Meanwhile, in some countries, trails may or may not developed to acquaint visitors with native wildlife, tribes and their culture (Miller et al., 2020; Smith et al., 2009) or to build a national identity (Nordbø et al., 2014). Referring to the magnitude of economic impact and multiplier effect, tourism economics pioneers state that the number of tourists, their expenditures, and circulation of these expenditures are the most critical factors in terms of the magnitude of the multiplier effect (Archer, 1982; Dwyer et al., 2010). Previous literature suggests that the magnitude of economic impact and income multiplier may differ due to several factors, of which one of the most critical is the stage of trail development, described by the ROS framework (Lukoseviciute et al., 2022). In TRR, the size of the trail area and intersectoral linkages with recreation industries as a consequence of development are the critical factors determining leakage and multiplier effect (Lukoseviciute et al., 2022). In the field of tourism, income generation is the most attractive indicator since it is the most useful from a policy viewpoint (Lindberg, 2001) and is prioritized in income maximization (Fennell, 1999). Consequently, the assessment of income multiplier has been widely applied in tourism studies since the 1990s (Archer & Fletcher, 1996; Hsu, 2019; Tafel & Szolnoki, 2020) and later in the field of NBT, including TRR (Hsu, 2019; Lukoseviciute et al., 2022a; Poudel et al., 2017; Rinne & Saastamoinen, 2005; Saayman & Saayman, 2006). With regards to various trail developments and management strategies, no studies have addressed the impacts on economic returns to the locality or region based on the stage of trail development, as most of the relevant literature has examined how various management strategies of recreational trails can control and reduce undesired environmental impacts (Evju et al., 2021; Figueras, et al., 2011; Park et al., 2008) or have studied recreational trail network design (Courtenay & Lookingbill, 2014; Meadema et al., 2020). This study applies the traditional recreational trail economic impact paradigm and expands it through the adaptation of the dimension for stage of trail development in order to evaluate the relationship between the stage of trail development and income multiplier (Fig. 4.2).

Figure 4.2 New theoretical paradigm adapted here



4.3 Study areas, materials and methods

4.3.1 Study sites

Four diverse geographical trails within the European Atlantic area were selected for this study to reflect a diversity of recreational trail developments, trail access demand, and trail visitor behaviour, resulting in diverse demand and expenditure on recreational services (Fig. 4.3).

"La Caldera de Taburiente" is a mountainous circular trail of 13 km, constructed within the National Park on the island of La Palma, located in the northwest of the Canary Islands archipelago. The entire island was declared a Biosphere Reserve in 2002, which is a recognized area of representative environments which have been internationally designated within the framework of UNESCO's Man and Biosphere Program for their value to conservation through providing the scientific knowledge, skills, and values to support sustainable development (Bridgewater & Cresswell, 1998). Complying with Biosphere Programme rules, the Canary Islands Government every year allocates funds for recreational trail maintenance and management, which are within the budget of "La Caldera de Taburiente National Park Management Plan". La Caldera de Taburiente National Park is one of the main attractions in the island since it is the largest erosion

crater on this planet and is one of the most important destinations for hikers, trekkers, and mountaineers in Spain (Gomez-Martín, 2019). La Caldera de Taburiente is a hiking paradise for island visitors and the trail is the main tool to explore the park. Tourism and agriculture are the two main economic drivers on the island since the island has a tropical rainforest climate according to Koppen climate classification (Beck et al., 2018) with an annual average temperature of 26◦C and it is an excellent destination for walkers and nature lovers. Consequently, there is high demand for recreational trail access throughout the year.

"Seven Hanging Valleys" is a hilly coastal linear hiking path of 6 kms, constructed within public territory and located in the civil parish of Lagoa and Carvoeiro, in the southern region of Algarve in Portugal and faces the Atlantic Ocean. The parish is considered the most luxurious and excellent tourism destination in Algarve, while the Algarve region is a destination for >30% of Portugal's international tourists (INE (National Statistical Institute), 2021), mostly due to the unique coastal diversity which is reflected in a great diversity of landscapes. As a result, the economy in the region is driven by tourism (Antunes, 2000). Since the region has a Mediterranean climate with an annual average temperature of 17◦C, it is an excellent destination for walkers. The development of recreational trails in Algarve has been initiated due to approval of a "Rural Tourism Hotspot Sustainability Strategy" under the "National Strategic Plan for Rural Development 2007-2013", which aims to avoid destruction and protect and conserve the natural and cultural rural landscape by employing rigorous measures in the most vulnerable areas on-site (MADRP, 2007). Today there are over thirty themed recreational trails in Algarve, of which "Seven Hanging Valleys" is the most popular being recently nominated as one of the best hiking destinations in Europe (European Best Destinations, 2023) and acknowledged as a representative of the most successful coastal nature-based recreation setting development in the region of the Algarve (Lukoseviciute, Pereira, & Panagopoulos, 2021).

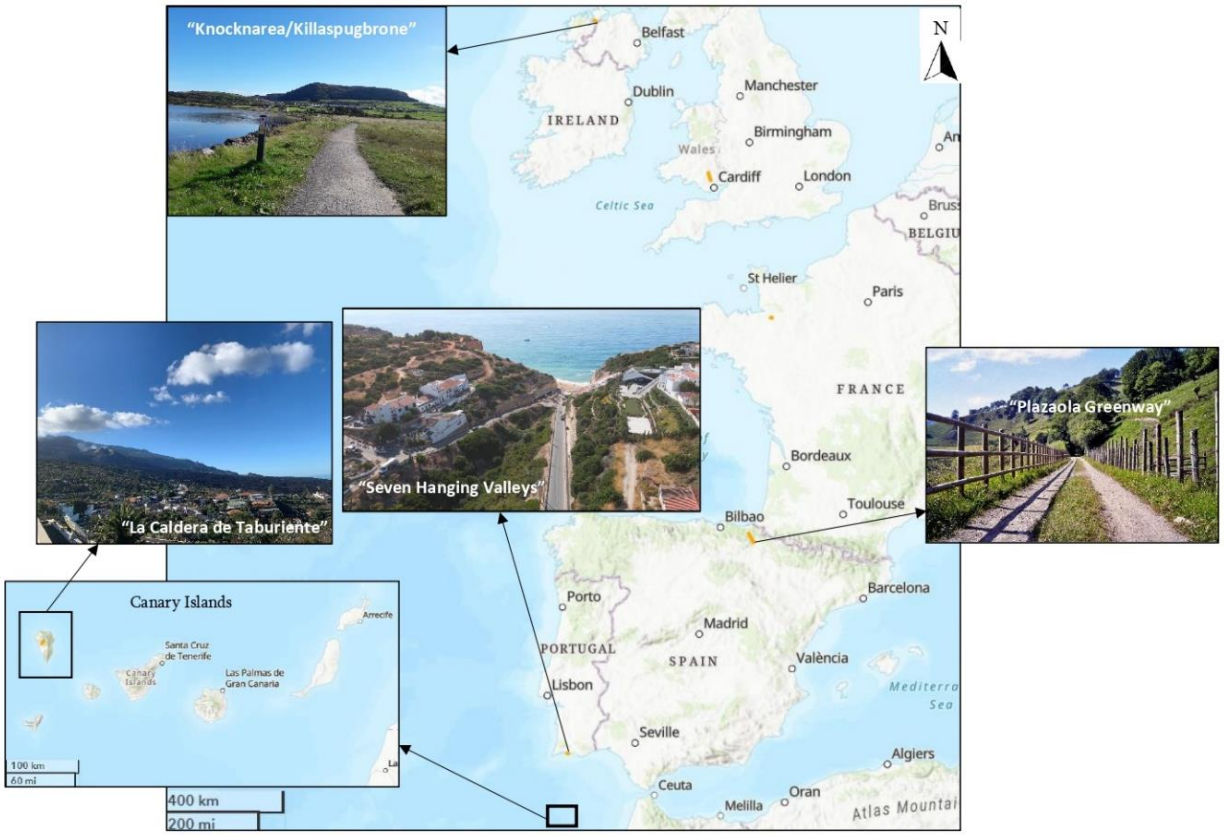
"Knocknarea/Killaspugbrone" is a 15 km loop trail which is both upland and coastal. The trail is located on a scenic part of the Atlantic Ocean and overlooks the famous surfing village of Strandhill in County Sligo, Ireland. The development of the "Knocknarea/Killaspugbrone" trail is part of County Sligo's recent investments in walking infrastructure in the county, where walking activities are among the most popular

in rural areas (National Trails Office, 2023). The construction of recreational trails in Ireland has been initiated by the approval of "Irish Trails Strategy" aiming to create, nurture and maintain a world class recreational trail network that is sustainable, integrated, well utilized and enhance the health, well-being, and quality of life of all Irish citizens (Irish Sports Council, 2023). The "Knocknarea/Killaspugbrone" trail is the central attraction in the Sligo area, which provides a clearly way-marked looped walk with breath-taking scenery combined with cultural and archaeological heritage. The trail's central visitor attraction is Queen Maeve's Cairn, a 5000 stone mound which is located on the summit of Knocknarea mountain, and which is one of Ireland's most important Neolithic structures. County Sligo is considered rural and well known for walks and surfing since it is characterized by the oceanic climate with mild summers, cool winters and rapidly changing weather conditions including cloud cover, mist, and high winds. Consequently, the demand for recreational trail walks in Sligo is dynamic throughout the year. Nevertheless, the national tourism agency "Failte Ireland" has recently cooperated with Sligo County Council to develop the National Surf Centre at Strandhill, underlining the area's excellence as a surfing venue, and strengthened by its great natural beauty and outstanding outdoor recreation space. It is estimated that the new surf centre will bring an extra 70,000 visitors to Sligo in its first year and will increase spending by outdoor recreationists in the region.

"Plazaola Greenway" trail is a 45 km linear mountainous rural hiking and cycling path. The trail is in the region of Navarra in northern Spain and runs through the Imotz, Larraun, and Leitzaran natural sanctuary valleys. The "Plazaola Greenway" is a rail trail running through the old Vasco-Navarro railway that joined Pamplona and San Sebastian and is characterized by a spectacular landscape, a route of uniform slopes and the considerable number of tunnels that are crossed. The Cycle Master Plan for Navarra initiated the revival of the railway to develop an internal cycle network infrastructure and to link up with the EuroVelo Network. The region of Navarra is characterized by oceanic climate with mild summers, cool winters, and rapidly changing weather conditions, therefore Navarra is not a very popular tourism destination and has a high tourism seasonality index (Lopez et al., 2006). Nevertheless, local authorities try to boost economic development based on tourism and dedicate funding for NBT development, especially restoration and creation of new paths (Raya et al., 2018). The "Plazaola Greenway" management is conducted within the framework of the Nature Trails Program

of the Spanish Ministry of Agriculture and Natural Environment with a stable budget allocated for trail constructions, maintenance, and sustainable development.

Figure 4.3 Location map of study case trails



4.3.2 Stage of trail development assessment

To describe the range of outdoor recreation opportunities, present in landscapes and determine the stage of trail development, the Recreation Opportunity Spectrum (ROS) framework was applied in this study (Clark & Stankey, 1979). The framework was adopted by the US Forest Service as a management tool to identify the range of outdoor recreation settings present in landscapes. Moreover, the framework allows one to determine the stage of trail development based on the range of outdoor recreation opportunity class along a spectrum ranging from primitive (P) to urban (U) present in landscapes and trail attributes (US Forest Service, 2011).

Initially, to determine the ROS class, a matrix consisting of three types of settings with its own key performance indicators (KPIs) is considered. The selection of three settings was based on the original framework and previous research in outdoor recreation site classification (Harshaw & Sheppard, 2013; Oishi, 2013). The physical, social and

managerial settings, which include qualities provided by nature (access, remoteness, naturalness), qualities of recreational use (user density) and conditions provided by management (facilities, visitor management) (Driver et al., 1987) were conceptualized by American academic and Forest Service researchers (Clark & Stankey, 1979) with the purpose to classify recreational sites along the spectrum. Knowing the ROS class, the stage of trail development is further assessed, following the matrix, consisting of the following trail attributes with their own KPIs: tread and traffic flow, obstacles, constructed features and trail elements, signs and ROS class. The ROS classification and stage of development matrixes with KPIs can be found in Lukoseviciute et al. (2021).

The assessment of each trails' stage of development was performed by the following stakeholders: local trail managers, governmental and municipal delegates, NBT experts and academics in the field of economics and tourism management from European Atlantic area countries: Spain, Northern Ireland, Ireland, Scotland, Portugal and the Spanish Canary Islands. The selection of stakeholders was based on their experience, professional knowledge, and familiarity with study case trails, ensuring accurate assessment, trail development and management issues identification and recommendations (Coban & Yildiz, 2019). Assessments were made by four governmental and six municipal delegates, six academics, three NBT and economics experts, three environmentalists and four local trail managers. In total, 26 stakeholders were involved. Stakeholders assessed each trail's ROS class and stage of development based on their professional knowledge, personal observations at each trail site and use of secondary source data such as technical reports and scientific publications. Initially, each stakeholder was asked to rate the performance of each KPI of each setting of ROS class using a 5-point Likert scale (1 = very low performance, 5 = very high performance). The highest rated KPI of each setting was selected for the final ROS class determination, applying a round average function, where each ROS class was assigned an integer between 1 and 6: primitive (P) = 1, semi-primitive non-motorized (SPNM) = 2, semi-primitive motorized (SPM) = 3, roaded natural (RN) = 4, rural (R) = 5, urban (U) = 6. Then, each stakeholder was asked to rate the performance of each KPI of the trail attributes matrix, using a 5-point Likert scale. The highest rated KPI for the final stage of development was selected to determine the stage of trail development, applying a round average function, where each stage of development was assigned to the following quantitative numbers: minimally developed = 1, moderately developed = 2, developed =

3, highly developed = 4, fully developed = 5. The final stage of trail development was determined by calculating the average value of each individual stakeholder assessment.

4.3.3 Economic impact assessment

The Ad hoc multiplier model was chosen for this study, which is the most suitable for short and long-distance trails due to ease of model application and the use of primary source data (Lukoseviciute et al., 2022b). The model estimates economic impact from a change in tourist expenditure and calculates the income multiplier based on information obtained from surveys applied to the following populations: trail visitors, local tourism business operators, and residents. To consider the degree of money leakage and accuracy of economic impact estimation (Archer, 1982), administrative boundaries were used to delimit the study area and define the local area. In this study the smallest administrative units such as parishes and municipalities which each study case trail falls within, covering major NBT activities and attractions were defined as study areas. The income multiplier is calculated using the following formula adjusted by Hsu (2019) and recently applied by Lukoseviciute et al. (2022a). The technical income multiplier calculation process with all parameters and statistical data required is presented in Lukoseviciute et al. (2022a):

$$m = \sum_{i=1}^{n} K_i V_i \times \left\{ \frac{1}{1 - L \sum_{j=1}^{n} Z_j V_j} \right\}, \quad (1)$$

where i refers to different business sectors of economic activity (i = 1, …, N); j defines household consumption categories (j = 1, …,n); K_i is the proportion of tourists' expenditure spent in the i-th business sector; V_i is the proportion of revenue left in the local area in the i-th business sector; L is the average propensity to consume; Z_j is the proportion of household consumption in the local area in the j-th category; and V_j is the proportion of household consumption in the j-th category (obtained from a secondary data source – the European Classification of Individual Consumption according to Purpose).

4.3.3.1 Data collection

In economic impact analysis it is crucial to define the time frame and the total trail visitor population from which the economic impact is estimated (Archer & Fletcher, 1996). Based on previous studies in the field of economic impact assessment of tourism (Archer & Fletcher, 1996; Bowker et al., 2007; Hsu, 2019), a one-year timeline was chosen to ensure the inclusion of four seasons as well as low and high tourism periods

thus reflecting the consistency of trail visitation and visitor expenditure dynamics which are highly susceptible to weather changes (Gatti et al., 2022; Verbos & Brownlee, 2017).

Data from trail visitors, resident and local businesses was collected over the periods of 2020–2021 in "La Caldera de Taburiente", "Seven Hanging Valleys" and "Plazaola Greenway" trails and 2021–2022 in "Knocknarea/Killaspugbrone" trail. Data collection questionnaires were approved by the ethics committee of the University of Algarve (CEUAlg Pn◦52/2021). The following administrative units of each study case were chosen: El Paso municipality with a population of 7745 residents in La Palma, Carvoeiro and Lagoa parish with a population of 9987 residents in Portugal, Killaspugbrone parish with a population of 1812 residents in Ireland and Imotz, Laraaun and Leitza municipalities with a total population of 4357 residents in Spain.

To estimate the total number of trail visitors during the study periods, the following footfall counters recommended by Madden et al. (2021) were installed: 'pressure slab' type sensors in "La Caldera de Taburiente" trail, wireless bidirectional 'SensMax' sensors in "Seven Hanging Valleys" trail, a dual inductive loop sensor to directionally count bicycles and a 3D Stereoscopic Camera to count people in "Plazaola Greenway" and one directional PIR (Passive Infrared Detector) Break Beam sensors in "Knocknarea/Killaspugbrone" trail. All sensors were installed at different trail locations at a sufficient distance from a trail entrance/exit to avoid counting passing tourists without intention to use the trail for recreation and ensure continuous data collection.

To gather socio-demographic characteristics of trail visitors and their expenditure behavior, a structured questionnaire designed by Lukoseviciute et al. (2022a) was applied (see Appendix C). The target trail visitor population was defined as trail visitors not living in the study area. The population sizes of trail visitors obtained from footfall counters (N = 30,579 of "La Caldera de Taburiente", N = 45,992 of "Seven Hanging Valleys", N = 24,597 of "Knocknarea/Killaspugbrone" and N = 42,485 of "Plazaola Greenway") was used to estimate representative sample sizes applying a simple random sampling formula for quantitative variables of interest (Bryman, 2015), using a 95% confidence level and a 2% margin of relative precision. We obtained a sample size of 395 trail visitors for "La Caldera de Taburiente", 454 trail visitors for "Seven Hanging Valleys", 211 trail visitors for "Knocknarea/Killaspugbrone" and 461 trail visitors for "Plazaola Greenway" trails. For the purposes of this research, face-to-face surveying in the form of a guided

questionnaire was deemed the most suitable approach to capture data concerning trails' users. To obtain an unbiased and representative sample of the population of the trails, a systematic sampling strategy was adopted, choosing every fifth trail visitor. Two or three interviewers on the premises of each trail conducted the data collection. Surveys were conducted in all seasons as well as on different days of the week to increase the representation of the samples. To facilitate the interviews, the questionnaire could be accessed both on mobile devices and in paper-and-pencil format.

To gather data from local residents, a questionnaire designed by Lukoseviciute et al. (2022a) was applied (see Appendix C). The target resident population was defined as people who lived within the defined administrative unit of each study area for a continuous period of at least 12 months before the time of sampling. Resident population of each study case administrative unit was considered to obtain a representative sample, applying a simple random sampling formula for quantitative variables of interest, using a 95% confidence level and a 2% margin of relative precision. A sample size of 123 residents was estimated for "La Caldera de Taburiente", 62 residents for the "Seven Hanging Valleys", 63 residents for "Knocknarea/Killaspugbrone" and 27 residents for "Plazaola Greenway" trails. Residents were interviewed face-to-face applying the random route sampling technique (Bauer, 2014).

To gather data from local businesses, face-to-face and phone interviews were conducted with business owners/managers asking for information about the final net profit as a proportion of the final monthly gross revenue and total monthly expenditures. Seven business sectors from which a subset matches a given study cases visitor expenditure categories were selected: accommodation, transportation, restaurants, local products, rentals, guided tours, and water sports. Due to a considerable risk of businesses refusing to participate in the survey, the convenience sampling technique was applied (Oberholzer et al., 2010). To ensure that at least one business of each sector provided the required information, local municipalities, and business associations participated in the surveying process. In total, 31 businesses were interviewed in La Palma, 14 businesses in Spain, 18 businesses in Portugal and 23 businesses in Ireland.

Finally, a bivariate correlation analysis was run between the measures of the income multiplier and the stage of trail development to test if there is a relationship between these variables.

4.4 Results

4.4.1 Stage of development

The ROS classification and stage of development of each study case trail are presented in Tables 4.1 and 4.2, considering the timeline after the local managing municipality has made initial investments in each trail's construction and development.

Each trail falls within a different ROS class and stage of development, representing various recreational opportunities. The "La Caldera de Taburiente" trail was classified as "SPM" and "highly developed" stage with the provision of semi-natural recreational opportunities. Such results were mainly because the trail has full access through primitive roads and motorized trails since it is distant from human activities and almost half an hour walk from any motorized road. With regards to naturalness, there are only a few subtle modifications and a low user density. The path is continuous and uses native materials, however obstacles are common. The trail has signage where it is needed for user reassurance.

The "Seven Hanging Valleys" trail was classified as "R" and "highly developed" stage with the provision of semi-natural recreational opportunities. The trail has full access and a high degree of remoteness. There are several 'legs' where users can enter and exit, while the two main access points are interconnected with popular recreational sites, such as beaches or cultural heritage. In relation to resource modifications, there are natural and artificial elements. However, the trail has a high user density and therefore overcrowding occurs frequently. The trail has a wide and smooth tread, infrequent obstacles, cleared vegetation around the trail with frequent and substantial trailside amenities, a wide variety of signs, and a modified recreation environment.

The "Knocknarea/Killaspugbrone" trail was classified as "SPNM" and at a "moderately developed" stage with the provision of natural and unmodified recreational opportunities. The trail has access through primitive roads and motorized trails, and it is half an hour walk from human activities and any motorized road. With regards to naturalness, there are only a few subtle modifications and a very low user density on the trail. In addition, there are only rustic and rudimentary trail facilities and limited information provision. The path is continuous and narrow with minor allowances constructed for passing, however with frequent obstacles. The trail's constructed features

are of limited size, scale, and quantity. Nevertheless, the trail has signing as needed for user reassurance.

The "Plazaola Greenway" trail was classified as "RN" and "developed" stage with the provision of semi-natural recreational opportunities. The trail has full access hence a low level of remoteness. With regards to naturalness, the trail's modifications are in harmony with the natural environment and a low user density on the trail. The local municipality invested in the provision of rustic facilities for user comfort, site protection as well as on-site regimentation and controls.

Table 4.1. The results of the ROS class of each study case trail

Recreation Opportunity Spectrum evaluation								**ROS class**
Settings	KPIs	P (1)	SPNM (2)	SPM (3)	RN (4)	R (5)	U (6)	
Physical	Access			◊, ▼		□, Δ		SPM ◊ R □ SPNM ▼ RN Δ
	Remoteness		◊	▼	Δ	□		
	Naturalness		◊, ▼		□, Δ			
Social	User density		▼	◊, Δ		□		
Managerial	Facilities		▼		◊, □, Δ			
	Visitor management		▼	◊	□, Δ			

Note: Symbols assigned to each trail were (◊) for "La Caldera de Taburiente"; (□) for "Seven Hanging Valleys"; (▼) for "Knocknarea/Killaspugbrone" and (Δ) for "Plazaola Greenway"

Table 4.2. Evaluation of trail development stage

Trail development stage evaluation						
Trail attributes	Minimally developed (1)	Moderately developed (2)	Developed (3)	Highly developed (4)	Fully developed (5)	**Development stage**
Tread & traffic flow		▼	□, Δ	◊		Developed Δ Highly developed □, ◊ Moderately developed ▼
Obstacles			◊, □, ▼, Δ			
Constructed features & trail elements		▼	□	Δ, ◊		
Signs			▼, Δ	□, ◊		
ROS class		▼	◊	Δ	□	

Note: Symbols assigned to each trail were (◊) for "La Caldera de Taburiente"; (□) for "Seven Hanging Valleys"; (▼) for "Knocknarea/Killaspugbrone" and (Δ) for "Plazaola Greenway"

4.4.2 Economic impact

Trail visitor characteristics

Table 4.3 shows the socio-demographic characteristics of trail visitors. It is evident that the share of men and women visiting trails in all four destinations is more or less

equal. There are marked differences in the split between international and national visitors. Predominantly international trail visitors were in La Palma (91%) and southern Portugal (81%) with very small shares of national visitors, while the Ireland and northern Spain trails are visited by predominantly national visitors, respectively 91% and 64%. The main mode of access transportation across all trails was a car. The second most popular transportation choice to reach the trail was walk/run in southern Portugal, Ireland, and northern Spain, while in La Palma a taxi/rideshare option was the most popular.

Mean group size ranges between 1.74 persons in Ireland, 2.01 persons in southern Portugal, 2.42 persons in La Palma and 2.81 persons in northern Spain. The most frequent group size is two persons, which accounts for 59% ("La Caldera de Taburiente"), 66% ("Seven Hanging Valleys"), 44% ("Knocknarea/Killaspugbrone") and 52% ("Plazaola Greenway") of visitors. The majority of "La Caldera de Taburiente" and "Seven Hanging Valleys" trail visitors were first time users since those trails are visited by international visitors, while "Knocknarea/ Killaspugbrone" and "Plazaola Greenway" trail visitors were typically recurrent since majority of trail visitors were local.

Table 4.3. Socio-demographic profiles of trail visitors

Variable Categories	**"La Caldera de Taburiente" (n=395),**	**"Seven Hanging Valleys" (n=454)**	**"Knocknarea /Killaspugbrone" (n=211)**	**"Plazaola Greenway" (n=461)**
Gender (%)				
Female	52	51	52	47
Male	48	49	48	53
Origin (%)				
International	91	81	9	36
National	9	19	91	64
Mode of transportation (%)				
Car	74	67	65	39
Walk/run	1	25	27	28
Taxi/rideshare	21	6	1	2
Bus	3	1	5	2
Cycle	1	1	2	29
Dimension of the trail visitor group in persons				
Mean ± SD	2.42 ± 1.27	2.01 ± 0.9	1.74 ± 0.8	2.81 ± 1.8
Frequency of use of the trail (%)				
First time user	82	74	24	35
Less than few times a year	0	2	8	31
Few times a year	16	11	22	2
Several times a week	1	12	33	17
Every day	1	1	13	15

Structure of expenditure

Table 4.4 illustrates that group visitors accounted for the largest part of the total sample of each destination, constituting 86% for both the "La Caldera de Taburiente" and "Seven Hanging Valleys" trails, 55% for "Knocknarea/Killaspugbrone" trail and 59% for "Plazaola Greenway" trail. The mean daily expenditure of solitary visitors varies between the minimum 3 Euro in "Plazaola Greenway" and maximum 11 Euro in "Seven Hanging Valleys" trail, while group visitor mean expenditures vary between the minimum 7 Euro in "La Caldera de Taburiente" and "Plazaola Greenway" trails and maximum 20 Euro in "Knocknarea/ Killaspugbrone" trail. Spending for accommodation accounts for 50% of total visitor expenditures for "La Caldera de Taburiente" and 27% for "Seven Hanging Valleys" trails, constituting the largest visitor expenditure category for both destinations. This shows that high expenditure in the accommodation sector is attributable to the higher stage of both trails' development and to the international visitor profile, whose visit to trails is a part of longer holiday stay. Spending for food and drinks was the largest visitor expenditure category for "Knocknarea/Killaspugbrone" and "Plazaola Greenway" trails, accounting for 46% and 36% respectively. Local products made up the smallest portion of trail visitor expenditures in "Seven Hanging Valleys" and "Plazaola Greenway" trails, while visitors to "La Caldera de Taburiente" and "Knocknarea/ Killaspugbrone" did not have any expenditures on local products nor on guided tours.

Table 4.4. Structure of trail visitor expenditure (€) in each trail

Trail name	**"La Caldera de Taburiente"**			**"Seven Hanging Valleys"**			**"Knocknarea / Killaspugbrone"**			**"Plazaola Greenway"**		
	SV	GV		SV	GV		SV	GV		SV	GV	
Sample size (n)	55	340		65	389		94	117		187	274	
Mean expenditure, €	6	7	**%**	11	9	**%**	4	20	**%**	3	7	**%**
Expenditure per category, €												
Food & drinks	6	12	18	14	12	19	7	37	46	7	19	36
Accommodation	21	10	50	22	17	27	4	25	30	2	16	28
Transportation	11	21	31	12	13	20	2	10	13	4	7	15
Rentals	0	1	1	16	11	18	1	9	11	5	8	18
Local products	0	0	0	8	8	4	0	0	0	1	2	3
Guided tours	0	0	0	2	3	12	0	0	0	0	0	0
Total %			100	Total %		100	Total %		100	Total %		100

Note: SV – solitary visitor; GV – group visitor.

Income multiplier

Table 4.5 gives an overview of the estimated economic impact, income multipliers and development stages of trails in our sample. The highest values of income multipliers were estimated for "La Caldera de Taburiente" and "Seven Hanging Valleys" trails, respectively 0.71 and 0.77, which means that each euro spent by trail visitors will generate €0.71/ 0.77 as local income. Such results were due to the high level of development of both trails resulting in significantly lower intersectoral linkages and leakages. In addition, since the "Seven Hanging Valleys" trail is the most popular in the region, visitor expenditures were recorded in the largest variety of touristic sectors compared to other sample destinations. As for the island of La Palma and the trail "La Caldera de Taburiente", a high-income multiplier was due to the presence of businesses to supply inputs and demand outputs from the TRR, resulting from obligations associated with national park status, the trail's development, maintenance, and conservation. In contrast, significantly lower income multipliers were estimated for "Plazaola Greenway" and "Knocknarea/ Killaspugbrone" trails with values of 0.53 and 0.39 respectively due to the low level of development of both trails; resulting from an absence of local businesses around the trail, low availability of human resources and finally resident expenses outside the study area leading to a high money leakage.

Multiplying the total tourist expenditure by the income multiplier, the annual local economic impact of €2,148,937 was estimated in southern Portugal, €1,638,210 in northern Spain, €589,007 in La Palma and €485,337 in Ireland. However, higher economic impact does not necessarily translate to a higher contribution to the local economy and community development, as observed for the case of northern Spain with a relatively low-income multiplier value, meaning that a high share of trail visitor expenses leaks out the local area.

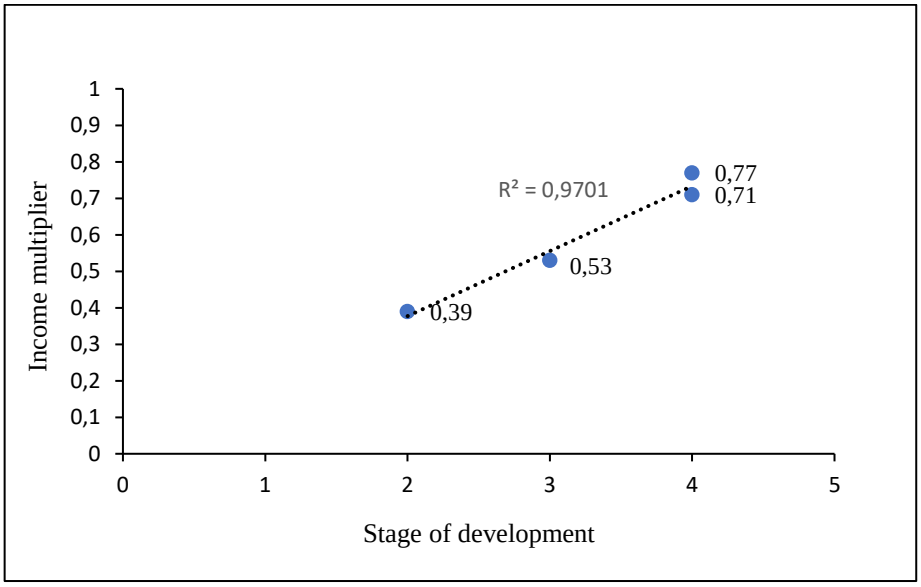
Table 4.5. Correlation between the income multiplier and the stage of trail development

	"Knocknarea/ Killaspugbrone"	**"Plazaola Greenway"**	**"La Caldera de Taburiente"**	**"Seven Hanging Valleys"**
Economic impact, €	485,337	1,638,210	589,007	2,148,937
Income multiplier	0.39	0.53	0.77	0.71
Stage of trail development	Moderately developed	Developed	Highly developed	Highly developed
Spearman's correlation coefficient (r_s)	0.949*			

*p-value< 0.05

The final part of the analysis examined the relationship between the stage of trail development and the income multiplier. Initially, a correlation analysis was applied between values of income multiplier and stage of trail development considering the non-parametric Spearman's correlation coefficient. As shown in the Table 4.5, there is a strong and statistically significant correlation between the income multiplier and the stage of trail development ($r_s = 0.949$, $p < 0.05$). Fig. 4.4 shows that stage of trail development is positively correlated with income multiplier and demonstrates that investment in recreational trails to achieve a higher stage of development stimulates larger income multiplier in the local area. As additional exploratory analysis, a linear regression model was estimated to understand to what extent the stage of trail development explains the income multiplier. Results revealed that stage of trail development explains 97.0% of income multiplier and the income multiplier of a trail increases by 0.18 ($p = 0.015$), on average, for each additional stage of development.

Figure 4.4 Income multiplier by stage of trail development



4.5 Discussion and implications

This study aimed to provide an explanation of the relationship between the stage of trail development and the income multiplier through the foundational theory of NBT local economic impact due to tourist's expenditure. To date, no studies have researched this relationship, therefore addressing this gap, the results of this study support the traditional nature-based recreation economic theory that recreational trail development creates value in alternative and sharing economies and is an important dimension to enhance

regional/local economic impact (Gyimothy & Meged, 2018; UNWTO, 2019). By presenting data, we enhance the knowledge by demonstrating a correlation between a higher trail development stage and higher local income multiplier. When referring to the economic impact, the framework of income multiplier describing the total direct and secondary effects resulting from additional tourist expenditure (Fletcher & Archer, 1991) has been widely applied by tourism scholars (Baaijens et al., 1998; Drakakis et al., 2021; Hsu, 2019). Some trail scholars reported empirical observations that investing in recreational trails generates high economic revenues in rural and nature-based locations (Bowker et al., 2007; Raya et al., 2018). These assertions, however, are quite vague and do not provide a trail investment and development classification scheme and a link thereof to economic impact. This study contributes a well-defined framework for determination of stage of trail development and is unique via the correlation of that with income multiplier. Numerous scholars have concluded that the demand for trail recreation and its economic impact are related to trail infrastructure attributes and endowments, and as a consequence, are the most critical factors for increasing trail demand and visitor trail-related service spending (Kelley et al., 2016; Oswald Beiler et al., 2015).

Building on these prior findings, this study contributes a well-defined framework for determination of stage of trail development and is unique via the correlation of that with income multiplier, providing evidence that higher stage of trail development determines higher income multiplier in the local area, and explaining the linkage with the income multiplier due to trail visitor spending. This finding is novel and equally relevant to any trail destination globally in enabling the accomplishment of more positive economically impactful outcomes.

The second novel addition to the theoretical framework is related to the size of trail catchment area, falling within the minimal available administrative unit; stage of development; trail length; and the magnitude of income multiplier. Previous recreational trail scholars assume that developed trails encompassing large geographic areas usually offer comparatively numerous spending possibilities for trail visitors and higher economic impact (Bozic & Tomic, 2016; Duglio & Beltramo, 2017; Pollock et al., 2012). Moreover, tourism economist Geoffrey Wall postulates that the size of the area is one of the most critical factors changing the income multiplier, in that the larger the area, the bigger the multiplier (Wall, 1997). However, based upon the main finding of this study,

the mentioned assumptions cannot be applied to nature-based recreation and particularly recreational trails as the main results revealed that stage of trail development and not size of the area is the primary determinant of multiplier. This study found that less developed long-distance trails, covering large areas, which include several municipalities, exhibited one of the smallest income multipliers when compared to short-distance highly developed trails, covering smaller areas. This contrasting finding can be explained by the density of residents in the local trail area. If there is a very low resident density, absence of local businesses owned by local residents and a high dispersion of trail visitor expenditures throughout the municipalities, an elevated level of money leakage outside the local area occurs resulting in a very low multiplier effect. Improvement of understanding of the relationship between trail development stages and income multiplier magnitudes enables achievement of better trail development practices, effective selection of locations which are currently economically promising for trail development and strategies for revival of economically depressed and derelict rural areas through TRR. Thus, the findings facilitate optimal location selection for TRR development. It is especially important for places heavily reliant upon sun and sea recreation, which suffer from seasonality, high tourist flows and enormous congestion on sandy beaches, and where tourist volume dispersal towards recreational trails is critical in order to shift tourist expenditures and stimulate local economic impact while simultaneously protecting fragile ecosystems (Bramwell, 2004; Leka et al., 2022).

Another novel addition to the theoretical framework is related to the definition of trail recreational opportunities, development stages and their respective KPIs; that shape not only economic impact but also profile of trail visitors, their trail-related experiences and expenditure patterns. This expanded framework equips one to consider all recreation opportunity attributes related to a trail's safety, design, remoteness, naturalness, facilities and service provision, and visitor management which leads to better economic trail performance and shifts the paradigm away from the traditional strategy of investments in recreational service provision only (Getz, 1993). Consideration of a trail and its surrounding infrastructural design, as well as recreational service provision are proposed by this study as important attributes to factor in when trying to develop more viable and economically successful trails. It was found that among the highest trail visitor expenditures were accommodation and food and drink services, which is in line with previous findings in Taiwan (Hsu, 2019), Portugal (Lukoseviciute et al., 2022), Germany

(Mayer et al., 2010), Finland (Huhtala, 2007), and Spain (Raya et al., 2018). Nature-based visitors are usually day-trippers, who primarily seek various food and drink service establishments or overnight visitors, prioritizing the service of trail accommodation (Mehmetoglu, 2007), therefore, these service categories receive the highest share of visitor expenditure along with the highest share of income and are associated with high stages of trail development. While expenditures in other sectors were not frequent and significant, this could be explained by the nature of trail visitors, who focus on exploring nature's beauty and therefore expenditure is often limited to food and accommodation services. The results of this study provide a roadmap on how to develop profitable trails based upon the attributes described by the ROS framework and indicate that a highly developed trail with safety, constructed features and trail elements, minimum obstacles, proper signage, maximum recreational opportunities provision, easy access, naturalness, proper visitor management and facility provision; will ensure increasing trail visitor demand, satisfied visitors, increased user expenditures, and greater income multiplier. However, some previous researchers have argued that if recreational trails are developed for the purpose of training or for professional sports, the expenditure on buying or renting equipment locally would be among the largest spends (Hjerpe & Kim, 2007; Pollock et al., 2012). This implies that trails targeting high stage of development as derived from the ROS framework should emphasize certain attributes appealing to users with particular training or sport interests. This can be demonstrated by the cases of "Plazaola Greenway" trail, which is designed for cyclists and walkers, and "Knocknarea/Killaspugbrone" trail, developed to cater users interested in walking, cycling, running and water sports; since both trails have not yet achieved a high stage of development and currently perform with low income multipliers.

In countries or regions with large existing tourist influx, it is relatively easy to develop TRR with modest investments in marketing. In addition, tourism destination managers have privilege to decide at which stage to develop trails in order to gain satisfactory economic contribution to local economies depending on whether trails have been chosen as the main or alternative tourism products. However, rural and remote trail areas in non-touristic destinations mainly visited by locals, with very few international tourists and no existing tourism base to leverage, require much larger investments in the entire touristic infrastructure framework and higher stages of trail developments so that trails may function as main tourism products and local economic development tools.

Furthermore, for effective trail development with the goal of creating significant local economic impact, the climatic element plays a vital role in forming and reinforcing the tourism base, as well as the demand for nature-based recreation activities (Falk, 2013). Countries with favourable climatic zones for sun and sea recreation have experienced advantages in facilitating destination image construction and the development of diverse tourism products (Gomez-Martín, 2005; Pike, 2002); therefore, trail developments in such places are much more likely to be economically successful than in places with climatic conditions unfavourable for recreation simply due to differences in visitor volume.

While expenditures by trail visitors may help stimulate local economies, trail community development practitioners should know that rural and underdeveloped areas may initially face significant money leakage due to a lack of trail-related services and low population density, as is demonstrated by moderately developed rural trails. Tourism demand models propose that a combination of attractions, promotion, adequate transportation networks, available information, and services drive the popularity of a destination and increase visitor expenditures (Gunn & Var, 2002). With regards to trail destinations, there are additional elements that play an important role in a visitor attraction system and economic impact generation such as safety and security (Keith et al., 2018), natural landscape quality (Dorwart et al., 2009), and trail design (Davies et al., 2012) as is defined by the ROS framework. Furthermore, in order to stimulate local economic development through NBT products, a community-based model that involves local communities in guiding the development of recreational trails should be used (Alavalapati & Adamowicz, 2000; Kline et al., 2015), because the degree to which communities choose to embrace various trail destination strategies may shape the resulting economic impacts (Bowker et al., 2007). Therefore, the results of this study are relevant when having a dialogue with local communities to discuss and set a targeted stage of trail development based on specific trail attributes and recreational services that also benefits the local community through employment and local income generation (Oswald Beiler et al., 2015).

The findings of this study are beneficial to the recreational trail tourism sector, trail development bodies and investors because they assist in identifying target trails with a high income multiplier and local economic effect. Identifying stages of development

which alter income multiplier could explain economic failures of trail investments and their management, leading to more balanced and effectively targeted trail funding. Therefore, investments in trails can be better distributed towards the attributes, as described by the ROS framework, which are most efficient in achieving the desired stage of trail development within fiscal constraints. The results of this study can serve as a role model for a strategy for revival of economically depressed rural areas, which can be used by groups considering trails as a tool for rural economic development. This study provides a roadmap for trail managers, local planning authorities and broader tourism industry professionals of trail recreational opportunities and development stages with their respective KPIs, which facilitates improved trail development planning and more efficient modification of current trail development and management practices (Bowker et al., 2007; Neumann & Mason, 2019; Tyrvainen et al., 2014). An implication is that trail managers must consult with local businesses during the trail development process in terms of trail development attributes which lead to a higher stage of development and in particular recreational opportunities provision described by the ROS framework (to which process local businesses have a strong incentive to contribute since they are primary beneficiaries of trail developments) since a high stage of trail development is unlikely to result in a higher income multiplier in the absence of trail-related businesses. In terms of policy relevance, this study can serve to inform regional NBT developers and policy makers about the most optimal trail development location among the alternatives and whether it is sustainably profitable to invest in trail development there to achieve a highly developed recreational trail stage given limited available funds (Kelley et al., 2013; Tyrvainen et al., 2014). In addition, stakeholders interested in timely and effective TRR development should focus more on short-distance trails since this study found that short-distance highly developed trails generate higher income multiplier and are therefore more likely to generate significant local TRR derived income.

4.6 Conclusions, limitations, and future research

This study is the first to advance nature-based recreation economic impact theory through the explanation of the relationship between the stage of trail development and income multiplier. Our study found a strong correlation between recreational trail development and income multiplier, revealing that higher stages of trail development stimulate greater income within local areas due to increased trail visitor expenditure.

From a theoretical perspective, the present study introduces a new paradigm in TRR and economic impact theory and enhances it through the cross-linking of concepts of economic effects and development of recreational trail opportunities, providing a clear understanding of how stage of trail development alters the magnitude of income multiplier. Our findings here show that recreational trail opportunities and provision of services through higher stages of trail development can increase trail visitor expenditure and influence local economic development via enhanced income generation.

From a methodological perspective, this research proposes using the comprehensive Ad hoc approach to estimate the local economic benefits in terms of income multiplier effect due to trail developments and recreation. This study used a combined approach of the ROS framework and the Ad Hoc model, considering a variety of trail settings. It is a useful approach for local-scale trail destinations due to the exclusion of sophisticated statistical resources, which are rarely available for local areas and are often out of date. The Ad hoc model approach can be applied to any type of trail and is easily replicable for any season when monitoring the magnitude of income multiplier since it uses primary data collected only by surveys. With regards to the ROS framework, it is a pioneering approach to assess the provision of recreational opportunities and stage of trail development, can be applied to any type of trail at any time of the year by individuals without expertise in tourism economics. The framework is highly accessible and can be easily combined with other approaches in particular incorporating the perceptions of local stakeholders in terms of trail development attributes. Finally, the combined methodology applied in this research facilitates more holistic assessment of trail developments in terms of economic impact and recreational opportunities provision, reflecting the level of recreational challenge provided by a trail.

While our overall research design is based upon a specific cases within the European Atlantic area using only four representative recreational trails in Portugal, Spain, Ireland and Canary Islands; our approach is valid since the goal was to extend the current theoretical framework of economic impact of recreational trail development via innovation regarding the relationship between the stage of trail development and income multiplier, and thus providing a footing for future TRR economic impact research. Nonetheless, our study has its limitations. In this study, the current stage of trail of development and economic impact was assessed by collecting data from the actual trail

performance and trail visitor expenditure. However, future scholars should study and deepen understanding of trail development scenarios based on the ROS classification and the type of trail-related services preferred by potential visitors, applying behavioural contingency assessment. Collection of this data would facilitate trail design and development as preferred by trail visitors, and expansion of trail visitor volume, visitor loyalty, total trail-related expenditures and economic impact. Moreover, future scholars should study economic impact and income multiplier of highly developed trail networks in places with less tourism influx to boost regional or even national economic development. Also, this study investigated trails located in relatively socio-economically stable and prosperous countries; it suggests that future research can also explore the intriguing relationships between trail developments and their income multipliers within low GDP per capita unstable developing nations, trail visitor volume and a trail destination's security factor. Therefore, this study points to several important research directions that will likely help develop the methodological and theoretical foundations for recreational trail development and economic impact in nature-based tourism, local/regional development and beyond.

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5. CHAPTER FIVE

STUDY 4: SUSTAINABLE RECREATIONAL TRAIL DESIGN FROM THE RECREATIONAL OPPORTUNITY SPECTRUM AND TRAIL USER PERCEPTION: A CASE STUDY OF THE SEVEN HANGING VALLEYS

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Abstract

Recreational trails represent corridors of benefits to human health and well-being, learning and education through an understanding of other cultures or countries, raising environmental awareness, local economic development, limiting the dispersion of the visitors, linking key attractions of a given area or diversifying tourism markets. However, trail development and design require to keep up sustainability principles and understand trail user perceptions. This paper aims to identify trail management priorities to improve sustainable design and visitor experience. The most popular hiking trail of Portugal located in the Algarve region was used as a study case to describe recreation opportunities of the trail's management, development stage, preferred trail attributes and determinants of trail visitor loyalty. This study applied the recreation opportunity spectrum framework and the logistic regression model. Planners and managers might utilise these results to identify strategies for nature conservation and sustainable trail development, simultaneously maximising trail-related experiences among loyal trail users.

Keywords: recreational trails; sustainable design; visitor perception; loyalty determinants; nature-based tourism; 'Seven Hanging valleys' trail

5.1 Introduction

In countries most dependent on tourism to survive, trails have a dual mandate – to serve as access to nature-based tourism, thus diversifying mass tourism, and protect adjacent natural resources. Within the broad recognition that trail-related tourism, directly and indirectly, benefits individuals, communities and societies (Raya et al., 2018), the United Nations World Tourism Organisation recently initiated a global promotion of sustainable and universally accessible trail-related tourism (UNWTO, 2019). As a result,

the concept of sustainable trail design and its development has emerged as globally desirable in trail tourism management at local and national levels (Davies, 2018). Sustainably designed and managed trails are particularly important within European Atlantic coastal areas as recent trends tend to indicate an increase in accessing recreational trails (Kelley et al., 2016; Lukoseviciute et al., 2021; McGurk et al., 2019). As a robust local economy driver, sustainable trail-related tourism falls in the sectors that should engage in the path of climate neutrality, which is the principal goal of the recent European Commission that agreed on the European Climate Law (European Commission, 2021). Appropriate development and management of recreational trails are crucial in the southern region of Portugal, where recently over 30 recreational trails on different themes and development stages have been constructed by private and governmental units (Turismo do Algarve, 2012). Since the development of trails in the region is relatively recent, there are neither management plans or strategies nor knowledge of sustainable trail (re)design based on trail visitors' perceptions. With an increasing demand for visiting recreational trails in the region, which was a destination for almost 30% of Portugal's international tourists before the pandemic of COVID-19 (INE, 2020), mostly due to the unique diversity of landscapes, cultural and natural heritages, it is central to enhance Algarve's sustainable recreational trail design and development to ensure environmental stability, rural development, trail visitors' satisfaction and trail-related experiences enrichment.

Sustainable trails should be designed, constructed and managed to accommodate their types and seasons of use to provide high-quality visitor experiences and contribute to ensure the adjacent environment protection and conservation. On one hand, many studies have focused on analysis of trail degradation, finding implications for sustainable trail design and management (Marion & Wimpey, 2017; Meadema et al., 2020; Tomczyk et al., 2016). On the other hand, there is evidence that designing trails require knowledge in a set of attributes that satisfy visitors (Kelley et al., 2016; Oh et al., 2020). As such, information about visitors' perception, of which satisfaction and loyalty are the most important dimensions for managers, has been acknowledged as a great contributor to trail design milestones (Moore et al., 2015). There are studies that show the critical role of visitor perception of trail environment and the effects on the experience to improve trail design and enhance recreational experiences (Davies et al., 2012; Dorwart et al., 2009;

Lekies & Whitworth, 2011; Sever & Verbic, 2018), but most of the studies have been conducted in non-Atlantic area countries.

The importance of new research on designing trails and trail-related experiences through trail users' perceptions plays an essential role in the field of nature-based tourism (Moyle et al., 2017). This is particularly important for the region of Algarve, where trail-related tourism, as the principal nature-based recreation form of tourism, has been recently acknowledged as a tool to diversify mass tourism at the same time the construction of new trails is in great demand (Samora-Arvela et al., 2020). As mentioned previously, capturing trail users' perceptions may be an effective instrument to improve trail design, recognised as important as the preference for trail use (Keith et al., 2018; Oh et al., 2020; Peterson et al., 2018). Moreover, it allows to develop effective management strategies to maximise satisfaction of the trail users. Since previous findings state that visitors do not like over-managed trails mainly because it decreases the quality of visitor experience, implying that there is no place for discovery, excitement, and self-reliance (Pearce & Schanzel, 2013), as well as visitors do not like the consequences of undeveloped trails such as erosion, muddiness, tree and plant damage, fire rings, and litter (Davies et al., 2012) it is crucial to find a balanced trail management strategy. Recreational trail development in the region of Algarve is comparatively recent, requiring new scientific knowledge for sustainable trail design and management. Consequently, the aim of this paper is twofold. Firstly, to identify the stage of development of the most popular hiking trail in Algarve – the "Seven Hanging Valleys". Secondly, to identify management priorities from trail users' perceptions of satisfaction with the trail attributes and their loyalty to the trail site. The results might be used as a tool to improve the sustainable (re)design of trails, to enhance visitors' experience and to promote protection of natural and cultural assets.

5.2 Literature review

5.2.1 Nature-based experience and determinants of visitor loyalty

Fossgard and Fredman (2019) have explored four dimensions in nature-based tourism experience design, of which 'adapting to the visitors' needs' was referred to as the principal one. However, to adapt to the visitors' needs, it is essential to understand behavioural and socio-demographic determinants that play an essential role in visitor satisfaction and loyalty. The definition of visitor loyalty is well established in the tourism

literature as a multidimensional construct, consisting of attitudinal constructs such as intention to return, willingness to recommend the destination and willingness to pay (WTP) (Cheng et al., 2016; Prayag et al., 2017; Ribeiro et al., 2018). Consequently, examining visitor experiences and perceptions of importance and satisfaction with trail attributes became pivotal in studies of nature-based recreation management (Anderson et al., 2010; Dorwart et al., 2009; Hallo & Manning, 2009; Manning & Freimund, 2004; Rivera & Croes, 2010; Skibins & Sharp, 2019). Recently, Peterson et al. (2018) have studied how trail conditions influence particular elements of the long-distance hiking experience, capturing trail user perceptions of preferred trail elements. Hall and Davidson (2013), Kohlhardt et al. (2018) and Nettles et al. (2020) examined visitors' perceptions of crowding at national seashore, recreational trail and desert to enhance future nature-based recreation management towards increased overall satisfaction. One of the main limitations of the mentioned studies is that the results cannot be transferred outside the sampling area and requires new research to investigate the generalizability of results with other trail user populations mainly due to different trail user profile and determinants to their satisfaction and loyalty.

Researchers have noticed that socio-demographic characteristics can be regarded as antecedents of perceived satisfaction, loyalty and behaviour (Arnberger & Eder, 2011). Significant differences were found in the WTP according to attitude towards environmental protection, the number of previous visits, country of residence, age and education (Reynisdottir et al., 2008). Regarding age and gender, Folmer et al. (2013) concluded that older women are more satisfied and loyal to a national wildlife park than younger men. Concerning marital status, Milman and Tasci (2018) discovered that married people who repeatedly visited their favourite theme park are more likely to return and pay. In relation to education, Olya et al. (2019) found that less educated and single female visitors are less satisfied and less loyal to heritage villages. Finally, the country of residence strongly influences visitor loyalty since Samdin et al. (2010) found that international visitors were willing to pay more fees for a national park (Samdin et al., 2010), and British tourists intend to revisit Greece more often than Russian tourists (Stylos et al., 2017); however, international visitors are significantly less likely than national visitors to revisit a recreational park in Australia (Moore et al., 2017).

Nevertheless, previous literature suggests additional determinants of visitor loyalty, such as overall satisfaction with the destination or the main activity chosen at the destination (Halpenny et al., 2016). Besides, destination attributes might significantly influence visitor loyalty and recreational experiences. Concerning recreational trails and parks, the most commonly examined destination attributes influencing outdoor experience were landscape, environment, vegetation, wildlife and climate change impacts on the site (Dorwart et al., 2009), as well as artificially created attributes such as trail design attributes, amounts of use, transportation, accommodation, supporting facilities and management (Olive & Marion, 2009; Sever & Verbic, 2018; Yin et al., 2020; Zhang et al., 2020). Some authors have examined the non-visual attributes on a mountainous, remote trail, such as fresh air and soundscape (Sever & Verbic, 2018), safety and security (Keith et al., 2018). In terms of trail design, the attributes of trail surfaces, materials, colour, signs, direction, gradients and difficulty levels were studied as the ones who raise expectations and shape outdoor experience (Davies et al., 2012; Lekies & Whitworth, 2011).

Meanwhile, a study by Moore et al. (2015) has noted that nature-based tourism visitor loyalty to the site might be associated with the visitors' behaviour (e.g. the main activity during the visit). Kyle et al. (2004) found that hikers and walkers were more frequent visitors to an urban park than joggers or cyclists. Finally, Halpenny et al. (2016) and Pinkus et al. (2016) found that national park visitors' revisit intentions were influenced by frequency of visits to the same destination and duration of stay as it also confirms the results of Zhang et al. (2019).

5.2.2 The ROS framework and its use in experience design

In general, nature-based visitor experience design mainly relies on mixed approaches based on surveys with visitors and management frameworks such as the Trail Sustainability Rating Index (Marion & Wimpey, 2017), the Importance-Performance Analysis (Marasinghe et al., 2021) and the Recreation Opportunity Spectrum (ROS) (Gundersen et al., 2015). The latter was conceptualised in the United States of America by academic and Forest Service researchers (Clark & Stankey, 1979) with the purpose to provide quality recreation through the provision of a diversity of settings and apply for all types of touristic sites. The basic conceptual idea is to classify recreational sites along physical, social and managerial settings (Driver et al., 1987), which include qualities

provided by nature (vegetation, landscape, topography, scenery), qualities of recreational use and conditions provided by management (e.g. roads, development regulation). Studies that applied the ROS framework in tourism planning and management were found to be beneficial in a visitor experience design because the information gathered can then be used by managers of tourist destinations to integrate outdoor recreation settings into planning and experience design that meet visitors' preferences at a very early stage (Harshaw & Sheppard, 2013; Joyce & Sutton, 2009; McCool et al., 2007; Sæþórsdóttir, 2010). A decade ago, the US Forest Service (2011) adopted the ROS framework and developed a modified framework to determine a trail development stage to reflect the level of recreational challenge provided by a trail. Concerning the development stage, there are five main stages of development, reflecting trail development scale from minimally developed to fully developed. A minimally developed trail assumes that it may require route finding, has frequently occurring obstacles, narrow passages, minimal structures, limited route signage, infrequent resource protection and constitutes to typically primitive or roaded natural ROS class, while a fully developed trail assumes that the trail tread is wide with imported materials, obstacles are not present, frequent structures, including bridges, broadwalks, amenities, regular resource protection, commmon signing and constitutes to roaded natural or urban ROS class. Consequently, this study drew on the application of the ROS with a determination of the stage of development for a recreational trail site and suggests that the framework might be employed in the future as a base for benchmarking sustainable trail design and experience design. To support the definition and management of diverse outdoor recreation opportunities, the ROS framework and a survey given to trail users were used in this study. Moreover, the lack of empirical work on comprehensive planning and management of recreational trail site design based on trail users' perceptions has motivated this study to consider a combined approach.

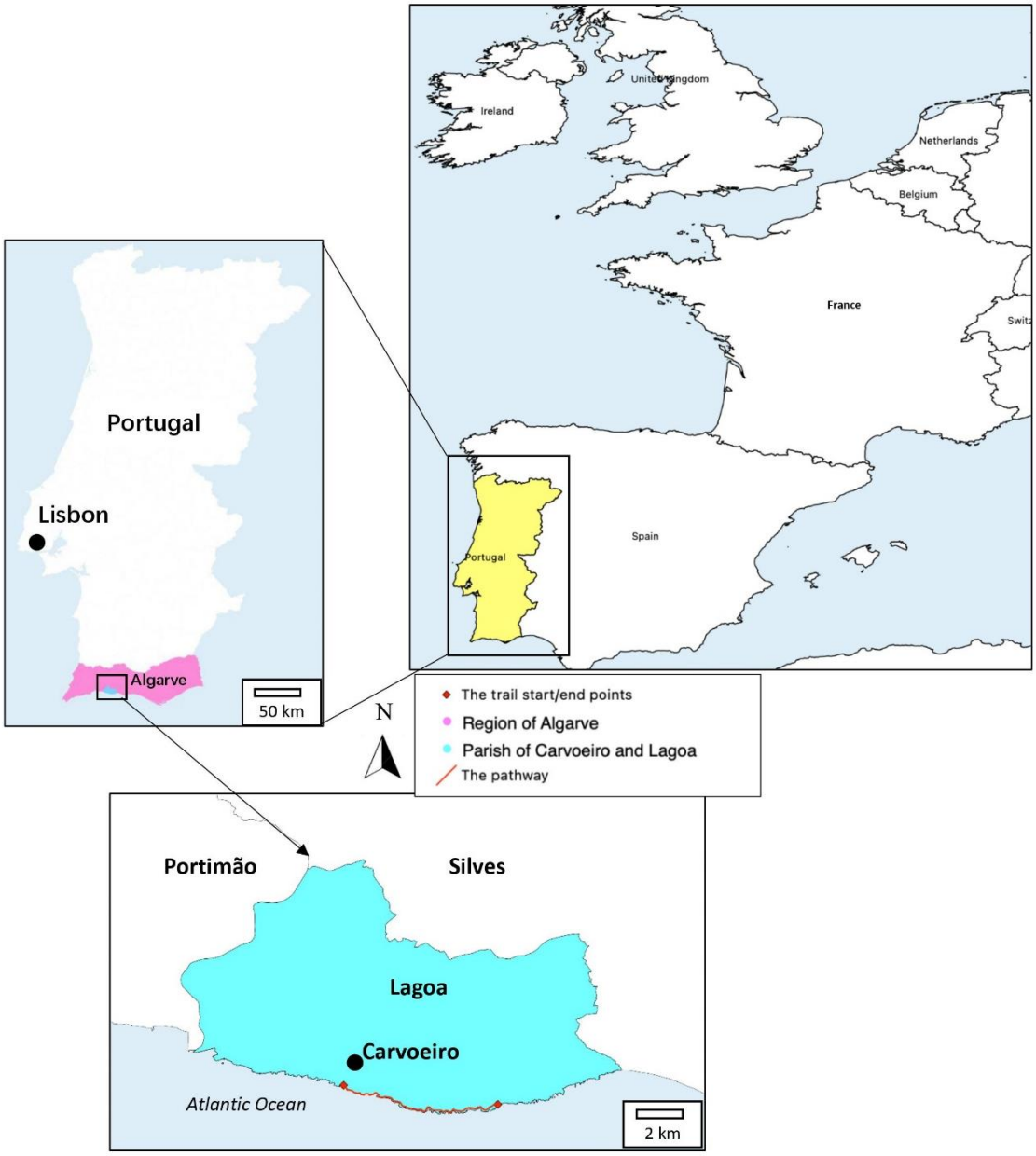
5.3 Methodology

5.3.1 Study site

The chosen study case for this research is the trail Seven Hanging Valleys, located in the parish of Carvoeiro and Lagoa, in the southern region of Algarve in Portugal. The trail is a linear coastal hiking path with a total of 11.2 km length distance (round trip), developed at an intermediate difficulty level. The trail was chosen for several reasons,

which are very likely to influence its popularity. First, it is located on the coastline of a well-known tourism destination of Algarve region in the parish of Carvoeiro and Lagoa, along stunning coastal cliffs connecting the cultural and natural assets between Vale Centianes and Marinha's beaches, favourably influencing outdoor recreationists' volume. Second, the parish of Carvoeiro and Lagoa is considered the most luxurious and excellent tourism destination due to golden sand beaches, spectacular cliffs and geological caves, and coastal trails, where the 'Seven Hanging Valleys' is the most popular. As a result, the parish attracts outdoor recreationists from different country parts in different volumes at different times in a year. Third, the trail was nominated as one of the best hiking destinations in Europe (European Best Destinations, n.d.). As a result, the trail is acknowledged as a representative of the most successful coastal nature-based recreation setting development in the region of the Algarve. The trail was constructed within the public territory and does not cross any reserves or protected areas. Consequently, the results of this study might be easily transferred to a similar recreational coastal trail setting in any southern European destination (Figure 5.1).

Figure 5.1 Location maps of the 'Seven Hanging Valleys' trail in Portugal and Europe



5.3.2 The ROS framework

The ROS framework was conceptualised by Clark and Stankey (1979) to describe the range of outdoor recreation opportunities present in landscapes and determine the stage of trail development, applying the framework developed by the US Forest Service (2011). In this research, the ROS framework has been selected as an initial trail assessment tool closely linked to the stage of the development framework where the ROS class interfaces in the framework as a partial assessment element. The overall ROS classification results in a recreation opportunity class along a spectrum consisting of six main classes, ranging from primitive (P) to urban (U). At one end of the spectrum, the P

class assumes that the area is remote from all roads with the unmodified natural environment, some evidence of trails, no developed facilities and a minimum management level. At the other end of the spectrum, the U class assumes that the area is highly developed with a high density of activities and intensive management. Three types of settings with criteria are considered for classification: physical, social and managerial (Table 5.1). The physical settings refer to access, remoteness and naturalness. The social settings refer to users and their behaviours, type and density. The managerial settings refer to facilities and visitor management. Regarding social settings, to avoid result repetition, only user density was chosen as a measure since this research applies a trail user survey with questions about trail user behaviour and socio-demographic characteristics. The assessment of recreation settings did not include a timeline since the assessment is focused on the present landscape of recreation opportunities and determination of the current stage of trail development.

Table 5.1. Criteria of components of each ROS class (Adopted from USDA Forest Service, 1990)

ROS class	Physical settings			Social setting	Managerial settings	
	Access	**Remoteness**	**Naturalness**	**User density**	**Facilities**	**Visitor management**
P	Cross country travel; non-motorized trails	Out of sight and sound of human activity. More than 1 and 1/2 hr. walk	Unmodified natural environment with some evidence of trails	6 parties or less met per day. Less than 3 visible parties' campsite	No facilities for user comfort	Low regimentation. No on-site controls or information facilities
SPNM	Non-motorized trails	Distant sight and/or sound of human activity. More than ½ hr. walk from any motorized travel	May have subtle modifications that would be noticed	6-15 parties met per day. 6 or less parties seen at campsite	Rustic and rudimentary facilities primarily for site protection	Subtle on-sit regimentation and controls. Very limited information facilities
SPM	Motorized trails and primitive roads	Distant sight and/or sound of human activity. More than ½ hr. walk from any better-than primitive roads	May have moderately dominant alterations	6-15 parties met per day. 6 or less parties seen at campsite	Rustic and rudimentary facilities primarily for site protection	Subtle on-site regimentation and controls. Very limited information facilities
RN	Controlled; full access	Remoteness of little relevance	Resource modifications are in harmony with the natural environment	Moderate to high contact on roads. Moderate to low on trails and developed sites	Rustic facilities providing some comfort for the user as well as site protection	On-site regimentation and controls are noticeable but harmonize with the natural environment. Simple information facilities
R	Full access	Remoteness of little relevance	The natural environment is substantially modified	Moderate to high contact in developed sites on roads and trails	Some facilities designed primarily for user comfort and convenience	Regimentation and controls obvious and numerous but harmonize. More complex information facilities.
U	Full access	Remoteness of little relevance	The natural environment is fully modified	Large numbers of users on site and in nearby areas. High number of social encounters	Facilities mostly designed for user comfort and convenience	Regimentation and controls obvious and numerous. Sophisticated information exhibits

Knowing the ROS class, the stage of trail development is further assessed, following the matrix, consisting of five trail attributes: tread and traffic flow, obstacles, constructed features and trail elements, signs and the ROS class. Matrix columns consists of five stages of development ranging from minimally developed to fully developed. The criteria for each trail attribute were used to determine the stage of development, putting

the results of the matrix in a separate Excel spreadsheet and applying the round average function.

5.3.3 Trail users' perception

Data of trail users' perception was collected through a face-to-face survey of 242 trail users at the trail site. The estimated population size (N=19,214) of trail visitors during the high season, obtained from bidirectional people-counting sensors ('SensMax') was considered to obtain a representative sample. The sample size was calculated using the simple random sampling formula for quantitative variables of interest (Bryman, 2015), using a confidence level of 95% and a margin of error of 2% (Cochran, 1977).

A systematic method was applied to select trail users to the sample based on the following rule: every fifth trail user or a group of users found on the trail was selected. In order to randomise the sample selection process, the survey was applied on selected days of the workweek and weekend, different times of the day and weather conditions, aiming to reflect variations in trail visitation from June through September 2020.

The research instrument was a questionnaire with two main parts. The first part included closed-ended and open-ended questions to profile the participants and describe visitors' behaviour and priorities. The following questions were included: country of origin, age, gender, education, duration of stay, frequency of visits, the main activity on the trail, if the trail was the main reason to be in the area and suggestions to improve the visitor experience. The second part included questions to measure satisfaction with the trail features, combined in three dimensions (trail environment, equipment, and services), using a five-point Likert-type scale, from 1-very dissatisfied to 5-very satisfied, and included a question for measuring intention to return and WTP. The measurement of satisfaction was simplified in order to get collaboration from respondents and avoid non-sampling errors due to non-response as well as measurement errors in measuring several indicators of multidimensional constructs (Westbrook & Oliver, 1981). The WTP question format was drawn from previous studies using a dichotomous choice contingent valuation method (Getzner et al., 2018; Lee, 1997) and was measured by asking respondents whether they are willing to pay for trail-related services or not. The questionnaire was based on the literature review (Keith et al., 2018; Kelley et al., 2016;

Mafi et al., 2020; Wade & Eagles, 2003), and it was adapted for the study case (see Appendix D).

The survey data was analysed using descriptive statistics and the logistic regression model. This model relates the probability of trail visitors' loyalty to a set of independent variables measuring visitors' behaviour, satisfaction with trail attributes and socio-demographic features. The questionnaire included a question that directly measures a visitor's loyalty: the intention to return to the trail site. Since 100% of respondents stated their intention to return, the variable of WTP was chosen as a proxy for loyalty. WTP was the binary dependent variable of the model, coded as 1 for 'yes' and 0 for 'no'. The independent variables were chosen from among the ones that revealed an explanatory relationship in the literature review and are as follows: socio-demographic characteristics, satisfaction with trail attributes and visitor behaviour (e.g. duration of stay, frequency of visits). Dummy variables were used for multinomial variables, taking a value 1 when the visitor belonged to the named category and 0 otherwise (Table 5.2). The literature on this topic reports that socio-demographic variables such as gender, age, country of origin and education explain a visitor's loyalty (Kyle et al., 2004; Marasinghe et al., 2021; Milman & Tasci, 2018; Moore et al., 2017; Olya et al., 2019; Stylos et al., 2017).

Table 5.2. Variables used in the logistic regression model

Name of variable	**Variable description and measurement**	**Categories and reference**
Gender	Gender of trail user. Values: 0= female, 1= male	Female (ref.), male
Age	Age of trail user	Na.
Satisfaction	Satisfaction with 12 trail attributes and overall satisfaction. Values: 5= very satisfied, 4= satisfied, 3= neutral, 2= dissatisfied, 1= very dissatisfied	Na.
Education	Level of trail user education. Values: 1= BSc, 2= MSc, 3= PhD, 4= Other	BSc (ref.), MSc, PhD, other
Origin	Origin of trail user. Values: 0= international, 1= domestic	International (ref.), domestic
Duration of stay	Duration of stay at the trail site. Values: 1= half a day, 2= a day, 3= overnight, 4= other	Half a day (ref.), a day, overnight, other
Frequency of visiting the trail	Values: 1= moderate frequency (few times a year, less than few times a year), 2= high frequency (every day, several times a week and once a month), 3= other	Moderate frequency (ref.), high frequency, other
The main reason to be in the area	If the trail was the main reason to be in the area. Values: 0=no, 1= yes.	No (ref.), yes
The main activity	Type of the main visitor's activity on the trail. Values: 1= walking, 2= sightseeing 3= photography, 4= family activities, 5= exercise	Walking (ref.), sightseeing, photography, family activities, exercise

5.4 Results

5.4.1 The ROS classification

The ROS classification with the current stage of development is presented here for the 'Seven Hanging Valleys' trail (Table 5.3). The results provide a landscape of recreation opportunities considering the timeline after the local managing municipality has made initial investments in the trail construction and development. The primary data for this analysis was obtained through personal observations at the trail site, bidirectional people-counting sensors ('SensMax') and face-to-face interviews with the leading manager of the trail, representatives from the regional department of coastal area management. The secondary data was obtained from technical reports and scientific publications.

Table 5.3. The results of the trail's ROS class and development stage

The ROS class								
	Setting	**P (1)**	**SPNM (2)**	**SPM (3)**	**RN (4)**	**R (5)**	**U (6)**	**The final ROS class**
Physical	Access					5		R (5)
	Remoteness					5		
	Naturalness				4			
Social	User density						6	
Managerial	Facilities				4		6	
	Visitor Management				4			

Development stage						
Trail attribute	**Minimally developed**	**Moderately developed**	**Developed**	**Highly developed**	**Fully developed**	**The final trail development stage**
Tread & traffic flow			3			Highly developed
Obstacles			3			
Constructed features & trail elements			3			
Signs				4		
Typical recreation environments & experience					5	

It can be seen that the trail falls into a rural class with a provision of semi-natural recreational opportunities. Regarding physical settings, the trail has full access, and remoteness is of little relevance. However, the trail has several 'legs' where users can enter and exit, while the two main accesses are interconnected with popular recreational sites, such as beaches or cultural heritage. Consequently, the trail entrance and its signage

lack clarity. In relation to resource modifications, there are natural and artificial elements. With respect to social settings, the trail has a high user density during the peak season (more than 19,214 visitors between June and September), while during the off-peak season, there are slightly less than 19,000 visitors.

Figure 5.2 Sample photographs of the trail 'Seven Hanging Valleys' during the field study: A, F – tread and traffic flow, G – obstacles, A, B, C, F – constructed features and trail elements, D – signs, A, B, C, D, E, F, G – typical recreation environments & experience

Regarding the development stage, the trail falls under a highly developed stage, implying that the trail has a wide and smooth tread, infrequent obstacles, cleared vegetation around the trail with frequent and substantial trailside amenities, a wide variety of signs, and a modified recreation environment. Moreover, the trail recreation environment and experiences are associated with visitor centres and high-use recreation sites such as beaches, other famous trails, cultural and natural heritage sites (Figure 5.2).

5.4.2 Trail users' profile and perception

The socio-demographic attributes of the trail users who participated in the research are given in Table 5.4. There were 242 respondents, but 23 were excluded from the analysis due to incomplete responses. Men respondents (50.2%) slightly outnumbered

females (49.8%) in the final sample. The number of domestic visitors (17.4%) was significantly lower than the international visitors (82.6%). Concerning the duration of stay at the trail site, almost half of visitors stayed for half a day (47.9%), while only 0.5% of respondents stayed overnight. The majority visited the trail for the first time (79%) and all respondents have stated their intention to return. Meanwhile, most respondents were willing to pay for trail entrance and services provided (65.8%).

Descriptive data analysis was conducted to assess respondents' satisfaction about trail attributes (Table 5.5). In general, there is a uniform opinion regarding their satisfaction with the attributes. Table 5.5 shows that two attributes registered neutral or low average satisfaction (<3.0): trash receptacles (mean – 2.80) and toilets (2.86). The highest satisfaction was given to the majority of attributes (≥3.0).

Table 5.4. Socio-demographic trail users' profile (n = 219)

Variable	Categories	%	Mean ± SE
Gender	Female	49.8	
	Male	50.2	
Age	*Continuous variable*	-	39.96 ± 12.1
Origin	International	82.6	
	Domestic	17.4	
Education	Secondary school	15.1	
	BSc	54.3	
	MSc	27.9	
	PhD	2.7	
Duration of stay	Less than 30 min	4.1	
	30-60 min	11.4	
	1-2 hours	32.4	
	Half a day	47.9	
	All day	3.7	
	Overnight	0.5	
Frequency of visits	Every day	0.5	
	Several times a week	2.7	
	Few times a year	3.7	
	Less than few times a year	14.1	
	First time user	79.0	
Main activity on the trail	Walking/hiking	70.8	
	Sightseeing	12.3	
	Family activities	6.4	
	Photography	3.2	
	Exercise/training	7.3	
Intention to return	Yes	100.0	
	No	0.0	
WTP	Yes	65.8	
	No	34.2	

Table 5.5. Results of trail users' satisfaction (n = 219)

Attribute	Mean	SD
Information available (brochures, online)	4.57	0.627
Opportunities to observe wildlife	4.52	0.545
Overcrowding	4.38	0.855
Leisure opportunities	4.38	0.641
Vegetation health and biodiversity	4.37	0.624
Amenities in proximity	4.30	0.698
Condition of the path	4.15	0.818
Safety and security	4.11	0.734
Signage	4.02	0.958
Parking	3.84	1.062
Toilet facilities	2.87	1.550
Trash receptacles	2.80	1.262
Overall satisfaction	**4.33**	**0.608**

5.4.3 Determinants of willingness to pay

The logistic regression model used to identify the determinants of trail visitors' WTP for trail-related services was estimated on the dataset of 219 trail visitors. Beforehand, multicollinearity was tested, confirming that there was no strong collinearity among the regressors. The variables of overall satisfaction and the main activity on the trail were eliminated from the final model since they were determined as non-statistically significant.

Table 5.6 presents the estimated coefficients of the parsimonious model of WTP along with associated standard errors and odds ratios. Diagnostics of this model are also reported in this table. Overall, the global model is correctly specified (LR $\chi 2=47.56$, $p<0.001$) because we reject the null hypothesis that all coefficients are jointly equal to zero. In addition, the null hypothesis of the Hosmer-Lemeshow test is not rejected ($p>0.10$), which shows that the fitted model is correct. The McFadden pseudo-R^2 value equals 0.313, showing good quality.

Table 5.6. Estimate results of the final logistic model

Variable	Coefficient	Standard error	*p*-value	Odds ratio
Satisfaction with trash receptacles (Na.)	-0.682***	0.202	0.001	0.505
Satisfaction with condition of the path (Na.)	1.066***	0.345	0.002	2.904
Moderate frequency of visiting the trail (Moderate frequency (ref.), high frequency, other)	-1.581***	0.526	0.003	0.206
Satisfaction with parking (Na.)	0.640***	0.213	0.003	1.897
Origin (International (ref.), domestic)	-1.287***	0.491	0.009	0.276
Age (Na.)	0.043**	0.019	0.021	1.044
Satisfaction with opportunities to observe wildlife (Na.)	-0.844**	0.482	0.080	0.430
Satisfaction with toilet facilities (Na.)	0.269*	0.160	0.093	1.309
Gender (Female (ref.), male)	0.618*	0.385	0.100	1.856
Duration of half a day spent at the trail (Half a day (ref.), a day, overnight, other)	0.636*	0.387	0.101	1.888
BSc education (BSc (ref.), MSc, PhD, other)	-0.786	0.576	0.172	0.456
Satisfaction with information available (Na.)	-0.509	0.423	0.229	0.601
Satisfaction with crowdedness (Na.)	0.264	0.238	0.268	1.302
Satisfaction with amenities (Na.)	-0.375	0.349	0.283	0.687
Duration of a day or overnight spent at the trail (Half a day (ref.), a day, overnight, other)	1.977	2.002	0.323	7.222
Satisfaction with vegetation health and biodiversity (Na.)	0.380	0.403	0.346	1.463
Satisfaction with signage (Na.)	-0.202	0.265	0.446	0.817
Main reason to be in the area due to trail (No (ref.), yes)	0.113	0.500	0.822	1.119
MSc or PhD education (BSc (ref.), MSc, PhD, other)	0.099	0.650	0.879	1.104
High frequency of visiting the trail (Moderate frequency (ref.), high frequency, other)	0.110	0.787	0.889	1.116
Satisfaction with safety and security (Na.)	0.016	0.300	0.958	1.016
Satisfaction with leisure opportunities (Na.)	0.001	0.359	0.998	1.001
Constant	-0.737	2.486	0.767	0.479
Test	$\chi 2$	*df*	*p*-value	
Hosmer and Lemeshow test	4.27	8	0.832	
Likelihood Ratio test	47.56***	12	<0.001	

Regarding the model's accuracy to predict visitors' WTP, the results presented in Table 5.7 show that the model can correctly classify 78.5% of observations with a high-performance ratio of classification (0.848), also known as the area under the ROC curve (AUC). The results show the predictor model's accuracy with a sensitivity of 87.8% to predict true positive and correctly identified WTP of each available category, and a specificity of 61.3% to predict true negative and correctly identified WTP of each available category. The above results allow to conclude a good model estimation to predict trail visitors' WTP.

Analysing Table 5.6, the results partially meet the authors' expectations in relation to the predictors of WTP. The Wald tests for each coefficient indicate that age, gender and country of origin influence a visitor's WTP. The logistic model identifies gender as a specific characteristic that explains heterogeneity in WTP and indicates that male

visitors are 85.6% more likely to pay for trail-related services than women (odds ratio=1.856). In terms of origin, the odds of paying for trail-related services are estimated to be 3.6 (≈1/ 0.276) times as high for international visitors as for domestic visitors (odds ratio=0.276). Concerning the frequency of visiting the trail, it was statistically significant (p=0.003) with the odds ratio of 4.9 (≈1/0.206), implying that moderate frequency of visiting the trail is associated with about a 5-fold decrease in the odds of WTP (odds ratio=0.206) when compared to high frequency of visiting the trail. Additionally, the time spent at the trail site was statistically significant with the odds ratio of 1.9, implying that a 1- unit increase in visitors' time spent of half a day or less will increase the odds of WTP by almost 2 when compared to a time spent of a full day or overnight (odds ratio=1.888).

Table 5.7. Classification table (n = 219)

Predicted WTP				
Observed WTP		No	Yes	% correct
	No	126	29	61.3
	Yes	18	46	87.8
Overall prediction rate (%)				78.5
Area under the ROC curve	0.848			

The logistic model identifies that the condition of the path is the primary determinant among trail design attributes indicating that each unitary increase in visitor satisfaction with the condition of the path increases the odds of WTP by 2.9. A great focus should be given to trash receptacles because trail users expressed the lowest satisfaction, and it is a powerful determinant of visitor loyalty. No less important are parking and toilet facilities. The logistic model identifies that each unitary increase in visitor satisfaction with the parking increases the odds of WTP by 1.8, while each unitary increase in visitor satisfaction with toilet facilities increases the odds of WTP by 1.3. An interesting result was found with regard to trash receptacles, indicating that each unitary increase in visitor's dissatisfaction with trash receptacles increases the odds of WTP by two (≈1/0.505) (odds ratio=0.505). Finally, it was determined that each unitary increase in visitor dissatisfaction with an opportunity to observe wildlife increases the odds of WTP by 2.3 times (≈1/0.430) (odds ratio=0.430).

5.5 Discussion

In popular tourist destinations, where nature-based tourism interconnects with famous sun and sea recreation, it is essential to manage trail access, which according to

Kelley et al. (2016), can direct visitor flow toward one direction, capture demand for the site and further facilitate visitor management. Our results share several similarities with Keith et al.'s (2018) findings that poor access and lack of information are more likely to be perceived as significant constraints to visitation, possibly due to the complex tourist infrastructure that the trail and surrounding areas traverse.

More than 47,000 tourists visit the 'Seven Hanging Valleys' trail per year, which is around 130 visitors per day. Accordingly, it is essential to link trail access improvement with the management of trail visitor flow to limit the number of tourists and prevent their free movement on fragile vegetation. There is evidence that degradation of the trail environment due to uncontrolled stepping outside the path is much more rapid than restoration (Conradi et al., 2015). Moreover, according to Dixon et al. (2004), repair of the damaged recreational trail environment due to unofficial access to the trail is much more costly than regular development and maintenance.

The results of specific characteristics that explain heterogeneity in WTP indicated that male visitors are 85.6% more likely to pay for trail-related services than women, which is supported by literature (Durán-Román et al., 2021; Kelley et al., 2016; Olya et al., 2019). The findings that international visitors are more likely to pay for trail-related services are in good agreement with the results of Samdin et al. (2010). Moreover, it was found that visitors spending half a day or less are more likely to pay for trail-related services when compared to visitors who spend all day. However, establishing a parallel with related literature, we found contradictory findings with Lamsal et al. (2016). These authors determined that the greater the time spent at the wetland complex, the greater the satisfaction and WTP. However, we may conclude that in the case of popular Mediterranean nature-based recreations, where the majority of visitors are international and visit for the first time, WTP is not associated with a greater time spent at the site, but the quality of experience, highly associated with destination attributes. As such, the condition of the path (p=0.002), trash receptacles (p=0.001), parking (p=0.003) and opportunities to observe wildlife (p=0.080) were identified as significant determinants of WTP. Nevertheless, the perception of the condition of the path is correlated to the type of user and desired experiences. For instance, Torbidoni (2011) has set three types of recreational trail users seeking diverse recreational experiences: nature-minded hikers, sporting hikers and general-purpose hikers. The "Seven Hanging Valleys" trail visitors

are mainly first-time international users arriving at the trail for a walk and to experience nature; therefore, the condition of the path should be managed in a way that does not challenge and tarnish personal nature-based experiences. Not surprisingly, the absence of trash receptacles was determined to have a very negative effect on most of the nature-based visitors' experiences in Slovenia (Verlič et al., 2015), Hong Kong (Ribet & Brander, 2020), Croatia (Sever & Verbic, 2018) and Portugal (Lukoseviciute & Panagopoulos, 2021), implying that, regardless of geographical context, recreational site cleanliness and related facilities remain important factors for visitors. Visitor satisfaction with the parking and toilet facilities increase the odds of WTP, which is supported in the related literature (Kelley et al., 2016; Olive & Marion, 2009; Sever & Verbic, 2018) and suggests that a respective focus on these trail attributes would be appropriate for trail design and development to enhance a visitor's experience. The least satisfaction with trash receptacles and significantly higher odds of WTP due to the absence of trash receptacles demonstrates the importance of visual aesthetics and consequently a willingness to support appropriate investments in trail infrastructure, which is supported by the literature (Ribet & Brander, 2020). Significant improvements of toilets, parking and trash receptacles would contribute to better trail-related tourism in the Algarve as well as for its sustainable development. The finding that dissatisfied visitor is more likely to pay for trail-related services is in good agreement with Fossgard and Stensland (2021) – those intangible resources, such as silence, views and other sensory qualities, are generally essential factors for nature-based tourists' satisfaction and quality experience and, therefore, this type of tourist does not give importance to tangible service provision. As previously stated, the variables considered in the study were supported by the literature, and the authors expected them to influence the WTP. However, it is essential to highlight that education level is usually associated with a visitor's better environmental understanding and that most of the services provided contribute to natural environment conservation.

As with all research, there are some limitations in this study related with the sample size, the season of sampling, the measurement of WTP and the number of study cases chosen. First, this study assumes the sample size based on the number of trail visitors during the high tourism season. Therefore, further research may utilise a bigger sample size and study trail visitors' perceptions during both the low and high tourism seasons. This also includes the second limitation of the sampling season. It is imperative to

compare differences between two opposing seasons since trail-related recreation is highly associated with weather conditions (Spinney & Millward, 2011), and desired trail-related experiences of different profiles of trail users might differ. Third, a dichotomous choice contingent valuation method was applied to measure whether trail visitors are willing to pay for trail-related services or not. Further studies should study how much trail users would be willing to pay for trail-related services, in particular, concerning a growing demand for access to recreational trails and very likely introducing an entrance fee to manage visitors flow and enhance trail-related recreation experiences. Finally, the results presented in this article are based on one particular trail site located in a coastal touristic territory. This study offers a springboard for future research on conducting a comparative study of more than one trail site located in different geographical and touristic contexts to understand how the development stage impacts trail users' perceptions and desired experiences because one trail might not have the capacity to meet the needs of all potential users.

5.6 Conclusions and recommendations

This study aimed to describe the trail recreation opportunities, determine the stage of development and identify the trail management priorities to improve sustainable trail design and enhance the visitor experience. By applying the ROS framework and a survey to trail visitors, this study focused on finding trail attributes that need management attention to providing the best recreational opportunities, protecting the natural trail environment and enhancing visitors' outdoor recreation experiences. Based on these results, we extrapolate that access to the trail, signage, visitor management and constructed trail features are the most alarming factors of sustainable recreation provision and natural environment protection. The high trail's stage of development was determined, implying that if referred trail attributes, that visitors mainly value, are improved, a full development stage may be achieved in the future. Trash receptacles and toilet facilities are primary concerns among many trail users. The logistic model determined that age, gender, origin, frequency of visiting the trail and the time spent at the trail are the main determinants of trail visitors' loyalty. Regarding trail attributes, it was found that the condition of the path, litter and toilet facilities, parking and opportunities to observe wildlife are the main attributes determining visitor satisfaction and WTP. For strategic and sustainable trail environment design, managers could install trash receptacles and

toilet facilities, improve the condition of the path, parking sites and signage along the trail, particularly on the trail entrances, thus improving visitor management.

The results of this study provide a more holistic view of the trail visitor, trail design and its environmental management, focusing on the trail's attributes influencing visitor loyalty, and positively interacting with the adjacent environment. From this perspective, our results can be of relevance to practitioners, such as national funding bodies, project proposers, investors and local planning authorities, with references to specific trail environment attributes. Understanding trail user perception and the landscape of existing trail management, this research helps find a balance between trail user needs and contributes to managing long-term sustainability. The results facilitate recreational walking industries and stakeholder groups to allocate funding properly and achieve the desired environmentally positive trail design, contributing to satisfactory economic returns and social justice. The results consequently refer to the policy implications since investors and policymakers might be advised to focus on limited investment funds. From a theoretical perspective, this research applied the approach, which is a valuable theoretical reference to the importance of integrated trail design methods, combining broader analysis of recreational opportunities and its management and trail user perceptions. The proposed approach might be easily applied to any other trail and in any geographical context. Our results also develop the literature on this topic. To the best of our knowledge, this is the first study of recreational trail design toward an enhanced visitor experience done in Portugal; therefore, these findings bridge the gap concerning sustainable recreational trail design and generally nature-based tourism in the global context, and Portugal in particular.

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6. CHAPTER SIX

STUDY 5: IMPORTANCE OF TRAIL-RELATED RECREATION DEVELOPMENT FOR LOCAL BUSINESS OPERATIONS AND PROFITABILITY

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Abstract

To promote successful development of trail-related tourism sector, local business perceptions may play an important role in optimization of trail destination management. However, in the field of TRT, local businesses have been merely addressed. On the whole, understanding business perceptions is a challenging task for researchers themselves due to the critical business viewpoint towards research studies and thus frequent refusal to engage with researchers. We studied trail-related business attitudes towards the importance of environmental and recreational amenities and assessments of possible improvements in trail-related recreation for their businesses. Companies see natural and recreational landscapes as being the most important for their business. Branding and marketing were viewed as the highest priority attribute of investments. In addition, we hypothesized in the questionnaire that the quality of recreational trails would improve due to preferred investment and asked respondents to anticipate the increase in revenues and number of visitors, enabling estimation of increase in annual revenue per company and in the study area as well as investment multiplier. The feedback from business was shown to be essential for local economic development since it ensures maximized efficiency of investments. Implications were suggested for enhanced sustainable trail destination development and management.

Keywords: trail-related businesses; investment attributes; recreational trails; analytical hierarchy process; pairwise comparison

6.1 Introduction

Trail-related recreation (TRR) has been regarded as one of the most fundamental strategies for developing nature-based tourism (NBT), providing access to natural environments (Fredman & Tyrväinen, 2010) and developing rural economically disadvantaged communities (Jones, Miles & Beaulieu, 2021). As a consequence of the

growing demands for access to recreational trails, particularly during and following COVID-19 pandemic restriction periods (Jackson et al., 2021), the NBT industry began to provide trail-related travel activities and locations with a wide range of trail-related services (Obradović & Tešin, 2022). The "Irish Trail Strategy" and "The Outdoor Recreation Action Plan for Northern Ireland" were launched in Ireland and Northern Ireland, with a vision in mind: to create, nurture, and maintain a world-class recreational trail network that is sustainable, integrated, well-used, and highly regarded (The Irish Sports Council, n.d.; Outdoor Recreation Northern Ireland, 2015). Furthermore, Donegal County's newest Corporate Plan 2020-2024 recognises competitive and creative local economic growth through trail-related activities. As a result, the recent development of recreational trails and their surrounding rural landscapes encourages the creation of new local enterprises, which are often small-scale and classified as micro-businesses (Mäntymaa et al., 2021), and often found in rural areas (Lundberg & Fredman, 2012). Examining the theoretical framework of TRR and its development, a clear pattern of inclusion of only trail visitor, landowner, or local community perceptions exists (Kline et al., 2015; Reiss & Jellum, 2012; Denstadli et al., 2010), thus indicating neglect of businesses. Considering the vast recent development of TRR, exclusion of businesses raises concerns regarding the sustainability of such recreation form and its contribution to rural community livelihoods in the local area.

In Europe, micro-businesses are classified as those with less than 10 employees with an average of 6 employees (Statista, 2022). Micro-businesses differ from small or medium enterprises (SMEs) in that the owner-manager has a significant impact, which is likely to be even greater in a micro-business because stakeholders are relatively few (Atkins & Lowe, 1994). In Ireland and Northern Ireland micro-businesses make up 90% of businesses and are an understudied area (Bourke & Roper, 2019) because the main focus of academics and policy makers has been on growth firms (Lean, 1998). In addition, in most countries, the NBT is not identified or monitored as a separate business (Fredman & Tyrväinen, 2010; Spenceley et al., 2021), and therefore the statistics of NBT firms are often not compiled (Sievänen et al., 2017). As a result, NBT lacks monitoring and statistics that challenge the assessment of its benefits for society. Despite the fact that many NBT scholars have recognised the potential of trail development to boost local and rural economies (Bowker, Bergstrom & Gill, 2007; Oswald Beiler, Burkhart & Nicholson, 2015), where local micro-businesses are the primary economic beneficiaries of trail

development investments, these businesses are frequently left out of the trail management process, and do not bode well in achieving the best trail management practises (Breiby et al., 2022).

Previous research has shown that the economic impact of NBT is dependent not only on the quantity of tourists and their consumption, but also on the destination and its suppliers (Pouta, Neuvonen & Sievänen, 2006; Souza et al., 2019). The best example may be the Nordic countries, where due to the abundant nature area, TRR is often located in forests or other types of local nature environments that can be often privately owned (Fredman et al., 2021) and, therefore, a good symbiotic relationship between landowners and business owners, combining their interests, is vital (Weiss et al., 2007). Both the sustainable trail management (Gotra & Boyle, 2006; Liu, 2003) and stakeholder theories (Freeman, 1984) imply satisfying the requirements and views of key stakeholders of a given trail or trail network. However, until now, trail management and development within private and public rural territories have been designed based primarily on consultations with trail visitors, local residents and investing bodies (e.g. environmental organisations) (Beeton, 2006; Denstadli, Lindberg & Vistad, 2010) due to incentives stemming from trail visitor experiences, health and well-being enhancement (Davies, Lumsdon & Weston, 2012), land use conflict management (Neumann & Mason, 2019; Matilainen & Lähdesmäki, 2014) and environmental protection (Ballantyne & Pickering, 2015). The notion of local trail-related businesses' perceptions of natural environments and their development through investments in recreational trail networks is largely missing and reflects the gap in current TRR literature (Breiby et al., 2022; Harik et al., 2015).

Even though new trail destination developments attract more visitors and potentially more spending in trail-related services, there are a multitude of factors that may affect the economic performance of any given trail. One of these factors is the attitude of the local business community towards the importance of the natural trail environment, amenities and investment coordination for business activities (Kelley, van Rensburg & Jeserich, 2016; Mäntymaa et al., 2021). A literature review revealed a research gap in this topic, since as far as we know, TRR businesses face internal and external challenges limiting their operations and profitability mainly due to a failure to generate large enough revenues to meet all operating costs (McKercher & Robbins, 1998)

and investments in trail development are not designed considering local business perceptions and needs. In addition, it is important to note that in nature-based recreation the available funds tend to be limited hence it is difficult to finance enhancement of all destination attributes (Kelley, van Rensburg & Jeserich, 2016). Since frequently only a few destination attributes or even only one are financed, in the absence of consultation with businesses, the maximum investment impact is often not achieved as the limited resources available for investment may be inappropriately targeted (Kelley et al., 2016).

As far as we are aware, neither a theoretical nor an empirical study has been executed on the potential for investments in TRR based on local business perceptions to enhance local business operations and profitability. Consequently, this study is the first and has two main objectives. First, to study local business perceptions of natural and recreational environments' quality and their importance for business operations and profitability. Secondly, to assess if the potential of investments in TRR could be beneficial for local business operations and profitability.

6.2 Conceptual framework

Stender, Sanders & Dowling (2018) and Cerveny et al. (2022) identified structural and foundational elements, land ownership regimes, trail funding, and partnerships as the main settings of governance that shape trail destination development and management (Fig. 6.1). Several types of investments into trail infrastructure and environment might be clustered around: creating, maintaining and signposting paths; trail site promotion, surrounding trail area development and management; and the land designated for recreational trail use. When all aforementioned settings are well-positioned to generate positive returns, this is known as a win for sustainability (UNDP, 2012). In NBT, the linkage among destinations is crucial since natural resource endowments on which a destination's competitive advantage is often dependent are not controlled by destination managers and this enables businesses to cooperate as a united network and if necessary transfer their services amongst each other in a mutually beneficial manner (Plummer, Kulczycki & Stacey, 2006).

The key pillars outlined in the literature for a sustainable trail destination development and management strategy are socio-cultural, economic, and environmental (Lukoseviciute, Pereira & Panagopoulos, 2021; Marion & Wimpey, 2017; Reis & Jellum,

2012). Many studies have been conducted in the past that focus on trail visitor perceptions of wider natural and cultural environment and memorable experiences based on environmental and socio-cultural trail management pillars (Choi & Kim, 2021; Kelley, van Rensburg & Jeserich, 2016; Lukoseviciute, Pereira & Panagopoulos, 2021; Taylor, 2015; Tyrväinen et al., 2001). The trail is in a way a vehicle to enjoy the local environment with its natural features that are the key attraction factors combined with the services. Maintaining these landscapes might need some compensation to local landowners to guarantee their quality (Tyrväinen, Mäntymaa & Ovaskainen, 2014). Other studies have investigated locals' perspectives on trail destination management and development, and the impact of trails on local communities (Denstadli, Lindberg & Vistad, 2010; Xu et al., 2016). Finally, trail governing/funding bodies and their assessments of the impact of trail exploitation on the natural environment have received significant attention from scholars (Cerveny et al., 2022; Kubo et al., 2018). However, in the real-world, business perspectives have not been taken into account in the trail destination development and management. Nevertheless, the most recent theoretical frameworks of recreational trails place more emphasis on economic performance setting and discussion of shaping the economic footprint to form a consumption pattern along the trail thus connecting local stakeholders – trail visitors, residents, governing entities/funding bodies and businesses (Fig. 6.1) (Timothy & Boyd, 2015; Stoffelen, 2018). Even though it has been found that improvements in the natural recreational environment significantly improve local business operations and revenues (Mäntymaa et al., 2021), few studies explicitly mention local business involvement in the trail governance process. From an economic theoretical framework perspective, the direct beneficiaries of financial investments into the trail networks are local businesses due to trail visitor expenditures on products and services. Concurrently, the indirect beneficiaries are local residents who benefit from increased employment and personal incomes (Archer, 1982). Indeed, the economic impacts and success of investments in recreational trail developments have recently been studied in various countries (Bowker, Bergstrom & Gill, 2007; Gyimóthy & Meged, 2018; Lukoseviciute, Pereira & Panagopoulos, 2022; Oswald Beiler, Burkhart & Nicholson, 2015; Raya, Martínez-Garcia & Celma, 2018). However, understanding the economic performance of trails is only a bridge towards design of a sustainable trail destination development and management plan, where investments and funding mechanisms must be adjusted to incorporate local NBT business consultations in their design processes, as

local NBT businesses are the key beneficiaries and generators of local economic impact (Kline et al., 2015).

As mentioned previously, most trail-related businesses are micro-businesses (McKercher & Robbins, 1998), usually located in rural areas (Matilainen & Lähdesmäki, 2014) and the core services they provide are accommodation, food and drink, transportation, guided tours (e.g. safaris), outdoor recreation equipment rentals, golf, and local retail (Lukoseviciute et al., 2023). Trail-related businesses falls within the definition of NBT businesses, characterizing such companies as lifestyle—entrepreneurship dominated, locally owned (and usually by a family) (Iorio & Corsale, 2010), committed to ecologically sustainable practices, consisting of only one or a few employees and generating comparatively low revenues (Mäntymaa et al., 2021; Matilainen & Lähdesmäki, 2014; McKercher & Robbins, 1998).Trail-related businesses are part of the cluster of NBT enterprises which may frequently be impacted by seasonal demand trends (Su et al. 2022). In order to provide a definition of a trail-related business, which is absent in prior literature, we considered a TRR business when its development is in a natural area where the key recreational attraction is a trail. Nevertheless, despite the small business size and niche target market areas, based on the theory of Waite (1973), small firms collectively can contribute enormously to local economic development (Fig. 6.1). As a result, according to Richard Cantillon's (2010) economic theory; a number of technical, managerial, and financial aspects need to be taken into account in order to achieve collective economic success.

Attractive natural environment is a key but insufficient factor alone for successful NBT businesses, which are currently aware of the need to sustain the natural environment that attracts customers to their outdoor recreation services (Gaede, Strickert & Jurin, 2011; Margaryan, 2018). NBT businesses are found to have a high dependence on non-market features such as scenery, wilderness and weather; which are more or less beyond the control of the businesses' managers (Fredman, Wall-Reinius & Grundén, 2012). In general, NBT businesses, as well as NBT visitors, prioritize forests, lakes, rivers and waterfalls in terms of natural dimensions and hiking trails and cabins in terms of built environment (Margaryan, 2018; Moyle et al., 2017). Well-managed and maintained natural and built environments through consultations and partnerships with businesses are one of the most important factors for business success (Lerner & Haber, 2001; Tyrväinen

et al., 2001). Additionally, to stimulate the economic success of outdoor recreation development, ongoing investment in coordinated delivery of promotion, trail destination development and management and surrounding landscape amenities management is required (Tyrväinen, Silvennoinen & Hallikainen, 2017).

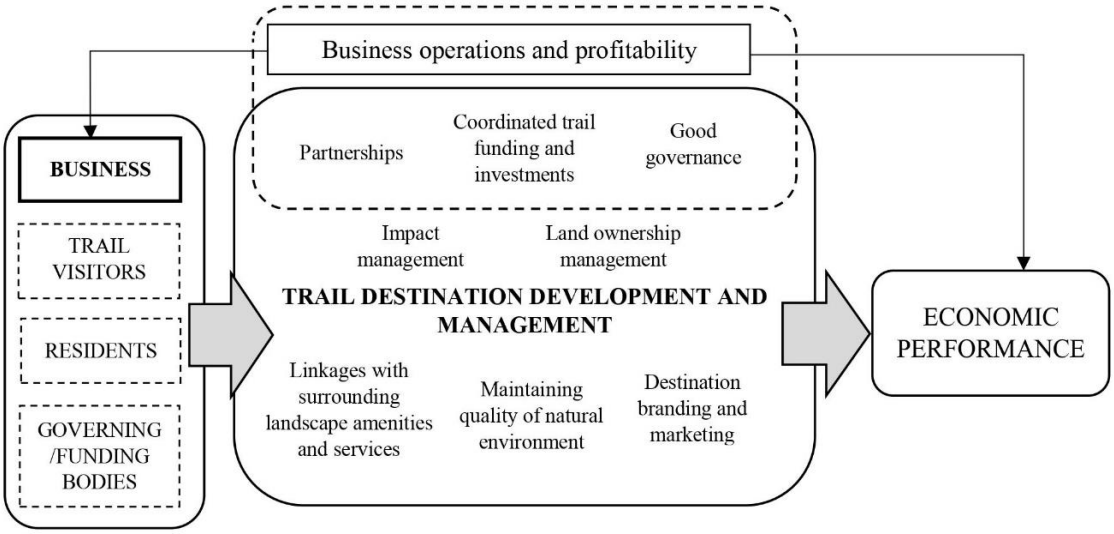
Nonetheless, previous research concluded that the presence of natural amenities is an important but insufficient factor for successful business development (Margaryan & Fredman, 2017; Wall-Reinius, 2012). Therefore, trail destination development and management should target the following elements – destination branding and marketing, maintenance and improvements of destination facilities and surrounding landscape amenities including linkage of various tourism-related sectors (Fig. 6.1) (Ford, Bowen & Yates, 2022; Fredman, Wall-Reinius & Grundén, 2012; Line & Costen, 2017; Margaryan & Fredman, 2017; Slocum, 2016) in particular due to increased demand for facilities, services and comfort in NBT (Fredman, Wall-Reinius & Grundén, 2012). However, investment prospects are typically constrained by the lack of funding for nature-based recreation, and the holistic enhancement of destination attributes is rarely achieved. Moreover, Komppula & Reijonen (2006) assert that while some destination features are less important to businesses, investing in them may not necessarily benefit business operations and profitability. Expanding knowledge is essential to resolving conflicting views on investment attributes held by local businesses. Considering limited funds and local business preferences would enable development of a balanced financial investment plan for a trail destination which reflects understanding of local business perceptions of the destination environment and the importance of various investments for local business operations and their profitability (Berry & Ladkin, 1997; Dudensing et al., 2011; Kelley at al., 2016).

Natural areas have long had a symbiotic relationship with local businesses, which play a key role in natural area development and act as intermediaries between providers (recreational trails) and consumers (trail visitors) (Mäntymaa et al., 2021). The relationship between natural heritage (in which most recreational trails are developed) and economic impact has been found by Courtney, Hill & Roberts (2006). However, this relationship is often seen as conflicting due to a lack of business integration with the recreational area management and more precisely recreational trail management decision processes (Machlis & Field, 2000). As a result, most NBT businesses become insolvent

in the long run due to sales and marketing problems, failure to seek and use expert advice, poor financial management and liquidity problems (McKercher & Robbins 1998). In addition, Lundberg & Fredman (2014) identified low profitability, lack of capital, regulations, infrastructure and taxes among the largest constraints on NBT businesses. According to Lundberg & Fredman (2012), successful NBT businesses are dependent on external (destination development including natural resources, marketing, partnerships) and internal (management, human resources) factors, whereas recreational trails and their management fall within the pillar of external factors directly contributing to enhanced local business operations and profitability. Moreover, trend categories with the highest impact on commercial opportunities in NBT demonstrate that nature visitors are expecting more tailor-made and sustainable services (Haukeland et al., 2023). Therefore, the growth of a successful cluster of trail-related businesses is one way to provide for those visitors who prefer to be active consumers of the natural landscape. Investment strategies that consider business perceptions facilitate, encourage, and create opportunities for the businesses of outdoor adventure providers. Therefore, following the conclusions of Margaryan (2018), NBT businesses should be studied from the supplier's perspective as they co-create NBT experiences.

Consequently, the assumption underlying the conceptual framework (Fig. 6.1) created for this study is that improvement of local trail-related business operations and profitability is accomplished through good governance, coordinated funding, and investments in TRR development in partnership and consultation with the local business community. This assumption is based on the economic and stakeholder theories (Cantillon, 2010; Freeman, 1984).

Figure 6.1 Conceptual framework



6.3 Study areas, materials and methods

6.3.1 Study area: Derry City and Strabane Council valleys in Northern Ireland

In Northern Ireland, outdoor recreation is the main tourist attraction for national and international visitors due to the myriad of stunning landscapes, seascapes and heritages (NISRA, 2020). In Northern Ireland, most nature-based activities are focused on the consumption of rural landscapes, artefacts, cultures and experiences (Panzer-Krause, 2020). Due to its natural and cultural beauty, Northern Ireland has been selected as a filming location for numerous movies and TV shows such as “Game of Thrones”. This has piqued the interest of various profile visitors to explore the country’s natural beauty via its recreational trail network (O’Connor & Bolan, 2008). In the last few years parks and forests with their trails accounted for 39% of all visitors to Northern Ireland. Between 2011 and 2017, walking for recreation was the outdoor activity with the greatest rise in participation, increasing from 36% to 49% (Sport Northern Ireland, 2019). In recent years recreational trail development has been expanded through “The Outdoor Recreation Action Plan for Northern Ireland”, which emphasises the establishment of a community trail network. The main strategic goals for TRR development include social, environmental and economic benefits and include improved local environment, community development, increased all-year-round tourism, improved linkage between visitors and services, development of local trail-related services, increased business commercial operations, and increased local, regional and national economic contributions (Outdoor Recreation Northern Ireland, 2015). Therefore, the inclusion of business

perceptions in trail development and management with an emphasis on coordinated investments has a significant impact on ability to achieve the strategic goals. The valleys of Derry City and Strabane Council comprise a mixture of landscapes which include mountains, the Foyle River and rolling farmland. As a result, numerous cycling and walking trails have been developed along the valleys with adjacent businesses ranging from coffee trucks, and outdoor activity organising agencies to guided tours. One of the examples of developed trails in the study area is the Foyle Valley Greenway, a 34 km long cycling trail, which was the first official cycling trail built on the island of Ireland the district of Derry City and Strabane Council is a 1248 km^2 local government district with a population of 151 109 (NISRA, 2021) and therefore is classified as rural. Consequently, the results of this study might be easily transferred to a similar recreational trail setting in any rural northern western European destination.

6.3.2 Research instrument to measure business perceptions

A survey-based questionnaire adapted to the study case from the Mäntymaa et al. (2021) study was used to gather information on business perceptions. The questionnaire consists of four parts. The first part included questions related to respondents' background. The second part asked about business activities including recent developments, the number of customers and revenues. The third part aimed to find out respondents' assessment of the performance and importance of the quality of natural and recreational environments for their businesses, as well as the importance of investments in TRR and its development for local business, using a 5-point Likert scale. The measurements were simplified in order to get collaboration from respondents and avoid non-sampling errors due to non-response as well as measurement errors in measuring several indicators of multidimensional constructs (Martilla & James, 1977). In addition, respondents were asked to assess the importance of given TRR investment attributes using a pairwise comparison approach. The fourth section asked to rate how beneficial would be the given investments for local businesses in terms of the proposed scenarios on a 5-point Likert scale. Finally, a combined actual and intended behaviour approach allowing to estimate consumer demand was used (Rosenberger & Loomis, 1999) to ask local businesses to evaluate how improvements in recreational trails and their network due to a preferred investment attribute would change the volume and revenue of their business.

The selection of variables in the third part was based on the findings of previous research in the study areas, which found that biodiversity, the natural environment and its amenities including recreational trails and their quality are the most important factors (Barry, van Rensburg & Hynes, 2011; Deenihan, Caulfield & O'Dwyer, 2013; Kelley, van Rensburg & Jeserich, 2016; O'Leary & Deegan, 2005). With regards to recreational trails, previous research found that the following three attributes are the most important in terms of investments and trail network development: 1) branding and marketing, 2) maintenance and improvement of trail facilities and 3) landscape attractions in the surroundings (Kelley, van Rensburg & Jeserich, 2016; Lukoseviciute, Pereira & Panagopoulos, 2021; Taylor, 2015; Schasberger et al., 2009). Accordingly, the three attributes were selected for a pairwise comparison, where the respondent expresses priorities between the two attributes verbally from equal beneficiary to absolute beneficiary of one attribute over another according to a five-step scale. Pairwise comparison is a part of the analytic hierarchy process, developed by Saaty (1980) and has been chosen for this study due to its simplicity and easy application in a manner that ensures consistency to tackle objective judgments about qualitative criteria of investments in TRR and derive the priorities of the evaluated attributes in ratio scale (Saaty, 1977). The main advantage of pairwise comparison in this study is that the respondent assesses the relative performance of only two attributes at a time instead of making a holistic evaluation of a set of attributes (Haara, Store & Leskinen, 2017). Pairwise comparisons were made at one decision hierarchy level.

6.3.3 Data collection

To collect data from local businesses, initially a sample size was identified, considering the official administrative boundaries of the two study areas. The list of businesses in Derry City and Strabane Council was extracted by district council area, rural/urban locations and industry groups from the Northern Ireland Statistics and Research Agency. Due to the limitations of the statistical data provided and the absence of an NBT category in the list of businesses, the following approach was applied to ensure the inclusion of all relevant businesses. From the list obtained from the Northern Ireland Statistics and Research Agency, each business was analysed via the governmental "Companies House" website and Google Maps considering whether the business is trail-related (e.g. accommodation, food service, guided tours, outdoor recreation equipment

rentals, golf, outdoor recreation training) or not, falls within the boundaries of the study area boundaries and is located in a rural area. In total, 130 businesses were found to be interviewed in Derry City and Strabane Council area.

A snowball sampling approach was used to select local businesses for data collection. Given the low population density and lack of available local companies for participation, this sampling strategy was required in this study area. Additionally, rural communities are frequently small and isolated, making it challenging for outsiders to engage with potential participants (De Guzman et al., 2020). Business owners or managers, ranked second in the management hierarchy, were selected to be interviewed. Questionnaires were applied by a direct approach and completed by either face-to-face and telephone interviews. Upon use of the face-to-face approach, businesses that were not willing to fill out the questionnaire at the time of the visit, were offered the option to complete the questionnaire later and send it to the interviewer by e-mail. In total, 30 businesses provided responses, corresponding to a response rate of 24%, which is in line with previous studies, applying questionnaires to nature-based recreation businesses and landscape experts (Haara, Store & Leskinen, 2017; Hodur et al., 2008; Mäntymaa et al., 2021; McKercher & Robbins, 1998). There is no particular reason to believe that a significant non-response bias exists, the relatively low response rate is not necessarily indicative of the responses not being representative of the unsampled population as demonstrated for another 5-point Likert scale and a pairwise comparison 9-point scale surveys (Mäntymaa et al., 2021; Meterko et al., 2015). The data collection was between July 1st and September 30th, 2022. Data collection was approved by the ethics committee (CEUAlg Pn°52/2021).

6.3.4 Data analysis

The survey data was analysed by applying descriptive statistics, using IBM SPSS Statistics 26.0 software (IBM, Armonk, NY) before transmitting collected data to a Microsoft Excel sheet for data integration. The pairwise comparison data were analysed by applying the Bayesian approach of the linear regression technique (Alho & Kangas, 1997), using the STEPS 0.02 (STatistical Elicitation of PreferenceS) software, developed by Finnish experts in forest recreation and natural resource management (Haara & Leskinen, 2007).

Analysing the results of pairwise comparisons, the verbal comparisons were converted into numerical values in the scale adapted from Kim et al. (2010) according to the preference intensity as follows in the scale from 1 to 9 for qualitative data, ranking and subjective opinions: 1/1; 3/1; 5/1; 7/1 and 9/1, where 1/1 indicates equal importance and 9/1 indicates that the first attribute is 9 times more important than the second one. In addition, intermediate values such as 2/1, 4/1, 6/1 and 8/1 were also allowed. The priorities of investment attributes were computed in relative weights, applying a Bayesian linear regression approach (Alho & Kangas, 1997) separately for each respondent, before randomizing the order of the pairwise comparisons in order to ensure independent comparisons between the pairs. The means of computed weights of each attribute for all respondents were then calculated to present the sequence from the most prioritized to the least prioritized attribute. Aside from the relative weights, the computation of the consistency of each respondent-specific result was achieved by calculating the coefficient of determination (R^2) of the regression, which measures how much the respondent statistical models explain the respondent-specific variation. Inconsistent pairwise comparisons with values of $R^2 \leq 0.5$ were excluded from further analysis.

Analysing the results of estimated change in the volume and revenue of businesses, the midpoint values of the magnitude of revenues identified by businesses in a classified scale from "£20,000 GBP" to "£1 million or more" were used for further analysis. In order to estimate the revenue increase for each individual business, the current average business revenue was multiplied by the average figure of the percentage growth and divided by the number of businesses.

In order to estimate the potential of investments in TRR, the investment multipliers were estimated through a cost-benefit analysis (CBA) approach. CBA considers economic benefits and other benefits of investing in recreational trails, as well as economic costs, and is the most commonly used economic assessment tool for estimating returns on investments in the public sector investment decision stage (Cordes, 2017; Raya, Martínez-Garcia & Celma, 2018). In the CBA, the benefits were considered as an average estimated change in the revenue, while the costs for each of the three investment attributes were obtained from prior real-world examples in Ireland and Northern Ireland. By dividing the total average change in revenue (the net value of taxation) by the total costs of investments in a given attribute, an investment multiplier was obtained. This study

does not consider the information from businesses about current spending such as operative costs (e.g. wages, electricity) since it was not available to obtain due to business oenwers trust issue.

6.4. Results

6.4.1 Respondent business profiles

The background information about the businesses of the respondents is presented in Table 6.1. The results show that 53,3% of the respondents were female, while 46,7% were male. Of the total respondents, 76,7% were business owners, while the remaining 23,3% were managers. Given that business owners are more concerned with operations and increasing profitability, they corresponded to the majority of respondents and allow for the collection of data of greater quality (Healey & Rawlinson, 1993). Nevertheless, the manager, who is ranked second in the management hierarchy, was interviewed in the business owner's absence. Results show that most respondents had a secondary school education (40,0%) or undergraduate degree (36,7%), followed by a minority of respondents with a postgraduate degree (20%) or PhD degree (3,3%).

The largest group of companies who responded to the survey produce food service and accommodation (24 companies or 80%); the second guided tours, outdoor recreation equipment rentals, local retail or grocery (6 companies or 20%). The companies in the study are 11.1 years old on average, with the 0-9 year age group accounting for 36,7% of the total. The 10-19 age group came in second (30,0%), and the 20-39 and 40+ age groups tied for third (16,7%) with respect to age. Since outdoor recreation is Northern Ireland's top tourist draw, the majority of businesses (22, or 73%) are open year-round, while only 6 (20%) are open during the summer and 2 (6,7%) are open during both the spring and summer seasons.

With regards to business development in the past 5 years, the majority of the companies (17 or 56,7%) reported increased revenues, 10 companies (33,3%) reported unchanged revenues, and only 3 companies (10,0%) claimed decreased revenues. It is clear that higher revenues have led to overall growth in the development of businesses associated with trails. In terms of business development expectations over the next five years, companies are upbeat because 73,3% (22) predict growth, just 26,5% (8) predict no changes, and 0 companies have declared their businesses to be doomed. In terms of

annual revenues, 20% of businesses earn less than £100,000, 60% earn between £100,000 and £499,999, and 20% earn £500,000 or more.

Table 6.1. Descriptive statistics of respondents and businesses interviewed (n=30)

	NBT's	
	n	**%**
Respondent's gender		
Male	14	46,7
Female	16	53,3
Position of the respondent in the company		
Owner	23	76,7
Manager	7	23,3
Level of education		
Secondary school	12	40,0
Further education (e.g. BTeC/HND level)	0	0,0
Undergraduate degree	11	36,7
Postgraduate degree	6	20,0
PhD degree	1	3,3
Branch of business		
Accommodation	11	36,7
Guided tours, outdoor recreation equipment rentals	3	10,0
Food service	13	43,3
Local retail	1	3,3
Grocery	2	6,7
Age of company (years)		
0-9	11	36,7
10-19	9	30,0
20-39	5	16,7
40 or more	5	16,7
Main season of business		
Summer	6	20,0
Summer/spring/autumn	2	6,7
Year-round	22	73,3
Development of revenues in recent 5 years		
Decreased	3	10,0
Unchanged	10	33,3
Increased	17	56,7
Expectations of business development in the coming 5 years		
Decreases	0	0,0
Unchanged	8	26,7
Increases	22	73,3
The magnitude of annual revenue (£)		
20,000-49,999	3	10,0
50,000-99,999	3	10,0
100,000-199,999	9	30,0
200,000-299,999	6	20,0
300,000-499,999	3	10,0
500,000-999,999	5	16,7
1 million or more	1	3,3

6.4.2 Respondents' perceptions on the quality of natural and recreational environments and their importance for their business development

Descriptive data analysis was conducted to assess respondents' perceptions of the quality of natural and recreational environments and their importance for their business development. To simplify visualization of results of the quality assessment, results measured on a 5-point Likert scale (from 5-very good to 1-very bad) were organized into three classes, representing, respectively, "very good" and "good" (values 5 and 4), "not good" or "bad" (3 and 2), and "very bad" (1). Figure 6.2 shows that the percentage figures of the highest classes on the scale vary from 60% to 97% in all attributes, with the two largest being quality of the recreational environment and landscape beauty (93% and 97%, respectively). This shows that, on the whole, respondents evaluated with high quality all attributes of both natural and recreational environments. The attributes of a network of recreational trails and the maintenance and guidance of recreational trails, however, might be improved since respondents evaluated the lowest the quality of these two attributes (18 or 60% and 19 or 63%, respectively). The management of the aforementioned attributes is critical for company development because trails are the main attraction for drawing tourists to explore natural areas and engage in outdoor activities, as well as the area around which the majority of nature businesses are established.

With regards to the importance of natural and recreational environment attributes for local businesses, results measured on a 5-point Likert scale (from 5-extremely important to 1-not at all important) were organized into three classes, representing, respectively, "extremely important" and "very important" (values 5 and 4), "moderately important" (3), and "slightly" or "not at all important" (2 and 1). Percentage figures of the highest classes on the scale (Fig. 6.3) show that the natural landscape is the most important attribute for businesses (28 or 94%). The second most important attributes were cultural landscape (27 or 90%) and the vicinity of their company within about 1 km (27 or 90%). Finally, respondents identified the vicinity of a local town within 5 km (26 or 86%) as being amongst the most important attributes. According to the percentage figures of the lowest class on the scale, two attributes were identified: a specific campsite where the companies arrange nature activities (14 or 47%) and beaches (9 or 30%), not surprising since the majority of respondent companies were from food and drink and accommodation sectors and located in regions with no beaches.

Figure 6.2 Respondents' assessment of the performance of the quality of natural and recreational environments

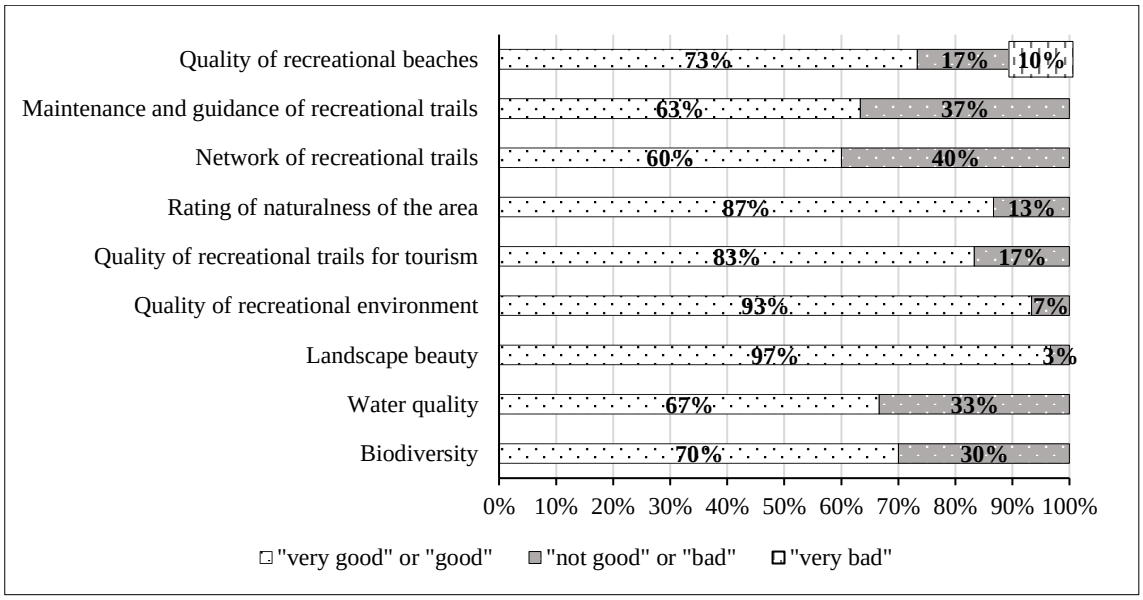
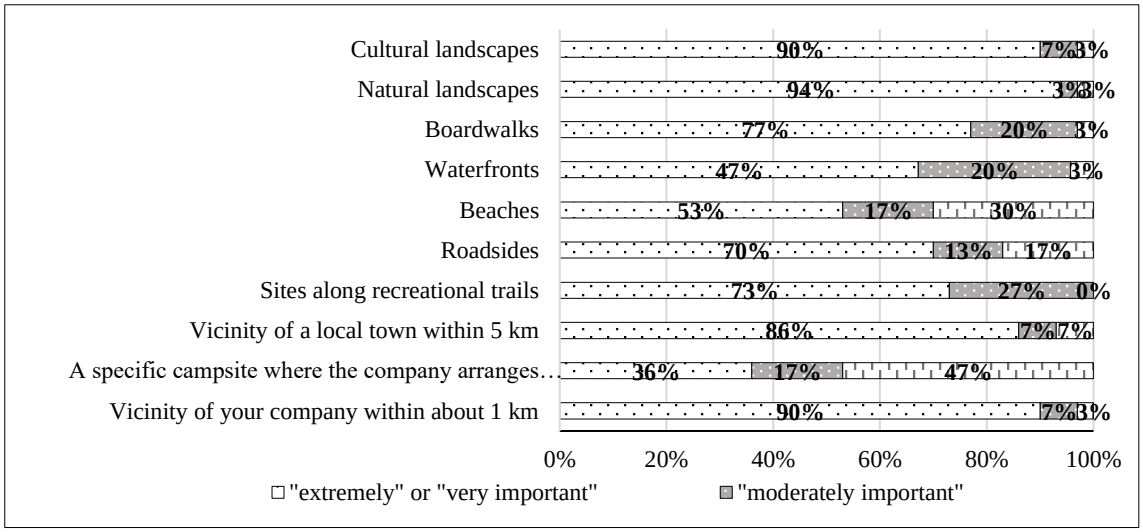


Figure 6.3 Respondents' assessment of the importance of the elements of natural and recreational environments for their business



6.4.3 Respondents' perceptions on importance of investments in recreational trails via pairwise comparisons

The findings of the respondents' evaluation of the relative significance of three attributes of investments in recreational trails are shown in Table 2. Since there were no inconsistent responses and the primary attribute models' coefficients of determination were not alarming, the results apply to all 30 business respondents ($R^2>0.5$). As a result, all respondents in this study had their pairwise comparisons accepted (R^2 *Mean=0,813*).

According to Table 6.2, branding and marketing had the highest priority for investment, receiving a weight of 47%. Respondents consider this feature to be the most important. Companies would prefer to see investments in landscape attractions after branding and marketing (weight of 30%), while the investment attribute considered the least important was maintenance and improvement of trail facilities (weight of 23%).

Table 6.2. The importance of investments in branding and marketing, maintenance and improvement of trail facilities and landscape attractions in the surroundings assessed with the pairwise comparisons of analytic hierarchy process

	Attribute		
	Branding and marketing	Maintenance and improvement of trail facilities	Landscape attractions in the surroundings
Mean[a]	0,470	0,227	0,303
StDev[b]	0,255	0,095	0,216
R^2 Mean[c]	0,813		

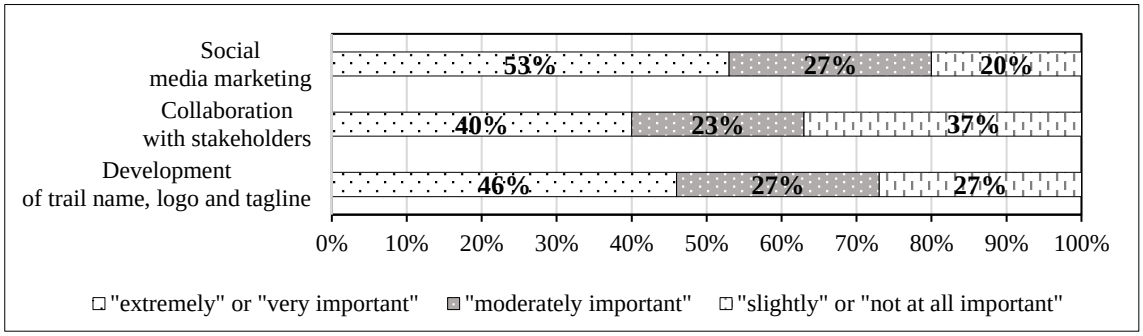
[a]Mean: Means of the priorities of the three main attributes obtained from all 30 businesses.

[b]StDev: Standard deviation of the three main attributes obtained from all 30 businesses.

[c]R^2Mean: Mean of the coefficients of the determinations of the models for the three main attributes.

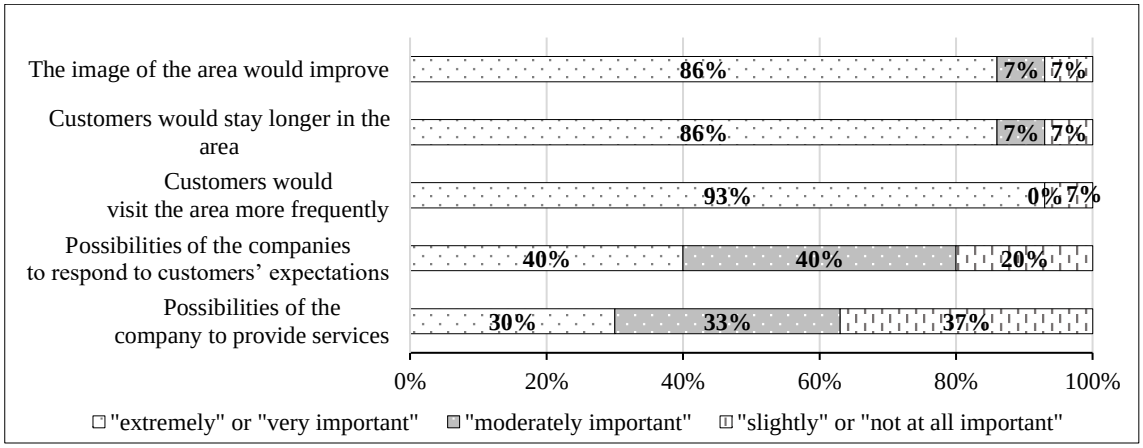
Further analysing preferences with regards to branding and marketing, the respondent pool gave highest priority to social media marketing (16 or 53% as “extremely” or “very important”), while only a few respondents (6 or 20%) assigned it low or no importance (Fig. 6.4). However, the least importance was given to collaboration with stakeholders with a roughly equal number of responses expressing high interest in collaboration (12 or 40% as “extremely” or “very important”) and low or no interest (11 or 37% as “slightly” or “not at all important”).

Figure 6.4 Respondents’ assessment of the importance of investment elements of branding and marketing attribute



On a 5-point Likert scale, respondents were asked how beneficial the given investments would be for local businesses in terms of the suggested scenarios. Figure 6.5 demonstrates that respondents primarily expect a rise in local visitor visits, with 93% of respondents rating this scenario as “extremely” or “very important” and only 7% rating it as “slightly” or “not at all important”. In addition, the majority of the respondents expect that customers would stay longer in the area or that the image of the area would improve (26 or 86% as “extremely” or “very important”). However, respondents found that investments in recreational trails would be less important for the scenario of possibilities of the companies to respond to customers’ expectations (24 or 80% as “extremely”, “very important” or “moderately important”). Surprisingly, the scenario of possibilities of the company to provide services was viewed as “extremely” or “very important” by only 30% of respondents, while the large proportion (11 or 37%) viewed it as “slightly” or “not at all important”, indicating that the majority of trail-related businesses prefer to keep the same range of service and are unwilling to adapt it to meet customer needs.

Figure 6.5 Respondents’ rating of expected benefits gained from investments and improved management practices of recreational trails



6.4.4 Estimation of revenue and visitor increases and investment multipliers

The respondents were asked to estimate how their preferred investment attribute would impact the volume of revenue and customer base in relation to improvements in the recreational trails and their environment. Respondents provided their estimated percentage values of the increase in revenues (net value of taxation) and customer population along with the information about current annual revenues. Businesses predicted that, on average, improvements to recreational trails driven on by preferred

investments would result in a 29% increase in customers and a 24% rise in revenues (Table 6.3). Given that there is no statistically significant difference between these figures (paired sample *t*-test, *t=2.048*, *df=28*, *p=0.236*), investing in recreational trails would increase both the volume of visitors and revenues. Estimating the total increase in revenue of all companies, current companies' revenues obtained from the survey (using midpoints of each revenue category and the exact amount of the last category) were multiplied by the estimated average percentage of revenue growth, resulting in summed up annual increase in revenue of £2.33 million and £0.078 per company. Multiplying the average revenue increase per company by the number of the businesses in the study area (130), a total annual increase of revenues was estimated more than £10 million per year.

Table 6.3. An overview of the increase in local companies' revenues and customers driven on by investments in recreational trails

<table>
<tr><td colspan="3" rowspan="2">The magnitude of current annual revenue (£)</td><td colspan="4">Average increase of</td><td>Sum of total increase in annual revenue (£)
2.33 million</td></tr>
<tr><td colspan="2">Number of customers</td><td colspan="2">Revenues (net value of taxation)</td><td>Paired sample t-test</td></tr>
<tr><td>n</td><td></td><td>%</td><td>%</td><td>St.Dev</td><td>%</td><td>St.Dev</td><td>p=0.236</td><td>Increase in annual revenue per company (£)
0.078 million</td></tr>
<tr><td>20,000-49,999</td><td>3</td><td>10,0</td><td>29,17</td><td>35,45</td><td>24,17</td><td>18,62</td><td rowspan="8"></td><td rowspan="2">Sum of total increase in annual revenue per study area (£)
10.14 million</td></tr>
<tr><td>50,000-99,999</td><td>3</td><td>10,0</td><td colspan="4" rowspan="7"></td></tr>
<tr><td>100,000-199,999</td><td>9</td><td>30,0</td><td colspan="2" rowspan="6"></td></tr>
<tr><td>200,000-299,999</td><td>6</td><td>20,0</td></tr>
<tr><td>300,000-499,999</td><td>3</td><td>10,0</td></tr>
<tr><td>500,000-999,999</td><td>5</td><td>16,7</td></tr>
<tr><td>1 million or more</td><td>1</td><td>3,3</td></tr>
<tr><td colspan="3" rowspan="3">Investment multipliers</td><td colspan="5">Branding and marketing</td><td>10,14</td></tr>
<tr><td colspan="5">Maintenance and improvement of trail facilities</td><td>5,63</td></tr>
<tr><td colspan="5">Landscape attractions in the surroundings</td><td>1,19</td></tr>
</table>

The investment multipliers were computed using investment quantities in the three investment attributes used for this study from prior real-examples in Ireland and Northern Ireland. According to the national tourism development authority report for the Republic of Ireland, branding and marketing for Ireland's four most popular tourist destinations will get an investment of about €4 million in 2021 (Failte Ireland, 2021). It is reasonable to assume that similar sums would be invested for branding and marketing of outdoor recreation in Derry City and Strabane Council given that both the Republic of Ireland and Northern Ireland have a joint tourism board called "Tourism Ireland" that manages investments in outdoor recreation. Since a branding and marketing campaign would only be necessary in this instance for one region, an estimate of £1 million was used. As a

result, an investment multiplier of 10,14 was estimated by dividing the total increase in annual revenue by investment costs, meaning that for each £1 invested in branding and marketing, £10,14 is generated as a revenue in a study area. With regards to investments in maintenance and improvement of trail facilities, a £1.8 million amount was considered, obtained from a neighbouring council in Mid Ulster investing in mountain biking infrastructure improvements in 2022 (MountainBikeNI.com, n.d.). Consequently, an investment multiplier of 5,63 was estimated. In terms of landscape attractions in the surroundings, the costs of £8.5 million were considered, obtained from Derry & Strabane Natural Capital Account Report 2021 (VividEconomics, 2021), which resulted in an investment multiplier of 1,19.

6.5 Discussion and Conclusions

The purpose of this innovative study was to investigate local businesses' perceptions of the value of rural natural and recreational environments, as well as to assess if the potential of investment attributes in TRR destinations could be beneficial for local business profitability and operations in Derry City and Strabane Council. The findings of this research lend credence to earlier economic and stakeholder theories, which held that successful development of NBT businesses, which are typically micro-businesses, can be accomplished through coordinated funding and investments in NBT area attributes through partnerships and consultation with local businesses (Cantillon, 2010; Freeman, 1984). It was found that improvements in the preferred destination attribute (branding and marketing) would greatly improve the operations and profitability of local businesses, with an increase in total revenue of more than £10 million anticipated in the study area.

For the case of investments in maintenance and improvement of trail facilities, the estimated investment multiplier was 5.63, meaning that every pound invested in the aforementioned attribute would generate £5.63 in revenue. These findings can be compared with those of a previous study by Raya, Martínez-Garcia & Celma (2018) from rural northern Spain, which estimated a total return of investment of €4.28 million with an investment multiplier of 4.92 for trail facility maintenance and improvement, indicating that results of this study fall within a range and generally do not vary significantly.

However, the most remarkable result to emerge from the Northern Ireland data is the value of investment multiplier of branding and marketing, indicating a 10.14 times return on such investments. Consequently, the findings illustrate that leveraging business perspectives may greatly increase overall revenues as in this case branding and marketing attribute was the most prioritized and approximately double the return was anticipated. Therefore, it appears that inclusion of business perspectives in the investment decision stage is indeed effective, in particular, for TRR developers, seeking maximization of return on investment. These results support earlier research in North Dakota (Hodur, Leistritz & Wolfe, 2008), which found that branding and marketing initiatives are prioritized by regional decision-makers and economic development organizations, indicating that this attribute is both the most crucial and the most economically beneficial for businesses as well as other stakeholders in NBT. Since NBT in rural areas is typically offered by small enterprises that have difficulties in being competitive in the global market (Rodrigues, Kastenholz & Rodrigues 2010) due to their isolation (Clarke, 1995; Mihailović & Moric, 2012), branding and marketing play a major role in the initial destination development stage. In addition to branding and marketing, well -functioning business ecosystems and networking are also crucial for the success as it was found in Finland where in Lapland the co-operation among firms is much more developed than elsewhere in the country (Tyrväinen et al., 2017a). The findings of branding and marketing being the most important reflect the intent of local businesses in the research study area to attract more visitors to the area as this is essential to business expansion. Businesses reported that as a result of improvements in TRR development and management, they anticipate a 29% increase in trail visitors and a corresponding 24% increase in revenues. These results demonstrate that businesses in the study region of Northern Ireland have more trust in the potential of branding and marketing to boost the attractiveness of trail-related locations to potential visitors, which according to Mäntymaa et al. (2021) is in contrast to the lower degree of importance Finnish businesses place on branding and marketing attribute. The difference in business perceptions, however, may be based on the current differences in visitor numbers, as Finnish businesses are currently generating higher revenues due to a higher number of visitors (as Finnish Lapland is an internationally known tourism destination with relatively easy access by air for international visitors), whereas Northern Irish businesses are generating less revenue and as a result need to find clever marketing strategies to draw more visitors. In general,

respondents in the study area perceive that potential visitors have relatively low levels of awareness of the existence of their outdoor recreation attractions.

According to the findings of this study, the majority of trail-related businesses that are clusters of NBT businesses are rural and micro-size businesses with annual revenues of up to £300,000, as was also demonstrated in study areas in Finland (Mäntymaa et al., 2021; Matilainen & Lähdesmäki, 2014); Sweden (Margaryan & Fredman, 2017a); southwestern North Dakota in the United States of America (Hodur, Leistritz & Wolfe, 2008) and Norway (Fossgard & Fredman, 2019). Limited budgets may prohibit simultaneous initial investments in both branding and infrastructure improvements, however, increases in the volume of visitors will generally lead to increased revenues, which can be applied to infrastructure improvements. Prior research in outdoor recreation destination development found a relationship between destination branding/image and visitor consumption, which is crucial for local business profitability (Aro, Suomi & Saraniemi, 2018; Hodur, Leistritz & Wolfe, 2008; Manhas, Manrai & Manrai, 2016). Case studies from practice demonstrate a 135% revenue increase as a result of implementation of a marketing campaign of "Greatland Adventures" outdoor adventures tours company in Alaska and a return multiplier of 12 for "Montana Whitewater" rafting and zipline tours in the United States of America (Tomis, n.d.).

Since respondents underlined social media as a tool for branding and marketing, this is in good agreement with Alves, Fernandes & Raposo (2016) as social media is a powerful instrument to increase consumption and attract more visitors to the area through improved attitudes toward the brand and increased word of mouth. Focusing on impact of NBT on rural businesses in the U.S. state of Maine, Jones, Miles & Beaulieu (2021) in an exploratory study indicated social media marketing as a promising vehicle to facilitate increased tourism and small business revenue in rural, economically disadvantaged areas. Therefore, this finding brings an important contribution to the rural trail destination management framework (Fredman et al., 2021; Hall & Boyd, 2005; Lukoseviciute, Pereira & Panagopoulos, 2022) through introduction of the most significant initial investment dimension to support local rural small-scale business operations and profitability and encourage the opening of new branches in the local areas and thus collective generation of significant revenue, according to the theory of Waite (1973). These outcomes may be relevant to other rural TRR sites, especially in the northern or

cooler climate regions of developed countries, where the TRR practice has a strong presence and socio-economic conditions are not drastically different than those that exist in Northern Ireland or the Nordic countries. The results of the current study should be utilized to identify the best TRR investments to enhance trail development and improve business potential in a given research area, despite the fact that the low number of observations reduces the generalisability of the results.

This study also demonstrated that, in general, businesses evaluated with high quality both natural and recreational environments. As previous research also found, an attractive environment and recreational opportunities are critical for increasing the revenues of businesses providing services of outdoor recreation (Hodur, Leistritz & Wolfe, 2008; Lerner & Haber, 2001; Mäntymaa et al., 2021; Margaryan, 2018). The success of commercial operations as well as the overall NBT experience depend on natural resources and their quality that calls for increased focus and actions on sustainability (Haukeland et al., 2023; Øian et al., 2018). However, since businesses rated the network of recreational trails and their maintenance and guidance as having the lowest quality, these attributes managed by governing bodies should be enhanced or amended. This finding, which highlights current destination management issues, is significant given that businesses are typically excluded from the outdoor recreation destination planning, development and management process, despite being one of the main stakeholders. Therefore, based on a stakeholder theory, which states that an important component of value creation in businesses, which enhances their chances of being successful, is their level of engagement and development of strong relationships with a wide variety of stakeholders, such as destination planners and developers (Harrison, Bosse & Phillips, 2010; Pollack, Barr & Hanson, 2017) - businesses should certainly be included in the decision-making stage as they reported poor management of key rural outdoor recreation attributes stemming from their lack of involvement in the planning and development process. More importantly, the inclusion of businesses in the NBT destination decision making process should be considered by both private and public landholders, as asymmetric co-operative relationships between landowners and NBT businesses have been reported (Matilainen & Lähdesmäki, 2014). These important findings should be further examined for inclusion in the theoretical trail development framework by encompassing business perceptions of trail destination design and development. From a practical point of view, rural TRR destination administrators ought to take into account

business suggestions and put more of an emphasis on destination infrastructure, including recreational trails, rather than just on maintaining the natural environment, since recreational trail infrastructure is a key element in outdoor recreation; directly related to visitor satisfaction, memorable outdoor experiences (Lukoseviciute, Pereira & Panagopoulos, 2021), visitor expenses (Lukoseviciute, Pereira & Panagopoulos, 2022a), which can also positively impact business profitability. The next consideration after taking into account investment attributes is who would fund for the realization of these investments in the event of a political decision.

While discussing a nature-based recreation destination and its providers, due to growing populations and access to nature-based recreation, it is important to take into account current destination management issues in other continents with significantly higher populations and tourist numbers, such as Asia, in order to forecast and prepare proper guidelines for TRR destination planning and management. According to Lee, Huang & Yeh (2010) and Markowski et al. (2019), in Asia, there was an insufficient NBT service (e.g. lodging, transportation, food and drink) provision and, in particular, during the weekends due to a high demand for nature-based recreation. This is the opposite situation to the European continent so far; however, it signalizes that with population growth and increased demand for access to nature, insufficient NBT service availability may become an issue in Europe as well; therefore it is important to identify factors which encourage businesses to operate with higher revenues, open new branches and expand NBT business networks in rural areas as previous research shows the potential of small NBT enterprises to revitalize rural areas (Dinis et al., 2019). In particular, it is important for rural trail-related areas, where most of NBT activities are concentrated; and therefore, identifying successful business development factors would facilitate in provision of sufficient services, while proactively avoiding business saturation, which leads to a loss of potential revenue.

The study's findings regarding the company structure were compared with those from similar geographical context countries such as Finland, Sweden, and Norway in order to ascertain whether the findings were typical and could be used as a foundation for destination planners to construct and manage recreational trail destinations. Since most nature-based recreation businesses are small, year-round operators that primarily provide lodging, food, and beverage services; with an average age of the company between 10

and 19 years old, and with annual revenues of about £100,000, the business profiles of this study are representative and comparable to those from Finland (Mäntymaa et al., 2021), Sweden (Margaryan & Fredman, 2017a), and Norway (Fossgard & Fredman, 2019).

This study suggests using a comprehensive pairwise comparison within an analytical hierarchy process approach to determine priorities for investments in the development of recreational trails and NBT destinations. In order to examine the potential investment benefits in the attributes for local business operations and profitability, this study combined a pairwise comparison approach with the CBA technique. For NBT locations with often limited budgets and where investment selection decision-making is essential, this combined technique is helpful since it permits evaluation of the priority of specified investment criteria that are freely chosen by experts or decision-makers. The CBA approach, which is based on neoclassical economic theory and incorporates current economic data, is also a valuable tool for calculating investment benefits at the early stage of decision-making because it does not require expertise in tourism economics and may be implemented at any destination at any time and utilized as an investment monitoring tool due to its ease of replication. The proposed methodology is highly accessible and can be easily combined with other approaches, incorporating the perceptions of local stakeholders.

It must be noted, though, that as is typical of the research aiming to understand local business perceptions, the empirical data set in the study was also rather small (De Guzman et al., 2020) since rural enterprises are challenging to interview due to their isolation and negative attitude towards interviewers (De Guzman et al., 2020). Therefore, when interpreting the results, it is important to take into account the small number of observations and the fact that the study was only conducted in one district of one country. To clarify this issue, further research with a larger sample size is needed. Moreover, future research should perform similar studies of the potential of investments in TRR for local business operations and profitability in widely differing geographical, climactic, and socio-economic tourism contexts. Furthermore, future studies may also look at the relative value of destination branding and marketing investments to businesses. These investments are frequently made by governmental bodies, though in some cases local business associations may pool funds to pay for destination branding and marketing in an

effort to attract tourists to their area. It is crucial to research the value to businesses of particular branding and marketing initiatives, which a business would need to pay for itself, as well as the synergy between returns on branding and marketing investments sponsored by government agencies and those sponsored by the businesses-themselves.

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7. CHAPTER SEVEN

STUDY 6: PARTICIPATORY MANAGEMENT OF ECO-CULTURAL TRAILS IN SUSTAINABLE TOURISM DESTINATIONS

(This paper is submitted to Journal of Outdoor Recreation and Tourism on 14th of April (2023) and its structure follows this journal style)

Abstract

Recent trail development has been motivated by sustainable tourism destination principles, suggesting a paradigm incorporating an eco-cultural trail concept. As with conventional trails, eco-cultural trail destination governance necessitates coordinated management of all elements, emphasizing and protecting cultural and natural assets. This research aims to provide a sustainable strategy for managing eco-cultural trails, applying a multi-stage qualitative approach and stakeholder participation. Natural and cultural landscapes, trail infrastructure, trail visitor experience, and marketing and collaboration were the examined dimensions. Based on stakeholders' meetings, a destination management plan was developed, aligning the environmental objectives to preserve natural and cultural assets for future generations, with site management that provides nature-based recreational opportunities and high-quality visitor experiences.

Keywords: eco-cultural trail; stakeholder approach; qualitative study; tourism destination; trail management;

7.1 Introduction

Crowding, fragmented guidance, and imbalanced climate change adaptation measures (Lu et al., 2018) pose challenges to the long-term sustainability of tourism destinations (Xiao et al., 2023) and, in particular, the preservation of landscapes. Sustainably managed tourism destinations have been of great importance for many nations worldwide, where many economic activities have been developed, including trail-related tourism (TRT) (Beeton, 2007; Bowker et al., 2007). The number of tourists, who prefer landscapes comprised of natural and healthy ecosystems, increases worldwide (Hall, 2001). Landscapes that embrace a diversity of manifestations of the interaction between humankind and its natural environment are defined as cultural landscapes (World Heritage Centre, 2008). Referring to the symbiosis of human activity and

environment, various recreational developments fall within such a landscape, of which one is the recreational trail (Schmitz et al., 2007). Today, the global network of recreational trails is wide; therefore, trails are categorized based on the type of activity performed on a trail, landscape settings, and trail development stage (Moore & Ross, 1998; Oishi, 2013; Timothy & Boyd, 2015). The main recreational trail categories described in literature are as follows: backcountry trails, recreational greenways, multiple-use trails, rail trails, and water trails (Moore & Ross, 1998). However, considering recent developments in cultural landscapes in natural settings, this study introduces the concept of an eco-cultural trail by adhering to the definition of eco-cultural tourism (Wallace & Russell, 2004). This leads to the following definition of an eco-cultural trail, that distinguishes it from other trail types: a trail developed within a combination of both cultural and natural landscapes to create a destination for TRT to perform any trail-related activity, such as cycling, hiking, or running, and intending to respect the natural and cultural elements of a landscape.

Recently, eco-cultural trails have been implemented as an alternative visitor attraction in cultural landscapes in natural settings (Lukoseviciute et al., 2021). The general increase in trail development has turned TRT into a globally increasing outdoor activity within tourism (Davies, 2018; Fredman & Tyrväinen, 2010; Hansen et al., 2022; Power et al., 2023). Sustainable TRT development is a dynamic niche area within the wider outdoor recreation space (Molnár, 2021). TRT is recognised as a valuable asset for recreation in cultural landscapes (Godtman Kling et al., 2019), providing easy access to nature, exercise and interactions with cultural and natural landscapes (Božić & Tomić, 2016; Madden et al., 2021; Wang et al., 2005). Moreover, TRT is a significant driver for regional development due to its socio-economic benefits for local communities (UNWTO, 2019). Importantly, sustainable TRT development allows for the extensive use of landscapes, such as coastal, which are typically developed exclusively within the 10-km coastal region, with consideration to tourism and its management difficulties (Freire et al., 2009).

The classical paradigm of recreational trails and their management is grounded on five main pillars - health, environmental, cultural, social and economic (Gyimóthy & Meged, 2018; Veras et al., 2021; Wang & Wang, 2022). Referring to eco-cultural trails, which have not been addressed in the literature before, Wallace & Russell (2004)

presented a management model for eco-cultural tourism, which later has been applied to varied eco-cultural destinations and their management such as Kazakhstan (Tiberghien, 2019), Ghana (Guri et al., 2021) or Bali (Sendra, 2017). However, because the eco-cultural tourism model application was their first attempt, the model is designed for general tourism destinations rather than trails because it does not include assessment of the attributes of the trail itself neither of the management performance. Since, as far as we are aware, the literature on recreational trails demonstrates a gap in terms of recognition of eco-cultural trails as well as their destination management plans, eco-cultural trails do not have adequate management plans. Therefore, it is critical to address eco-cultural trails and their destination management planning.

It is important to note that creating an eco-cultural trail management plan may reveal the classic quandary of previous eco-cultural trail destination studies: how to balance often contradictory efforts to develop sustainable trail destinations while also improving TRT competitiveness (Nizioł & Życzyński, 2020; Witkowski et al. 2022). It is also known that increasing popularity of TRT causes negative environmental impacts on landscapes (Ballantyne & Pickering, 2015), which have a negative effect on trail visitors' experiences (Lynn & Brown, 2003) since TRT partially relies on the aesthetic appearance of the landscape (Iversen et al., 2023). To avoid the aforementioned quandaries, the approach of participatory management seems to be the most appropriate for developing strategic management plans for eco-cultural trail destinations, which also enables consensus-building and assists in resolving frequently occurring stakeholder conflicts (Benveniste, 1989). The benefits of participatory management are well publicized—sharing responsibility, negotiating benefits, incorporating professional knowledge, enhancing capacity for implementation, increasing trust between stakeholders, improving understanding and awareness, facilitating policy integration and increasing public commitment (Selman, 2007). With a balanced eco-cultural trail management plan, according to several authors, TRT may contribute to sustainable destination development (Kato & Progano, 2017) and fulfil sustainability goals to enhance memorable trail-related experiences while simultaneously improving eco-cultural tourism development.

As is the case for conventional trails and eco-cultural tourism destinations, eco-cultural trail management at local, regional, or national levels requires coordinated management, giving more emphasis on natural environment changes due to human

activity and involving various groups of stakeholders since it is a process composed of a set of coordinated actions (Cerveny et al., 2022; Coban & Yildiz, 2019; Davies, 2018). Therefore, this study aims to develop an eco-cultural trail development and management plan that assists in providing high-quality visitor experiences, supports local communities, and provides sustainable destination trail management plans that protects the area's natural and cultural assets.

7.2 Literature review of trail-related tourism destinations

Nature-based recreation has become an increasingly popular phenomenon, allowing people to engage with unique landscapes and habitats, endemic biodiversity and local heritages through various activities (Ballantyne & Pickering, 2015; Kim et al., 2015), of which one of the most common is TRT. However, studies have shown that unsustainable trail development and increased trail access cause negative impacts on flora, fauna, soil and water resources (Evju et al., 2021; Marion & Leung, 2001; Olive & Marion, 2009). Moreover, spatial trail proliferation replicates these impacts across entire ecosystems causing cumulative damage (Ballantyne & Pickering, 2015). In order to minimize unsolicited effects caused by TRT, sustainable trail management have been prioritized by nature-based tourism scholars (Marion & Wimpey, 2017; Oswald Beiler & Lintz, 2016). As per this recent literature, sustainable trails should be managed to accommodate their types and seasons of use to provide high-quality visitor experiences and to ensure the protection and conservation of adjacent environments.

Recreational trail developments are elements of cultural landscapes as they are reflections of the action of a particular community in the territory. Cultural landscapes, according to the UNESCO World Heritage Convention, often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. In 1992 the UNESCO World Heritage Convention became the first international legal instrument to recognize and protect cultural landscapes (World Heritage Convention, 2008). Recreational trails can provide educational experiences contributing to a deeper sense of place both for tourists and local communities (Bott et al., 2003; Hayes & MacLeod, 2006). In addition, recreational trails play a role in visitors' sociocultural process or so-called trailscape (Fagence, 2017), therefore the trail itself is considered a heritage (Svenson et al., 2021). Recreational trail development within cultural landscapes in natural settings,

which intends to respect cultural and natural resources with stakeholder participation in the destination management process, suggests the addition of an eco-cultural category to the trail classification, stemming from the definition of eco-cultural tourism. Adopting the eco-cultural tourism concept to the framework of recreational trails allows trail management to shift toward achieving eco-cultural trail destination principles and minimizing the risk of unsustainable human-nature interaction (Santarém et al., 2015).

According to Sörlin & Wormbs (2018), trails are essential in a sociocultural process of familiarization with local environments. Therefore they are hybrid entities since they are not pure nature or pure culture. Eco-cultural trails should be considered as products of combined development stages, purpose of exploitation and use, resulting in their dual profile in a cultural landscape. We approach the eco-cultural trail as a product of the synthesis of multiple factors (Garden, 2006) - such as development of physical trail infrastructure, trail users, provision of trail-related services, actions for preservation of heritage, and trail management - embedded in cultural and natural landscapes, where stakeholder perceptions about trail management are crucial. The assumption follows that well-planned and developed eco-cultural trails can contribute to a socio-culturally and environmentally responsible TRT product creation process, which can play a crucial role in resource management (Kling et al., 2019), diversification of massive tourism (Perrin-Malterre, 2018), and extension of recreational land usage (Samora-Arvela et al., 2020). Eco-cultural trails promote natural resource management strategies that ensure environmental preservation, quality of life, and economic development. Therefore, they function as a buffer between built and natural environments, allowing recreation and education, increasing the value of the environment, providing an alternative mode of transportation, enhancing local community and business development and preserving culturally and historically valuable areas (Clark, 1997; Kil et al., 2015; Thimothy & Boyd, 2015).

With regards to trail design, construction and management, four main pillars, adapted from the outdoor recreation development roadmap provided by the State Outdoor Business Alliance Network (2021) should be considered: 1) Trail Design Development - with continuous funding for resource management, territorial planning, safety and amenities provision to ensure memorable trail-related experiences; 2) Trail Network Creation - involving local stakeholders who foster trail-related recreation innovations and

strategies, collaboration and sustainable trail destination development; 3) Supply and Demand – from the supply side the monitoring of trail attributes and stakeholder perceptions, applying innovative smart technologies and educational programmes, from the demand side the quality of natural and cultural resources (which is a determinant of trail access demand, which in turn impacts supply), socio-economic impact (both on supply and demand); 4) Marketing and Communication of trail destination - investing in marketing campaigns, promotion channels, communication with stakeholders that drive local economic development.

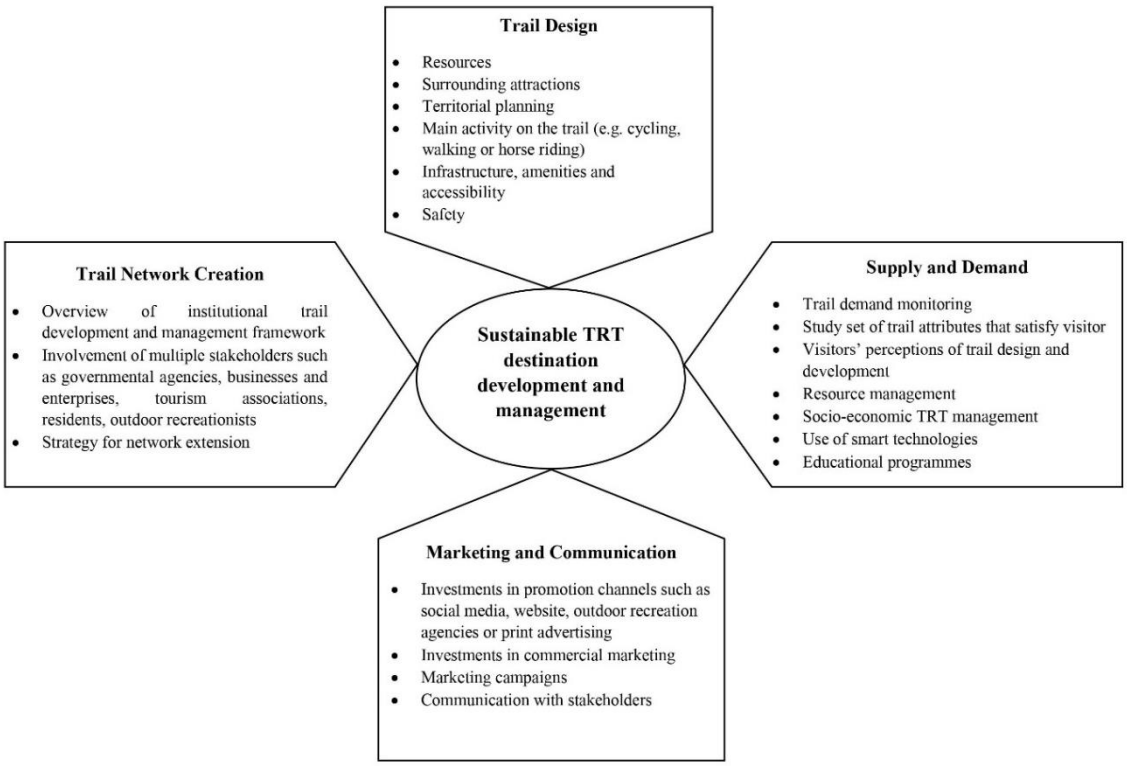
With no exception, eco-cultural trails and their development should meet sustainability requirements, in order to minimize the following challenges: overcrowding, trail development in challenging environments (e.g. wetlands, deserts), overly complex partnerships involved in trail management, institutional and societal patterns, land use conflict, liability policies, safety assurance and potential increases in crime, vandalism or littering (Eyler et al., 2008; Weber et al., 2017). The minimization of the aforementioned challenges is essential to the development of eco-cultural trails that are sustainable, protect natural and cultural resources, and play an important part in the provision of high-quality trail visitor experiences, local economic growth, and eventually, the provision of a sustainable TRT destination. In this context, various groups of stakeholders are involved. Consequently, there is a need to establish a dialogue with various trail stakeholders such as local communities, businesses, governing institutions, trail visitors and prevent potential conflicts.

Sustainable development of eco-cultural trails requires not only good trail infrastructure development but also knowledge of natural resource management (Lekies & Whitworth, 2011; Thimothy & Boyd, 2015). The importance of multiple stakeholder involvement is widely acknowledged and considered to be beneficial to enhancement of local knowledge by creating a mutual learning mechanism, avoiding conflicts and establishing trust among stakeholders (Denstadli et al., 2010; Wilkes-Allemann et al., 2017). According to Kling et al. (2019), creating discussions and forums where dissenting stakeholder opinions and experiences are encouraged can have several benefits for improved and more sustainable decision-making.

Successful stakeholder identification is crucial to systematically guide target-oriented discussions involving heterogenous stakeholder groups, classified by field of

expertise, territory, institution and interest area and finally to achieve effective and practically applicable results (Junior et al., 2020; Molnár, 2021). Multiple stakeholder participation in key trail management actions, ensuring that stakeholder groups and discussions are balanced, can increase the likelihood that local community needs, and priorities are satisfied, while simultaneously facilitating diminishment of conflicts between stakeholders, enhancement of expertise and knowledge in effective eco-trail management of local natural and cultural environments (Molnár, 2021). Furthermore, constant stakeholder involvement in trail management and a positive feedback mechanism, emphasising the importance of their active participation is determinant to eco-cultural trail long-term success and can ensure relationship establishment with loyal stakeholders (Witkowski et al., 2022). The assumption is that stakeholder perception is central in planning and managing eco-cultural trails, in pursuance of a more integrated and holistic sustainable TRT management and trail destination development. Based on the literature review, Figure 7.1 demonstrates the four main pillars of sustainable TRT destination development and management.

Figure 7.1 Four TRT destination and management pillars are displayed in the figure, namely trail design, supply and demand, marketing and communication, and trail network creation



7.3 Methodology

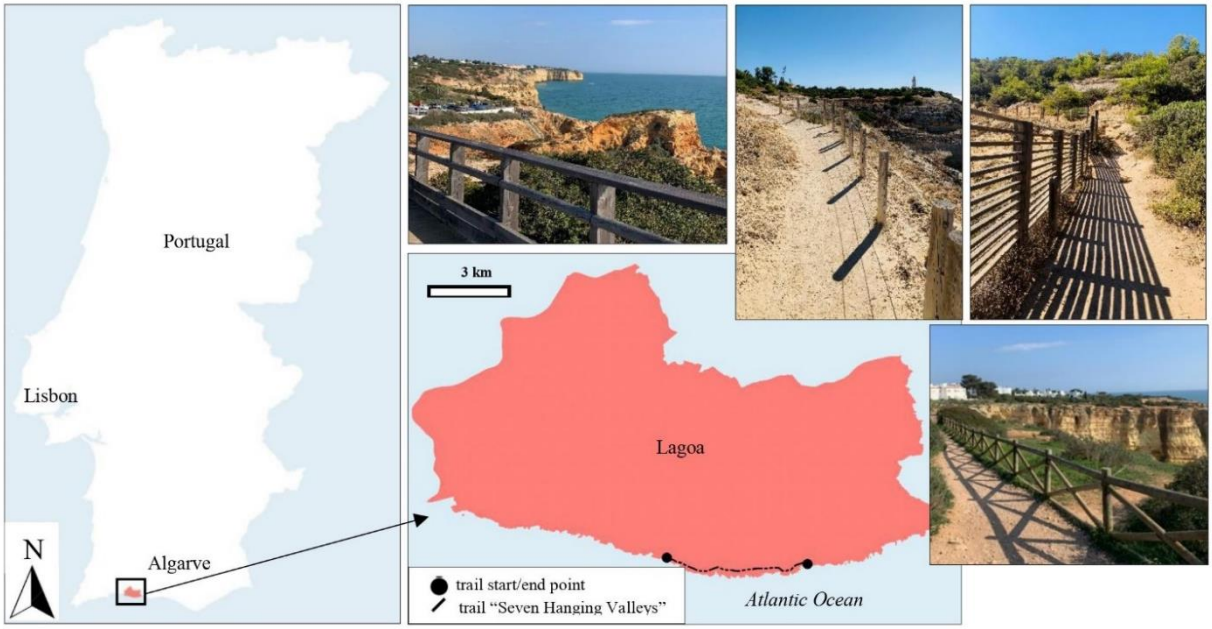
7.3.1 Study area

This study was performed in the Algarve, the southernmost region of continental Portugal, known for its specialisation in tourism and where TRT activities have been developed in recent years (Pinto & Guerreiro, 2008) to diversify intense sun and sea recreation and to contribute to eco-cultural tourism development (Valle et al., 2011). Today in Algarve there is a network of over 30 trails with different themes, providing opportunities to discover not only the beach, but also age-old culture and traditions and to get memorable experiences in contact with nature. Algarve region is rich in heterogenous landscapes encompassing an array of habitats from beaches, cliffs, and wetlands to national parks populated by scrublands, cork, pine, orange and mimosa trees and eucalyptus. The diverse habitats are home to a large variety of animals with many endemic species present (Nunes et al., 2020). According to Valle et al. (2011), 64% of the Algarve visitors consider that eco-cultural attractions are important in their holiday decision. The trail "Seven Hanging Valleys", located in the municipality of Lagoa is one of the most popular hiking destinations not only in the Algarve. It is a linear hiking path with a total length of 5.6 km, connecting two popular recreational beaches – Praia da Marinha and Praia de Vale Centeanes (Figure 7.2). The trail is associated with a set of the most popular eco-cultural attractions, namely Marinha beach, Benagil cave, Benagil village, spectacular cliffs "Heart" and "Leixão do Ladrão" and the chapel "Nossa Senhora da Rocha". Therefore, the cultural landscape of the trail is related to recreation activities (Schmitz et al., 2007).

The trail was chosen for several reasons, which are very likely to influence its popularity, strategic planning and the need to shift the management plan towards one appropriate for an eco-cultural trail. First, it is located on the coastline in the most luxurious parish of Lagoa, alongside stunning cultural and natural assets, favourably influencing different outdoor recreationists' visitation volumes at different times of year. Second, the trail is the most popular in the region, receiving 19,214 visitors during the high season and around 19,000 visitors during the low season. The initial trail network in Algarve development was encouraged by The Territorial Regional Scale Planning, which aims to diversify and qualify the cluster of regional tourism, leisure and recreation (PROT Algarve, 2007). The strong natural and cultural features make Algarve region a highly

suitable place for the development of eco-cultural tourism. The "Seven Hanging Valleys" trail has been acknowledged as the most successful case to diversify sun and sea recreation and introduce visitors to trail-related eco-cultural recreation in the region. Thus, the trail's management and further development should be managed to fit the eco-cultural trail mould and align with the Portuguese Territorial Programme, which considers sustainable management of natural resources and interconnection of both recreations – nature-based and sun and sea (DRE, 2019) and the Municipal Master Plan of Lagoa, which aims to revitalize economic activity due to tourism and promote sustainability in a context of a proactive governance model, lined up with territorial intelligence and cohesion (PMDL, 2021).

Figure 7.2 Location maps of the "Seven Hanging Valleys" trail in Lagoa municipality, Portugal



7.3.2 Methodological approach and data collection

In this study, a multi-stage qualitative approach (Baxter, 2010) and a stakeholder analysis were used (Reed et al., 2009) to define the strategic dimensions of an eco-cultural trail management strategy. Data collection was approved by the ethics committee of the University of Algarve (CEUAlg Pn°52/2021). Data were derived from two focus groups and a workshop involving four main stakeholder representative groups (Figure 7.3). According to Krueger (1994), focus groups are conducted in series with multiple mini-focus groups composed of participants who are reasonably homogenous to provide diversity of perceptions on the research topic. Therefore, in order to develop a strategic

eco-cultural trail management plan; which requires various powers, expertise, interests, and perceptions; four stakeholder mini-focus groups were defined. Consequently, the first mini-focus group represented governmental agencies at national, municipal and county levels; responsible for environmental conservation, rural tourism management, and economic development (Tavares & Camões, 2010). The second mini-focus group represented private enterprises (such as hotels, travel and tour agencies) in nature-based tourism including TRT with interest in local economic development, revenue growth and natural environment conservation; which attract customers to their outdoor recreation services (Margaryan, 2018). The third mini-focus group represented academic experts (in nature-based recreation and sustainable rural destination management and development) and students with local knowledge and familiarity with the study case. The fourth mini-focus group represented local, national and international environmental organizations, associations and NGOs with interests in cultural and natural heritage conservation, local economic, social and cultural development, and ecotourism promotion (Nogueira & Pinho, 2014). It is important to note that many participants of all mini-focus groups were also local residents – business owners or managers, employees of the local municipality, and students. Due to the dual profile of many focus group members, it was not deemed necessary to create a separate group of resident representatives.

Recruitment of stakeholders was conducted, applying a purposeful stakeholder sampling technique, commonly utilized in qualitative research for the selection and identification of information-rich stakeholders to get the most use of limited resources (Patton, 2002). A database of potential participants was created based upon the previous focus groups and workshops conducted, addressing various topics in the same community. Therefore, a relationship has been established with diverse stakeholder groups from which potential recruits could be selected. Stakeholders with a variety of interests in eco-cultural trail development and management ranging from business development to environmental protection as well as stakeholders having an impact on strategic eco-cultural trail management decisions were selected. Moreover, stakeholder familiarization with the trail was also a selection criterion, implying that selected stakeholders were trail users. Finally, selection of stakeholder representative groups was also based on their knowledge, experience and professional vision; in order to gather both information on cultural and natural resource management and key pillars for sustainable eco-cultural trail management. With regards to students, those showing interest in eco-cultural trail

management and familiar with the trail, were included in the database. Individuals from the database with appropriate profiles for the study were invited to participate.

Focus groups

The first focus group was held online (27th of October 2021) with 15 stakeholders from governmental and non-governmental organizations (2 representatives from the regional development department, 2 representatives from the local municipality's environmental division, 1 representative from the local science museum), agencies (3 representatives from travel agencies), and private enterprises (3 representatives from local guided tours and 4 representatives from local hotels). A second face-to-face focus group was held on the trail site (4th of November 2021) with 28 academics (7 professors, with expertise in tourism, environmental science, and economics, and 21 master's students in tourism). Both focus groups followed a three-stage nested focus group approach (Figure 7.3). Due to the diversity of the participants and their varying levels of language proficiency, both Portuguese and English were used during the focus groups.

The first focus group stage aimed to assess the performance of current TRT development attributes, which facilitates further SWOT analysis performance and elaboration on the final strategic dimensions of an eco-cultural trail management strategy. Consequently, questions to measure the performance attributes in two categories (infrastructural and connectivity and marketing related), using a five-point Likert-type scale, from 1 – very low performance to 5 – very high performance were applied. The attributes that made up the infrastructure category were as follows: points of interest, visitor information online, trail conditions, picnic areas, navigation signage along the trail, visitor information boards, parking, accessibility, litter facilities, safety and security, and restroom facilities. The attributes that were included in connectivity and marketing category were as follows: access roads to the trail, pedestrian links to the trail's network, directional signage to the trail, promotional trail brochures, leaflets, posters, and digital promotional links to a wider trail network, promotional trail visitor centre, public transportation links to the trail, information kiosk and promotion of the trail. Since this research addresses eco-cultural trails developed in cultural landscapes in natural settings, the following open-ended questions were asked: 1) What services associated with the "Seven Hanging Valleys" trail should be valued to contribute to a better tourist experience? and 2) Refer to other types of heritages that should be combined with the "Seven Hanging

Valleys" trail management. The assessment of trail performance attributes was conducted by each participant individually as well as by answering open-ended questions. The results were used to facilitate the final key dimension and sub-dimension identification, performed by analysts.

The second focus group stage aimed to identify the main strengths, weaknesses, opportunities and threats associated with eco-cultural trail development and nature-based recreation. Each participant, considering the information they themselves provided in the 1st stage of focus group, performed a SWOT analysis to assess the internal (strengths and weaknesses) and external (opportunities and threats) factors which impact the eco-cultural trail. The SWOT analysis was chosen since it is a useful method for application to heterogenous stakeholder groups, which encourages brainstorming and deeper discussions, when determining relevant issues for sustainable development (Mollenhorst & De Boer, 2004). In this research the SWOT analysis serves as a bridge between the assessment of current trail development, with identification of internal and external factors, towards a firmer establishment of the final key strategic dimensions of eco-cultural trail development and management. The results were used to facilitate the final key dimension and sub-dimension identification, performed by analysts.

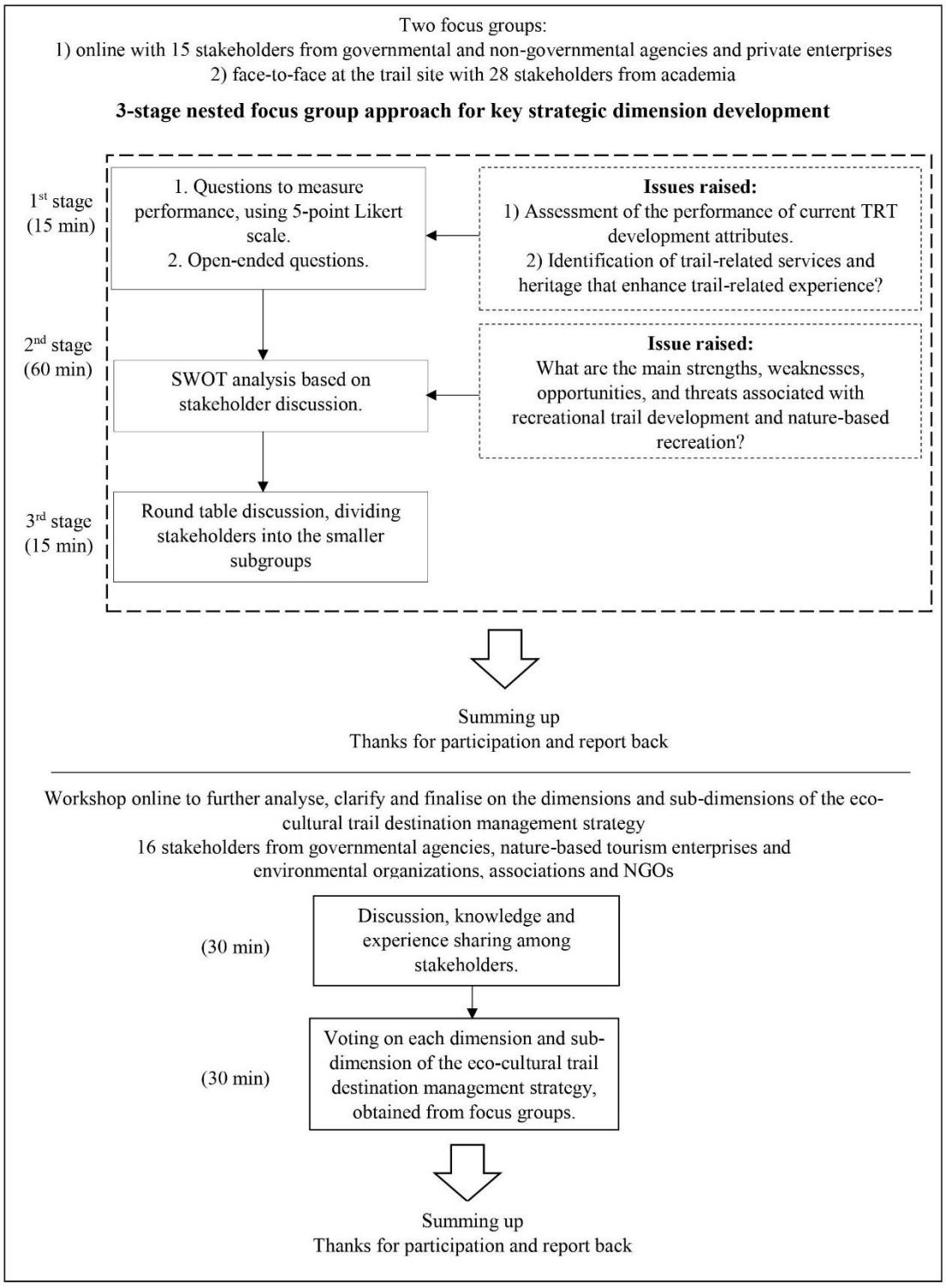
The third stage aimed to open the discussion between stakeholders based on the results of the SWOT analysis. Therefore, a round table discussion format was applied to initiate a discussion among participants, dividing them into the smaller subgroups based on the area of expertise since it allows brainstorming and better stakeholder interaction. Large group division into smaller groups is a standard tool in corporate planning and it is effectively a nested focus-group approach (Buckley et al., 2021). Both focus groups were assigned scientific researchers to pose questions and sum up the discussions. Besides the discussion of SWOT analysis results, researchers asked stakeholders to discuss on the most important trail's management and development actions. Both focus group round table discussions were audio-recorded for further qualitative content analysis and establishment of key strategic dimensions and sub-dimensions, performed by analysts.

Online workshop

On the 9th of December 2021, an online interactive workshop was held with 16 stakeholders from governmental institutions (3 representatives), nature-based tourism businesses (5 representatives), environmental groups, associations (4 representatives),

and NGOs (4 representatives), which lasted around 60 minutes. The academics were excluded from the workshop to ensure that the discussion of the key final strategic dimensions was oriented towards a more practical implementation, based solely on practitioners. According to McCabe et al. (2012) this was an optimal group size for the workshop as large numbers may have led to a breakdown of the in-group dynamic. Due to the diversity of the participants and their varying levels of language proficiency, both Portuguese and English were used during the focus groups. The workshop aimed to further analyse, clarify and finalise on the dimensions and sub-dimensions of the eco-cultural trail management strategy, which originated from the result of both focus groups' content analysis, conducted by analysts. Before the analysis, clarification and finalization of the dimensions, stakeholders spent about 30 minutes in turn to discuss and share their knowledge and experiences in rural area management, trail construction and development, natural and cultural heritage conservation as well as nature-based tourism. In a follow-up workshop activity, each member was asked to vote on each dimension and sub-dimension delivered by focus groups in relation to sustainable eco-cultural trail management. In addition, each workshop participant was asked to propose additional/new dimension(s) or sub-subdimension(s) that were considered as relevant or significant for sustainable eco-cultural trail management, if any. Following the group vote for each dimension proposed, the most popular dimensions for strategic trail management were selected for the final eco-cultural trail management strategy. The workshop was audio-recorded for further qualitative content analysis, performed by analysts and final elaboration of strategic dimensions and sub-dimensions of eco-cultural trail management strategy.

Figure 7.3 A flowchart illustrating the methodology stages used during focus groups and the workshop



7.3.3 Data analysis

Quantitative survey data obtained from trail attribute performance measurement was analysed using descriptive statistics applying IBM SPSS Statistics for Windows, Version 26.0. (Armonk, NY), after transmitting collected data to Microsoft Excel for data

integration. Qualitative data from open-ended questioning of each stakeholder perception of trail design, management and development was analysed following Braun & Clarke's (2006) approach for identifying, analysing, and reporting differentiated themes and applying qualitative data analysis software NVivo 12 (QSR International). A word frequency query was employed, choosing 100 words in varying font size. The final result of such a query is a table, indicating the highest frequency of a few selected words (Heimerl et al., 2014). The SWOT analysis was performed by stakeholders representing multidisciplinary groups; consequently, it enabled the identification of different aspects in four factors - namely strengths, weaknesses, opportunities, and threats - from a diverse set of perspectives. The data analysis was performed listing each aspect per the appropriate factor and prioritizing it based on the number of references given by each stakeholder as well as the significance for eco-cultural trail management. The analysis of internal and external factors was based on seeking a fit between the two perspectives.

Audio files were analysed employing inductive content analysis to thoroughly examine gathered data (Kothari, 2004). For this purpose, a qualitative data analysis approach (Braun & Clarke, 2006) and the software "NVivo 12" (QSR International) were used for iterative data organization, filtering, categorization and eventually coding in key sub-dimensions and dimensions (Sotiriadou et al., 2014). At this stage, cross-checking by 3 independent analysts was performed and repeated until the theoretical saturation and efficient coding were achieved (Aldiabat & Navenec, 2018; Saunders et al., 2018). Coding is the primary process for developing key dimensions within raw data by recognizing important moments and encoding them prior to interpretation (Boyatzis, 1998). In this stage, lower-level key concepts were identified and categorized with similar concepts using axial coding and then linked and integrated with related dimensions through selective coding to produce the final key strategic eco-cultural trail management dimensions (Merriam, 2009).

7.4. Results and discussion

7.4.1 Assessment of stakeholder perception of TRT development

Table 7.1 presents the preliminary findings of assessment of stakeholder perception of TRT development attributes based on the mean performance score ranking, obtained from the 1st stage of focus groups. In general, there is a uniformly diverse opinion about the performance, as the mean ratings for all 19 attributes ranged from 4.43 to 1.82. Table

7.1 shows that 13 attributes were highlighted for registering high and very high average values (≥3.0) and are as follows: points of interest, visitor information online, trail condition, picnic areas, navigation signage around the trail, visitor information boards, parking, accessibility, access roads to the trail, pedestrian links to trail's network, directional signage to the trail, promotional trail brochures, leaflets and posters, and digital promotional links to a wider trail network. The least performance was given to the following 6 attributes, registered at low and very low values (<3.0): litter facilities, safety and security, toilet facilities, promotional trail visitor center, public transportation links to the trail, information kiosk and promotion of the trail.

Table 7.1. Stakeholder perception of trail development attributes performance

Trail attributes	Mean	SD
Infrastructural		
Points of interest	4.43	0.690
Visitor information online	3.89	0.916
Trail condition	3.71	0.713
Picnic areas	3.39	0.956
Navigation signage around the trail	3.32	1.020
Visitor information boards	3.25	1.005
Parking	3.04	0.922
Accessibility	3.00	0.816
Litter facilities	2.86	1.268
Safety and security	2.39	0.956
Toilet facilities	1.82	0.983
Connectivity and marketing related		
Access roads to the trail	4.00	0.770
Pedestrian links to trail's network	3.82	1.056
Directional signage to the trail	3.43	1.069
Promotional trail brochures, leaflets, posters	3.32	1.188
Digital promotional links to a wider trail network	3.07	1.152
Promotional trail visitor center	2.71	1.049
Public transportation links to the trail	2.64	1.129
Information kiosk & promotion of the trail	2.04	0.881

Note: trail attributes classified in 5-point Likert scale from 1 – low performance to 5 – high performance. SD: Standard Deviation

Stakeholders stressed natural and cultural heritage as major trail attractions that should be merged with educational and sport activities that enhance trail-related experiences and stimulate local economic growth and sustainability in response to the question of refer to other types of heritages that should be combined with the "Seven Hanging Valleys" trail management (Table 7.2).

In response to the question of what services associated with the "Seven Hanging Valleys" trail should be improved to contribute to a better eco-cultural trail visitor experience, stakeholders highlighted food and drinks as a major trail service, along with eco-cultural tours, accommodation, transportation and cleanliness (Table 7.2). As a result,

stakeholder perceptions imply that an eco-cultural trail should be viewed as a composite nature-based recreation product that includes natural assets and offers gastronomic, historical, educational, and recreational activities with a strong focus on heritage conservation.

Figure 7.4 Word clouds of the most popular trail services and heritages

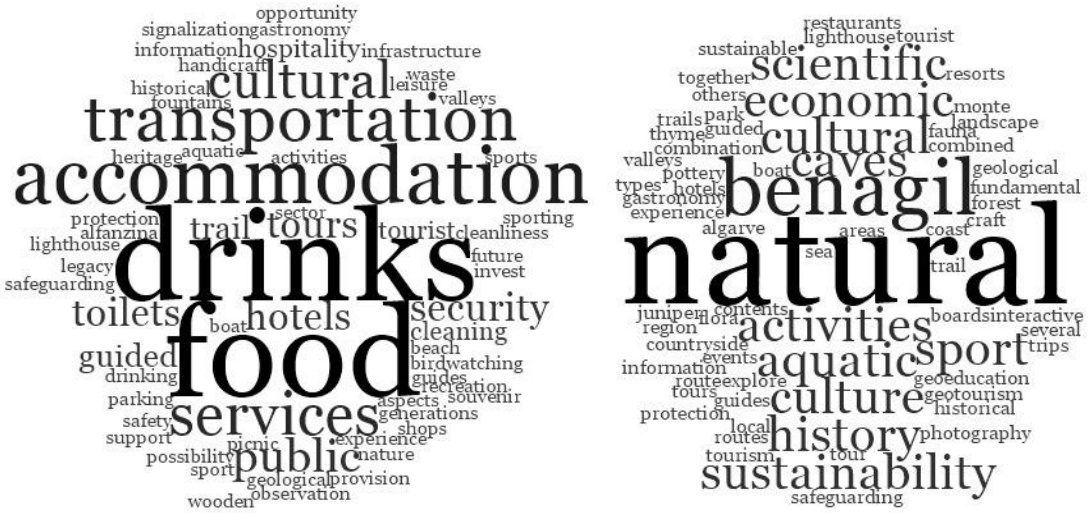


Table 7.2 Frequency of the most cited words by stakeholders

Word	Number of times word mentioned
Natural heritage	37
Cultural heritage	29
Educational activities	20
Sport activities	12
Food and drinks	35
Eco-cultural tours	25
Accommodation	16
Transportation	10
Cleanliness	10

7.4.2 SWOT analysis

SWOT analysis is the final and most essential part of stakeholder perception assessment, in which the internal factors of the trail that comprised strengths and weaknesses, as well as external factors that directly influence the trail area that comprised opportunities and threats, were discussed (Harfst et al., 2010). Scanning both internal and external factors is an important part of further elaboration on key dimensions and sub-dimensions of eco-cultural trail management strategy. The SWOT model is applied to illustrate the results (Table 7.3). The table displays the number of references given by

stakeholders to a particular aspect, and the percentage of references to a particular aspect relative to the sum of all aspect references for a given factor.

As per stakeholder perceptions, the trail's greatest strength is its spectacular scenery, which includes scenic cliffs, beaches, and formations like grottoes, stone arches, natural bridges, and fragile sea stacks (Valle et al., 2011). Because of its geographical location, the trail recreation environment and experiences are associated with high-use recreation sites, therefore, the trail can act as a diversifier of a sun and sea recreation with a tremendous potential to promote nature-based recreation in the region and introduce visitors to the eco-cultural trail network. Furthermore, the trail is easily accessible with free admission, resulting in constantly increasing TRT popularity and increased opportunities to promote eco-cultural trail leisure.

The major weakness, according to stakeholders, is a lack of trail facilities such as toilets, drinking fountains, and litter bins, which results in a lack of sanitation on the trail and poor visitor satisfaction. The trail is built within a cultural landscape in a stunning natural setting, where toilets, litter bins, and other sanitation facilities shouldn't be observed unless further from the trail. A security issue was also highlighted. Furthermore, stakeholders criticise the trail's accessibility due to a lack of public transportation, which results in overloaded parking because visitors typically reach the trail by private vehicle or taxi.

Stakeholders recognise eco-cultural tourism promotion as a major opportunity, encouraging improved land-use patterns and environmental consciousness due to its substantial dependence on cultural landscapes (Cajee, 2014). In terms of local economic growth as a result of TRT, scholars have acknowledged the importance of research collaboration and investments in local businesses, which are the main economic beneficiaries as points to be strengthened (Bowker et al., 2007; Oswald Beiler et al., 2012). Stakeholders have highlighted opportunity of eco-cultural trails as complex tourism products to encompass a wide array of facilities and various recreational services including accommodation near the trail to ensure memorable trail-related experiences (Božić & Tomić, 2016).

Stakeholders identify that natural and cultural assets degradation remains the most serious threat to the trail, which according to Defeo et al. (2009) and Teixeira (2014)

happens due to human occupation and cliff erosion. The major contributors to cliff erosion are sea level rise (Ferreira et al., 2008) and exceeded recreational area carrying capacity (Zacarias et al., 2011), which is observed at the trail's points of interest during the high tourism season. Coastal erosion has already been destroying cultural heritage near the trail, as seen by the condition at "Capela de Santa Catarina". Numerous Mediterranean historical monuments are under threat due to coastal erosion and sea level rise (Reiman et al., 2018). Furthermore, erosion of the trail's cliffs raises visitor safety concerns and if not mitigated will eventually lead to the trail's demise. The municipality of Lagoa, where the trail is located, is recognised as one of Portugal's most desired tourism destinations, with a rapidly growing touristic population and level of urbanization along the coastline. According to Vaz et al. (2012) coastal urbanization in the Algarve will sprawl significantly thus significantly deteriorating the natural landscape.

Given the region's rich natural and cultural assets, it is critical to construct destinations of eco-cultural trails and develop a regional strategy that can divert sun and sea recreationists toward nature and cultural landscape discovery. It is proposed to exploit the trail's strengths and possibilities to reduce weaknesses, mitigate risks, and compensate for or mitigate any potentially negative environmental, social, and economic consequences by providing suitable measures for a sustainable eco-cultural trail management strategy.

Table 7.3. SWOT analysis of exploratory trail "Seven Hanging Valleys"

Strengths	**Weaknesses**
• Superb scenery (39%)(15 references) • Connection with natural and cultural assets (16%)(6 ref) • Provision of nature-based activities (13%)(5 ref) • Geographic location (8%)(3 ref) • Nominated the best hiking destination in Europe (8%)(3 ref) • Free entrance (5%)(2 ref) • Proximity to roads and populated areas (5%)(2 ref) • Easy accessibility (3%)(1 ref) • Preservation of nature (3%)(1 ref)	• Lack of trail facilities (23%)(10 references) • Cleanliness (14%)(6 ref) • Limited access to public transportation (9%)(4 ref) • Parking (9%)(4 ref) • Security (9%)(4 ref) • Limited access for disabled people (7%)(3 ref) • Lack of eco-cultural trail tourism advocacy (7%)(3 ref) • Crowdedness (7%)(3 ref) • Vandalism (7%)(3 ref) • Lack of connection with local businesses (7%)(3 ref)
Opportunities	**Threats**
• Eco-cultural trail tourism advocacy (38%)(15 references) • Raise of public environmental awareness (13%)(5 ref) • Trail condition improvement (13%)(5 ref) • Development of physical activities on the trail (6%)(3 ref) • International research collaboration (6%)(3 ref) • Investment in local businesses (6%)(3 ref) • Local economic development (6%)(3 ref)	• Landscape degradation (28%)(12 references) • Reduced security due to cliff erosion (23%)(10 ref) • Trail erosion due to sea level rise (19%)(8 ref) • Exceeded carrying capacity (16%)(7 ref) • Low trail visitation due to extreme weather conditions (7%)(3 ref)

• Trail access control (6%)(3 ref) • Accommodation near the trail (6%)(3 ref)	• Environmental degradation due to overcrowding (7%)(3 ref)

7.4.3 Key strategic dimensions of eco-cultural trail destination management

Qualitative stakeholder focus group discussion content analysis was conducted, applying qualitative content analysis tool NVivo to map the key ideas and thus identify key strategic dimensions of eco-cultural trail management (Table 7.4). After analysing the interactive workshop's data, we were able to better construct the four strategic dimensions and their sub-dimensions (Figure 7.4), which are as follows: natural and cultural landscapes, trail infrastructure, trail visitor experience, and marketing and collaboration.

Natural and cultural landscapes

Referring to the dimension of natural and cultural landscapes, the following five associated sub-dimensions, resulting from the content analysis were identified: physical, ecological and social carrying capacity, entrance fee, environmentally sustainable behaviour, environmental protection measures, and environmental awareness. Stakeholders agreed on the significance of promoting environmentally responsible behaviour in order to protect the natural and cultural environment. As per stakeholder perceptions, in order to protect cultural heritage in natural settings, it is essential to study physical, ecological, and social carrying capacities and understand the maximum capacities of the trail. As per prior indication of exceeded trail carrying capacity, stakeholders discussed the need to introduce an entrance fee and thus control trail access, which facilitates in dispersion of overloaded parts of the trail. Prior research supports stakeholder perceptions by indicating that pricing is the method of shifting use away from over-used places and time periods and toward other locations and times (Chase et al., 1998). Understanding trail carrying capacities can assist to effectively estimate the degree of trail usage in eco-cultural trails. Moreover, it can effectively support management of heavily loaded trail sections at the most visited interest points and avoid the destruction of cultural landscapes in natural settings. According to prior scholars, an inclusive management plan, performing environmental impact assessment, and considering carrying capacity is required (Orsi & Geneletti, 2013; Wolf et al., 2012).

Tourists put an environmental strain on the eco-cultural trail, thus stakeholders proposed strengthening environmental protection measures. In addition, according to

stakeholders, it is critical to avoid vandalism in order to strengthen environmental protection, as it also has a detrimental impact on recreational trail-related activities (Verlič et al., 2015). Finally, implementing environmental protection measures from the provider side is insufficient; thus, stakeholders highlighted that sustainable and responsible trail visitor behaviour must be encouraged as it is previously stated in literature (Gronau, 2017). According to Lin & Lee (2020), trail visitor place attachment, which is generated by ensuring the environmental quality of the trail and raising environmental awareness through information provision, significantly impacts trail visitors' ecologically responsible behaviour. As a result, managers should concentrate on improving visitor place attachment.

Table 7.4. Dimensions, sub-dimensions and codes

Dimension	Natural and cultural landscapes	Trail infrastructure	Trail visitor experience	Marketing and collaboration
Sub-dimension	· Physical, ecological and social carrying capacity · Environmental protection measures · Environmental awareness	· Accessibility · Safety · Trail facilities · Trail design · Maintenance	· Digital tools · Network of recreational activities · Eco-cultural and educational tours · Public cultural services and activities · Food and drink service · Accommodation	· Partnerships · Marketing initiatives · Promotion channels
Codes	Monitor trail visitors, monitor visitor volume, introduce an entrance fee, limit the number of trail users, encourage sustainably responsible behavior, educate visitors about ecological site issues, plant trees, improve cleanliness, plant additional vegetation cover, use renewable energy, prevent vandalism.	Improve information provision, install toilets, litter facilities, drinking fountains, build more boardwalks, transportation, trail design, build more parking lots, invest in maintenance and infrastructure improvement, place first aid spot, trail signage, protective fences, study visitor's WTP for security.	Manage crowdedness, cluster trail visitors, provide virtual and digital tour guides, food and drink service, accommodation, promote eco-cultural and educational tours, enhance the network of surrounding leisure areas and activities, build more points of interest, reinforce the usage of surrounding trail leisure areas.	Establish partnerships with local businesses and funding organizations, B2B initiatives, invest in local businesses, expand the number of promotional outlets, create eco-cultural trail brand ambassador program, connect with influencers.

Trail infrastructure

Trail infrastructure is critical because it protects natural and cultural resources (Tomczyk et al., 2016) while improving trail-related experiences (Kelley et al., 2016). According to Lukoseviciute & Panagopoulos (2021), installation of sanitary elements such as litter bins or toilets is essential to prevent pollution within fragile natural and cultural landscapes. Stakeholders highlighted trail accessibility in the strategic planning, tied to visitors and their required experiences, which is supported by previous findings of Moseley (1979). Proper trail accessibility enables the management of trail visitor flows, the prevention of unauthorized trail entry and free movement of visitors on delicate vegetation. Stakeholders identified safety as an important trail infrastructure element, which according to Wolch et al. (2010) effects not just trail-related experience but also time spent on the path. According to prior studies, safety assurance is especially important when trying to increase eco-cultural trail visitor's place attachment (Amerson et al., 2020). With regards to safety, stakeholders suggested to develop a safety app for usage in circumstances of dangerous conditions or accidents since the eco-cultural trail is rural and natural hazards are common in the area (Marques et al., 2013). Furthermore, stakeholders raised the question of assessing visitors' willingness to pay for trail security, which might lead to the establishment of an admission fee, as previously identified.

In regard to identified sub-dimensions of the trail facilities and design, according to stakeholders, installation of proper trail facilities and thus improvement of trail design (e.g. more boardwalks, protective fences, improvement of trail signage, placement of first aid spots, litter bins, toilets, drinking fountains) is critical. Moreover, stakeholders discussed that trail infrastructure maintenance is a crucial strategic eco-cultural trail management element, which significantly contributes protection of natural resources and to trail condition advancement, including increased safety, leaving the visitors more exposed in the recreational experience (Marion & Wimpey, 2017). As per prior identification of a trend toward trail-related activities, often in conjunction with high service and comfort levels (Wall Reinius, 2009), eco-cultural trail infrastructure and service provision are essential to meet trail visitor expectations and contribute to memorable experiences.

With regard to the identified sub-dimension of public transportation, stakeholders argued that instead of building new parking lots, it is better to urge authorities limit their

expansion and focus on improving public transit. Stakeholders emphasized that improvements in public transportation provision can diversify access to the trail and hence reduce overcrowding in parking lots. According to Keith et al. (2018), transportation provision is related to more frequent trail use, more time spent on the path, and access by sustainable modes of travel. As a result, public transportation is crucial in increasing tourists' attachment to the trail. In addition, the lack of appropriate mobility infrastructure limits disabled people's access to the trail, which aligns with eco-cultural trail management model implications emphasizing the need to promote social inclusion through disabled access provision (Wallace & Russell, 2004).

Trail visitor experience

The analysis of stakeholder discussions resulted in the identification of the sub-dimension of a network of recreational activities in the trail's surrounding areas, which would shift a portion of trail visitors and would allow management of over-used trail sections. In relation to the building of a recreational trail activities network, stakeholders discussed the importance of clustering trail visitors in order to understand their profiles better and the types of eco-cultural activities they prefer as tourist segments of eco-cultural tourism destinations were identified by Jopp et al. (2022). According to Derek et al. (2019), different nature-based recreation activities have different use requirements, and the needs of tourists participating in one activity may conflict with those of tourists participating in another. Given that the trail is one of the most popular in the region, it is essential to provide various recreational services on the trail, designed to fulfil trail visitors' needs and enrich an eco-cultural trail visit experience (O'Dell, 2005; Tiberghien et al., 2018). Consequently, the analysis of the content of stakeholder discussions yielded the following sub-dimensions, critical in shaping trail visitors' personal experience, and enhancing authentic cultural landscape experiences: eco-cultural and educational tours, and public cultural services and activities. Moreover, referring to the current digital era, the sub-dimension of digital tools, particularly for eco-cultural and educational tours, was identified. As per stakeholder discussion, digital content development attracts the greatest attention in terms of trail visitor experience and enables tourism management transformation, which is already happening in the majority of tourist niches (Clark et al., 2022). Digitalisation not only adds value by enabling faster access and usage and improving the visitor experience, but it also provides cost advantages for TRT providers

(Bilgili & Koc, 2021). Finally, accommodation, according to stakeholders is critical, as they discussed that the majority of trail visitors remain overnight in the local area, and according to Slocun (2016) accommodation near the trail would actively prolong tourist stay as well as contribute to local economic revenue production (Lukoseviciute et al., 2022). Moreover, based on prior research, accommodation provision would facilitate management of trail crowding since visitors accommodated locally may have different visitation pattern (Derek et al., 2019). Previous research found that nature-based visitors appreciate a well-preserved natural environment with accommodation provided (Tyrväinen et al., 2014).

Marketing and collaboration

Since eco-cultural trails are a relatively new nature-based tourism products and new-sophisticated consumers seek authentic and unique experiences (Buhalis, 2000), the marketing and collaboration has been heavily debated among stakeholders since every new product aims to increase customer awareness and thus strengthen loyalty through marketing initiatives (Gamboa & Gonçalves, 2014). Based on the content analysis, the following sub-dimensions of the strategic marketing and collaboration dimension were constructed: partnership, marketing initiatives, promotion channels, identification of marketing target group, land-use conflict management. Marketing is extremely critical for eco-cultural trails in the Mediterranean region since one of its roles is to divert visitors away from excessive sun and sea leisure and toward nature and culture landscapes discovery. According to stakeholders as well as prior scholars, for successful destination marketing it is important for the marketing campaign to be collaborative, involving both funding organizations and a range of stakeholders; who may bring their knowledge, expertise and other capacities and create sources of new trail promotion channels (Wang & Xiang, 2007). As determined by stakeholders, collaboration is also foundational for land-use conflict management. Land-use conflicts due to outdoor recreation expansion have been an issue in many tourism destinations (Hjalager, 2020; Howley et al., 2012). As a result, eco-cultural trail managers must manage conflict between private and public groups and counterbalance the impact of land-use rights on the planning system by encouraging improved communication and collaboration between public and private entities. Within the TRT context, collaborative destination marketing will introduce change, improvement, and innovation through the interaction process (Ford et al., 2023;

Slocum, 2015). Based upon stakeholder input, investments in local trail-related businesses located around the trail (e.g. lodging, restaurants and other food providers, souvenir shops, water sport activities, transportation services, and eco-cultural tours) are critical for establishing a concerted trail marketing strategy and creating a link between destinations as was also demonstrated by Plummer et al. (2006). Stakeholders proposed fostering improved management of destination marketing and monitoring promotional trail content, in particular on social media. Moreover, prior to establishment of a marketing strategy, the identification of a marketing target group must be addressed. According to stakeholders, the promotion channels can be acted upon via local trail-related businesses playing a role as trail ambassadors and connecting with social media influencers.

Figure 7.5 A map of four dimensions with its sub-dimensions of eco-cultural trail management strategy

The generic TRT destination management model (Figure 7.1) and the four-dimension eco-cultural trail management model may be compared, and it is found that the dimensions of trail infrastructure and design, marketing, and collaboration all follow a similar dimensional pattern. This suggests that trail infrastructure is a key component of trail management plans for all types of trails, not only eco-cultural trails. Scholars who focus on nature-based recreation recognize the value of well-managed trail infrastructure, emphasizing the capacity of the infrastructure to support natural ecosystems and the

quality of recreational experiences (Ferguson et al., 2023). Examples of this management include appropriate routing and threading, adequate maintenance, and visitor monitoring. Looking at the trail as an infrastructural element creating a relationship between nature and the user, trail infrastructure is critical within broader human-nature interactions. In terms of the marketing and collaboration dimension, which is also crucial for every trail development strategy, there is no exception for eco-cultural trails. Marketing and collaboration can be found as the final and successful future TRT development dimension in most strategic planning (Karagiorgos et al., 2023; Taylor, 2015).

The fact that the natural and cultural landscape dimension was excluded from the general TRT management model led to the unsurprising conclusion that it was unique to eco-cultural trails. This dimension is novel and applicable exclusively to eco-cultural trail management since not every trail necessarily incorporates both natural and cultural elements within its environment. As the trail visitor experience dimension is closely related to the natural and cultural landscape, which creates a need for a variety of services and facilities provision, this dimension was also novel for eco-cultural trails. As a result, the eco-cultural trail management model places an emphasis on interconnection between visitor interaction and the natural and cultural landscape. The study findings suggest natural and cultural landscape as well as trail visitor experience dimensions should be prioritized by eco-cultural trail managers. Additionally, eco-cultural trail managers should collaborate with local communities and stakeholders to develop marketing strategies, especially in remote areas rich in natural and cultural heritage for eco-cultural trail development.

Results from the study yielded several of the aforementioned implications for managing eco-cultural trails that assist in providing high-quality visitor experiences, support local communities, and protect the area's natural and cultural assets. The proposed management plan is the first to define eco-cultural trails and provide a management strategy consisting of four dimensions. Therefore, trail managers can use the plan as an indicating tool to better understand eco-cultural trail features and distinguish their management from general trails. The proposed plan may be applicable to any eco-cultural trail since it has been developed by a wide range of stakeholders and applies a holistic assessment through multiple methods. The application of the model is not limited by any specific criteria, such as geographic location, trail features, or trail

visitor profiles. As this study is pioneering in defining and designing a strategic management plan for eco-cultural trails, it provides trail managers with the foundation for preliminary strategic eco-cultural trail management, considering four key dimensions

7.5 Conclusions

This study aimed at developing a sustainable management strategy for trails that fits the definition of an eco-cultural trails through a stakeholder engagement and qualitative approach, using a popular trail in southern Portugal as a study case. The multidisciplinary approach comprised of initial trail assessment, SWOT analysis and discussions with stakeholders to develop an eco-cultural trail management strategy. The approach is applicable to any type of trail and can be easily modified according to the specifications of the trail, destination and number of stakeholders participating. As an element of TRT, eco-cultural trails are hybrids of cultural and natural assets in cultural landscapes. They are important for the development of eco-cultural tourism as well as for the sustainable planning of natural and cultural landscapes. Therefore, it is widely acknowledged that the development of TRT will be driven by sustainable management of eco-cultural trails as a means of exploiting cultural landscapes with the benefit of the decongestion of the sun and sea tourism model, promoting sustainability objectives in trail tourism destinations, and strengthening alternative options for tourists' engagement in such destinations.

A key element to the success of eco-cultural trail tourism is stakeholder engagement and local control in the planning, development and maintenance of these sites, necessitating a long-term management strategy. Based on stakeholders' perspectives, the eco-cultural trail of "Seven Hanging Valleys" presents several deficiencies in the provision of facilities, sanitation and security. Lack of collaboration and networking with the community does not add to the conservation and sustainable exploitation of natural resources in cultural landscapes as well as to trail visitor experiences. Moreover, climate change and anthropogenic issues threaten the trail assets. Raising environmental awareness and promoting the sustainable form of TRT tourism will contribute to local economic development. Considering the threats and the trails potential, a long-term management strategy comprising the following dimensions were developed: natural and cultural landscapes; trail infrastructure; trail visitor experience; and marketing and

collaboration. The strategy provides recreational opportunities and high-quality visitor experiences while protecting natural and cultural resources in perpetuity.

Nevertheless, this study has its limitations. Trail visitor priorities in eco-cultural trail destination management attributes are not considered in this study and from a holistic point of view would provide a valuable source of information in order to sustainably exploit the proposed strategic management plan. Future studies should consider the proposed plan and incorportate the results of trail user. Additionally, this study did not consider constraints on funding into account, despite the fact that the majority of nature-based tourism destinations do. This is an important consideration when developing strategic plans based on destination attributes that need to be added or improved. Future studies are advised to take this into account.

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8. CHAPTER EIGHT

GENERAL CONCLUSIONS

8.1 Conclusions

The economic impact of trails for recreation have recently been acknowledged globally, even though over the centuries, humans have developed trails that have created movement patterns. Therefore, TRT as NBT recreation niche has called the attention of the global tourism community (UNWTO, 2019). In recent times, TRT development has been performed through the revival of heritage routes, abandoned railways, narrow countryside paths, or famous pilgrimage routes. The development of TRT has been conjugated with sustainability principles, which have become an attractive strategy for sustainable territorial development (Marion & Leung, 2004). Sustainable territorial development occurs through a circular economy, social environmental awareness, and environmental conservation focus on rural areas; such as coastal zones, remote hinterlands, islands, national parks, and other protected areas.

As academic examination of the TRT arena is relatively new and therefore unadvanced, the full spectrum of sustainability pillars and their implications are not reflected in TRT development, neither from theoretical nor practical perspectives. The economic pillar further explored in this thesis was relatively neglected in prior work, although economic development as a sustainable means of economies' transitions has already been practiced in various sectors of tourism (Marin, 2015; Narayan, 2004; Pratt, 2015), of which TRT is not an exception. When TRT is targeted as a core sustainable territorial development tool, understanding the economic effect of TRT development as well as key determinants of the economic impact is crucial. According to Wilson et al. (2012), the economic impact dimension is one of the core aspects of strategic and sustainable TRT development and management as well. Sustainable strategic planning with an emphasis on economic impact was applied globally in various tourism forms, such as coastal tourism in South Carolina, USA (Harrill & Potts, 2003) and Queensland, Australia (Ruhanen, 2004) and rural tourism in Andalusia, Spain (Blancas et al., 2011). Despite the importance and worldwide acknowledgment of economic impact and economic dimension incorporation into strategic planning, research in TRT has tended to neglect that, which has led to suboptimal sustainable and incomplete strategic trail

planning. Considering the research gaps, identified in the introduction, this thesis aimed: 1) to develop a foundation for assessment of TRT economic impact and estimate the income multipliers of trails and 2) incorporate the economic dimension into trail development and management framework and propose a pathway for optimization of sustainable trail destination development management plans.

As economic impact assessment is still complex and widely misunderstood due to failures to explain the theoretical basis and practical analysis of various existing models (Archer, 1982), the application of economic impact with multiplier effect is still very rare in NBT, while in TRT it is almost non-existent. Through a systematic literature review, this research initially found that the theoretical framework of TRT and economic development lacks a solid foundation for economic impact assessment. Consequently, through a comparative analysis, this study suggests that I-O is the most suitable theoretical approach to study the economic impact of long-distance trails situated within several counties while the Keynesian multiplier approach, implemented through the Ad hoc model, is the most suitable approaches to study the economic impact of short-distance trails due to their easy application and use of primary source data. In addition, despite the complexity and variety of economic impact assessment models, the following determinants were identified as key economic impact magnitude drivers that should be considered while assessing TRT economic impact: stage of site development, travel distance, average tourist spending, duration of stay, visitor origin, gender, and the size of the recreation industry. The results are in line with previous research on economic impact determinants of tourism (Brida & Scuderi, 2013), except for two variables, gender and travel distance, which in the general tourism sector were not found to be significant determinants of economic impact.

Further applying the proposed Ad hoc model for a short distance trail in southern Portugal, the suitability of the model for economic impact with income multiplier assessment was tested, which for the first time allowed to estimate the income multiplier effect of a trail and add an economic dimension to the theoretical framework. It was found that trail development in the study area generates an economic impact of €1,001,198, with an income multiplier of 0.72 per high tourism season, meaning that for every euro spent by trail visitors, 0.72 € is generated as local income. The results imply a propulsive role for TRT in local income generation and economic development.

Considering diverse trail development levels in contrasting landscapes and the tourism influx within the European Atlantic area, this study further aimed to examine if there is a relationship between the stage of trail development due to investments and the magnitude of the income multiplier. Adapting the theory of economic impact in tourism (Archer, 1989) to TRT, this study found a strong relationship between the stage of trail development and the income multiplier and thus further advanced the theoretical framework of trail development with a number of theoretical and practical implications.

Trail visitors play a major role in economic impact generation as their expenditures are crucial. Therefore, when planning and developing economically successful trails, in particular aiming to achieve a higher stage of trail development, a consultation with trail visitors to improve their experiences and loyalty and thus encourage visitor spending in the trail area is essential. Examining trail visitor perceptions of trail attributes and their loyalty to the trail site, this study found that trash receptacles, toilet facilities, the condition of the path, parking, and opportunities to observe wildlife are the main attributes determining visitor satisfaction and willingness to pay. These findings are not surprising, as most nature visitors prefer safety, beauty, and sanitation (Ribet & Brander, 2020; Vasiljevic et al., 2023; Verlič et al., 2015). The results support the findings of a relationship between the stage of trail development and the income multiplier, providing a list of management implications for improved trail design, enhanced visitor experiences, and overall sustainable trail development in relation to a higher stage of trail development.

Trail-related businesses that provide services to trail users are just as vital in the economic sense as trail users themselves, since these businesses directly benefit from trail visitor spending. Without local businesses, there would be no expenses and no economic impact. This study found that trail-related businesses, as key stakeholders, are usually left out of the trail management process and do not contribute to sustainable trail development. Therefore, for the first time, this study aimed to understand local businesses' perceptions of the quality of natural and recreational trail environments and identify local business preferences in investment attributes that could potentially increase operations and profitability. It was found that local trail-related businesses evaluated high-quality both natural and recreational environments and preferred investments in trail branding and marketing that would greatly improve operations and profitability, with an increase in total revenue of more than £10 million anticipated in the study area. The results further support sustainable and economically successful trail design and management in line with

trail visitor perceptions and extend the adaptive theoretical trail management framework, integrating local trail-related business perspectives.

Consideration of key stakeholders is a fundamental ingredient in sustainable development efforts (Sautter & Leisen, 1999). The final stage of this research finalizes the development of strategic management plan for trail developed in eco-cultural destinations that are economically viable, socially just and ecologically restorative based on perceptions of key trail stakeholders such as governmental agencies, private enterprises in nature-based tourism, academic experts and students. Strategic planning for trails is crucial to preserve natural and cultural landscapes, which are key attraction elements for visitors and consequently economic impact generation, as well as sustainable recreation form development in a local area. The findings of this research indicate that there is a unified opinion of stakeholders about the necessity to improve and maintain good quality provision of facilities, sanitation and security, invest in marketing and collaboration. In addition, stakeholders emphasized the need to preserve cultural landscape in order to sustainably exploit natural resources in cultural landscapes and enhance trail visitor experiences. However, climate change and anthropogenic factor threats have to be considered when preparing or revising strategic plans for economically viable, socially just and ecologically restorative trails. Nevertheless, this study concludes that TRT is a powerful economic development tool, simultaneously raising environmental awareness and promoting the sustainable form of NBT.

8.2 Theoretical contributions

This thesis offers a number of theoretical contributions to the existing literature on the topic of TRT and sustainable territorial development.

Study 1 unlocks the topic of economic impact in NBT, since for the first time refers to the importance and significance of NBT for economic development and provides a panorama of assessing economic impacts with the multiplier effect and its application in TRT that has not been addressed by previous research. Therefore, the results of this study are a valuable reference for the theoretical framework, bridging the concepts of economic impact assessment approaches and TRT development. The findings shed light on economic impact assessment in the NBT topic and enables future research to further test and validate various economic models for various trails. The key contribution to the

literature is provision of a roadmap of clustered economic impact assessment models for two main groups of trails – long-distance and short-distance, which clearly guides towards each model's practical application and validation. This study also provides a list of determinants of TRT economic impact, which are critical theoretical KPIs when designing economic impact methodologies, interpreting results, and initiating new research questions related to economic impact.

Through application and validation of the proposed Ad hoc model to assess the income multiplier and economic impact of a short-distance trail development, Study 2 provides innovative theoretical contributions by: i) validating the appropriateness of the selected model to estimate the income multiplier of a short-distance trail; and ii) pioneering the income multiplier of TRT assessment, providing a clear understanding of a significant TRT role in local economy development and income generation. Since no other research has evaluated the income multiplier for a local scale trail, this finding is novel in the literature on TRT and economic impact. Therefore, the results are of great importance for both sustainable territorial development (Barbero & Bicocca, 2017; Medeiros, 2020) and TRT (Godtman Kling et al., 2017; Timothy & Boyd, 2017) theoretical frameworks, with an emphasis on economic impact.

Study 3 and 4 further provide deeper knowledge of economic impact of trails and pioneer the examination of the relationship between the stage of trail development and income multiplier. As no studies have researched this relationship, the pool of theoretical contribution is expansive from which the key following categories can be extracted: the stage of trail development and their respective KPIs, the size of a trail catchment area, and the recreation opportunities provision. This study provides a clear basis for determining the stage of trail development using a set of KPIs. The results show that the stage of trail development is directly correlated with the income multiplier. Further, the trail catchment area and its relationship with income multiplier is addressed providing knowledge for economic impact of NBT theory as it is contradicting previous classic economic paradigms (Wall, 1997). In NBT, the trail catchment area is not directly related to the magnitude of income multiplier, which is a critical contribution to the NBT economic impact theory. Finally, the definition of trail recreational opportunities and their means for the economic impact are delineated, thus expanding the knowledge and equipping one to consider all recreation opportunity attributes related to a trail's safety,

design, remoteness, naturalness, facilities and service provision, and visitor management. The results of Study 3 and 4 can be used by trail managers to enhance a better economic trail performance and improve satisfaction of trail visitor thus shifting the paradigm away from the traditional strategy of investments in recreational service provision only (Getz, 1993).

Study 5 pioneers the examination of TRT business perceptions of investments in trail development. Since no prior studies have addressed local trail-related businesses and their perceptions of trail development and management, this study introduces a group of stakeholders usually neglected in trail literature. The results of this study support earlier economic and stakeholder theories that claimed successful development of NBT businesses, which are typically microbusinesses, can be accomplished through coordinated funding and investments in TRT area attributes through partnerships and consultation with local businesses (Haukeland, 2011). Local TRT businesses have influence in the final decision making process, therefore the consideration of their perceptions of investments may lead to a more successful economic trail development, as well as further and deeper understanding of the perceptions of various businesses located in diverse geographic settings.

With the addition of four strategic management dimensions—cultural landscape, trail infrastructure, trail visitor experience, and marketing and collaboration—Study 6 significantly expands the theoretical framework for managing economically viable, socially just, and ecologically restorative trails developed in eco-cultural destinations.

8.3 Practical contributions

Regarding practical contributions, Study 1 provides guidance for trail destination development and management through a set of determinants that drive the magnitude of economic impact: the number of visitors; the size of the group; distance travelled to the trail site from the location of visitor's stay; travel costs per trip; average expenditures per person; duration of stay; type of visitor; gender; annual income; season; the size of study area and frequency of visitation. Considering these determinants would allow trail manager to build or modify the current trail destination with its attributes. For instance, larger groups of visitors tend to spend more money, which indicates that trail destinations need to accommodate the needs of large groups (e.g., larger parking, more rest zones,

more accommodation options). In general, identified determinants serves as economic impact of trail destination management guidelines.

Study 2 implies that TRT developers and investors might use the results of this study to justify development and investments into recreational trails in southern regions of Mediterranean European countries. As this study differentiates multiplier effect by each business sector, TRT marketers can use the results and focus on development of the most income-profitable business sector(s) around the trails when having limited funds and aiming to increase income in their region. The findings of this study may be helpful for effective marketing of TRT campaigns since they show that the trail has the ability to significantly increase local income and contribute to sustainable territorial development. Furthermore, based on the findings of this study, successful promotional marketing may be accomplished, especially when attempting to draw in more investors and advance TRT in rural areas.

The findings of Study 3 are beneficial to the recreational trail tourism sector, trail development bodies and investors because they assist in identifying target trails with a high-income multiplier and local economic effect. The economic failures of trail investments and their management could be explained by identifying development stages that alter the income multiplier, which would result in better balanced and precisely targeted trail funding. The findings of this study can be used by organizations considering trails as a tool for rural economic development as a model for a plan for revitalizing economically poor rural areas. In order to improve trail development planning and more effectively modify current trail development and management practices, this study provides an outline for trail development bodies and investors of trail recreational opportunities and development stages with their respective KPIs (Neumann & Mason, 2019; Tyrvainen et al., 2014). In terms of policy importance, this study can assist local NBT developers and decision-makers by providing information on the best location for trail development among the alternatives and whether it is sustainably profitable to invest in trail development there in order to reach a highly developed recreational trail stage given the limited funds available (Kelley et al., 2013). In addition, trail development bodies and investors interested in timely and effective TRT development can be advised by which trail (short-distance or long-distance) development they would generate higher income.

Study 4 contributes to a more holistic view of trail design and its sustainable management based on trail visitor perceptions in southern Portugal. The results provide a list of trail's attributes influencing visitor loyalty, and positively interacting with the adjacent environment, which are of great importance for practitioners, such as national funding bodies, project proposers, investors and local planning authorities. Based on these results, the following attributes were identified calling managerial attention when designing and developing trails in southern Portugal: access to the trail, signage, visitor management and constructed trail features, while trail visitors are concerned about the cleanliness and sanitary features. The study also provides a list of determinants for trail designers and managers influencing visitor's loyalty, which is a crucial factor for sustainable trail management in the long-term perspective placing a motivation for visitor's expenditure (Alegre & Juaneda, 2006): age, gender, origin, frequency of visiting the trail and the time spent at the trail. Findings from this study assist in finding a balance between the needs of trail users and the sustainability of the trail over time. The findings help stakeholder groups and the recreational walking sectors allocate financing effectively and create environmentally friendly trail designs, which promotes social justice along with positive economic outcomes. Since investors and decision-makers may be given advice on the preferred trail attributes list and directed to concentrate on a small number of investment funds, the results consequently communicate to the policy implications.

Study 5 brings the managerial contribution that leveraging business perspectives through strategic partnership may greatly increase overall revenues through branding and marketing attribute, which was the most prioritized by local businesses in Northern Ireland, and approximately double the return on investments in trail development. It is the first study addressing local business perceptions of natural and recreational trail environments and their development in northern Atlantic area. The findings are imperative for tourism suppliers and TRT destinations whose aim is to develop economically successful TRT destination with the maximum return on investments simultaneously maintaining high quality service provision for trail visitors. The key findings indicate managerial implications for trail managers and investors in the study case region, focusing on branding and marketing attribute as a key investment. As businesses reported inadequate management of important rural TRT qualities as a result of their lack of participation in the planning and development process, this study indicates

for managers that businesses should be involved in the decision-making stage in order to achieve the most economically efficient returns on investments (Sotiriadis & Yan, 2023).

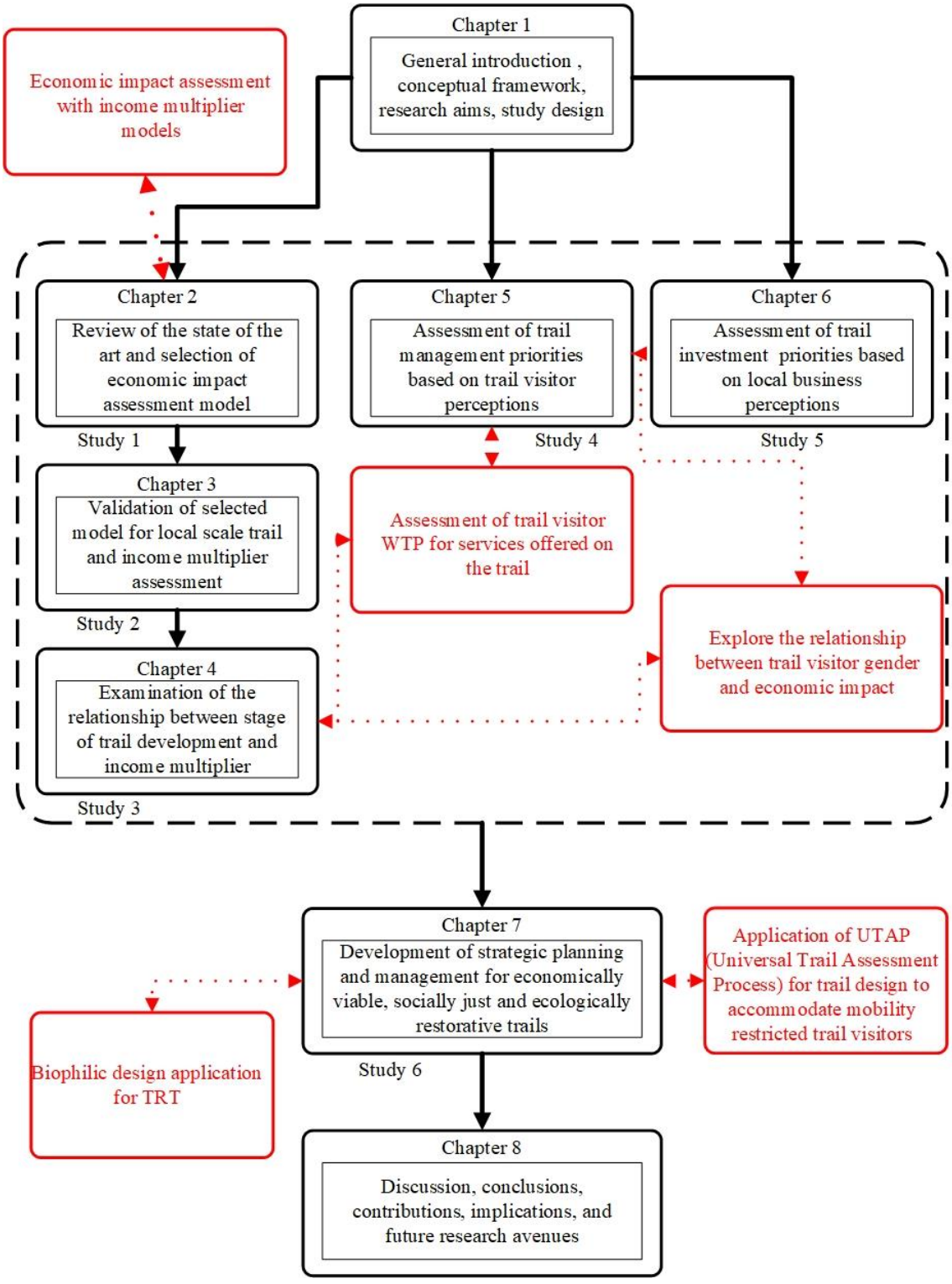
Study 6 contributes to a strategy that may encourage sustainable management of economically viable, socially just and ecologically restorative trails developed in eco-cultural destinations. The strategy is advised for both the development of new trails and the revitalization or enhancement of existing trail networks in coastal Mediterranean areas, which are rich in cultural landscapes and share threats from climate change, high tourism flow, and underdeveloped trail networks. The proposed strategic dimensions, namely cultural landscape, trail infrastructure, trail visitor experience, and marketing and collaboration are imperative for a holistic trail destination development and management and could help the TRT destination to become more competitive, contributing to sustainable territorial development while also eliminating or minimizing current and potential recreation problems.

8.4 Limitations and future research avenues

This study is unique and innovative because it explores the economic dimension of TRT development and expands existing literature as well as strategic management practises. Even though the main focus of this study is the economic dimension, this study aimed to look at the TRT topic holistically, incorporating not only the economic dimension into strategic management but also various stakeholder perceptions and how these perceptions could benefit sustainable trail design and development. As it is the foundational study in the TRT topic, which in general has not been addressed by previous research from an economic point of view, limitations were inevitable, which also project continuation for future research in this topic, visualized in Figure 8.1.

First of all, because this study was the first to review economic impact assessment models and since it only validated the Ad hoc model for a short distance trail, future studies could build on the other models found in the systematic literature review and apply them for both long-distance and short-distance trails to confirm or disprove their applicability for the two main trail groups. The knowledge of various models and their applicability would significantly expand the theoretical framework of TRT economic impact.

Figure 8.1. Future research avenues



Secondly, this study did not explore trail user's willingness to pay (WTP) for services offered in the trail. Therefore, future studies could explore trail visitor WTP for trail services in various geographic locations and diverse trail developments through a contingent behaviour approach and estimate the potential economic impact, thus

contributing to knowledge of hypothetical trail development to achieve maximum economic impact with income multiplier. Understanding visitor economic behaviour is crucial in developing TRT in today's competitive tourism environment with limited funds.

Further, this study's literature review revealed that gender is one of the factors explaining travel expenses contradicting the previous findings of general national tourism where gender does not significantly impact travel expenses (Fredman, 2008; Marrocu et al., 2015). This relationship is not addressed in the study, providing an opportunity for future research.

With regards to sustainable trail design, this study did not address the key concept of biophilic design and its attributes' application to the design of biophilic trails. Biophilic design addresses contemporary building and landscape practice by establishing a new framework for the satisfying experience of nature in the built environment (Kellert et al., 2008). Biophilic design has been applied primarily in designs of infrastructural urban environments (Bolten & Barbiero, 2020; Guzo et al., 2022). However, infrastructural developments in nature such as trails should be studied from the biophilic design point of view to sustain the productivity, functioning and resilience of natural systems over time. Maintenance of healthy ecosystems within the trail environment is crucial from an economic development perspective (Tallis et al., 2008).

Further addressing the sustainable trail design concept, mobility restricted users are usually left out. From the angle of sustainability, social justice in TRT is mandatory to create a safe and beneficial trail environment for people of all abilities. As this study did not explore sustainable trail design from mobility restricted users pespectives, future studies should apply Future Universal Trail Assessment Process (UTAP) methodology, which is foundational for trail assessment and facilitating increases in trail use by users of all abilities as well as ensuring compliance with national standards.

This research represents a cross-country view of TRT in various grographic environments within European Atlantic area, which is a limitation, in particular when comparing the results with economic development of NBT in other countries outside the European Atlantic area. Future studies should assess economic impact with income multiplier of trails within diverse geographic and economic environments and enrich current understanding of TRT and economic impact.

A major limitation with regards to the analysis of business perceptions of the importance of TRT development for local business operations and profitability is the limited number of businesses involved from only one study area. The study's findings cannot be generalized and extended. Therefore, future research could contribute to the body of knowledge via implementation of the same approach in different geographical zones and with random and representative samples of businesses.

Finally, the study of participatory management of eco-cultural trails in highly touristic coastal areas is also conducted in the context of one trail study area in coastal Mediterranean zone. Therefore, future research could explore strategic dimensions of economically viable, socially just and environmentally restorative trails developed in eco-cultural destinations in widely differentiated geographical contexts.

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9. APPENDICES

Appendix A: data collection approval from ethics committee of University of Algarve

UAlg
UNIVERSIDADE DO ALGARVE
COMISSÃO DE ÉTICA

Nº DO PROCESSO	CEUAlg Pn°52/2021
DATA DO PEDIDO	03/07/2021
TÍTULO/TEMA	Trail-related tourism and sustainable territorial development.
RESPONSÁVEL	Goda Lukoseviciute
FUNDAMENTO DO PEDIDO DE PARECER	Pedido de parecer no âmbito de tese de doutoramento em Gestão do Turismo.
PARECER FINAL DA COMISSÃO DE ÉTICA DA UALG	**Positivo sem recomendações.**

Universidade do Algarve, 30/07/2021

A Presidente da Comissão de Ética da UAlg

Profª. Doutora Helena Guerreiro José

1

Appendix B: data for income multiplier assessment used in Study 2

Table B1. Classes of individual consumption by purpose (INE, 2020)

Classes (*j* categories)	Value in 2020
1 Food and non-alcoholic beverages	0.1993
2 Alcoholic beverages, tobacco and narcotics	0.0372
3 Clothing and footwear	0.0708
4 Housing, water, electricity, gas and other fuels	0.0919
5 Furnishings, household equipment and household maintenance	0.0586
6 Health	0.0674
7 Transport	0.1627
8 Communication	0.0294
9 Recreation and culture	0.0679
10 Education	0.0200
11 Restaurants and hotels	0.0906
12 Miscellaneous goods and services	0.1042
	Total 1.0000

Table B2. Structure of the average trail visitors' expenditure

i	Sector	Average group visitor expenditure per person (€)	SD	Average individual visitor expenditure (€)	SD	Percentage (K_i)
1	Restaurant	15	16.18	19	24.84	21
2	Accommodation	17	38.90	19	45.27	23
3	Transportation	12	20.72	14	17.16	16
4	Car rentals	12	18.84	21	45.84	19
5	Guided tours	4	10.06	2	7.63	5
6	Local products	12	34.29	10	15.92	15
7	Water sports	1	4.38	0	0.00	1
	Total	**73**		**85**		**100**

Table B3. A direct income effect of trail visitor expenditure

i	Sector	Total expenditure (€)
1	Accommodation	320,291
2	Restaurant	292,559
3	Car rentals	259,863
4	Transportation	228,706
5	Local products	210,902
6	Guided tours	64,366
7	Water sports	13,866
	Total	**1,390,553**

Table B4. Estimates of the parameters of trail visitor expenditure and business sector cost

i	Sector	K_i	V_i	$K_i \times V_i$
1	Restaurant	21	0.48	0.1008
2	Accommodation	23	0.34	0.0782
3	Transportation	16	0.30	0.0480
4	Car rentals	19	0.20	0.0380
5	Guided tours	5	0.52	0.0260
6	Local products	15	0.35	0.0525
7	Water sports	1	0.40	0.0040
	Total			**0.3475**

Table B5. Distribution of residents' household consumption

Classes (*j* categories)	National survey [§] (V_j)	Residents' survey (Z_j)	$Z_j \times V_j$
1 Food and non-alcoholic beverages	0.1993	0.8441	0.2126
2 Alcoholic beverages, tobacco and narcotics	0.0372	0.8842	0.0209
3 Clothing and footwear	0.0708	0.0794	0.0009
4 Housing, water, electricity, gas and other fuels	0.0919	0.6578	0.0107
5 Furnishings, household equipment and household maintenance	0.0586	0.7549	0.0152
6 Health	0.0674	0.4566	0.0347
7 Transport	0.1627	0.7654	0.0078
8 Communication	0.0294	0.0000	0.0000
9 Recreation and culture	0.0679	0.6058	0.0418
10 Education	0.0200	0.4608	0.0830
11 Restaurants and hotels	0.0906	0.8511	0.1263
12 Miscellaneous goods and services	0.1042	0.6319	0.1228
		Total	**0.6767**

Appendix C: questionnaires applied in Study 3

Trail visitor questionnaire

This questionnaire is anonymous, confidential, and will be used only for scientific research purposes. The questionnaire has been approved by the ethics committee of the University of Algarve with the reference number CEUAlg Pn° 52/2021. The aim is to get information about trail visitors' demographic profile and expenditures related to the trip and visitation of the trail in the local area. The collected data will help to investigate how trail-related tourism contributes to local economic development and how both trail-related tourism and its economic impact might be improved. Your answers are very important, and we would like to thank you for your willingness to participate.

1. Where do you live?

a) I am a local resident (I live in the local municipality/parish/county)

b) I am from another location (within the country, please specify) _____

c) I am from abroad (please, specify the country) _____

2. What was your main mode of transportation to get to the trail?

a) Car b) Bus c) Train d) Walk/Run e) Taxi/Uber f) Cycle g) Other (specify) _____

3. How often do you use the trail?

a) First time user b) Every day c) Several times a week d) Once a week e) Once a month f) Few times a year g) Less than a few times a year

4. What is the composition of your group today including you?

a) It's just me

b) Adults (please, specify number) _____

c) Children under 18 (please, specify number) _____

5. What is your gender? Female Male

6. What is your main activity on the trail today?

a) Walking/hiking b) Exercise/training c) Family activities d) Social activities e) Pet walking f) Wildlife watching g) Sightseeing h) Photography

7. If you are staying overnight to visit the trail, what is the type of accommodation?

a) Hotel b) Lodging c) Apartment d) Local accommodation (room, house, apartment and lodging) e) Caravan parks f) Private holiday home g) Other

8. How much is your spend per person associated with the trail?

	Tourists' consumption in Euros per capita (if a group is surveying)	Tourists' consumption in Euros per capita (if individual is surveying)
Food & Drink (in restaurants)		
Accommodation		

Transportation (e.g.bus ticket, uber, other transportation service)		
Rental (e.g. car, bikes)		
Guided tours (e.g. boat tour, dolphin watch)		
Local products (e.g. handcrafts, souvenirs)		
Playing golf		
Water sports		

9. How many people do the figures provided relate to (including you)?

Adults _____ Children (under 18) _____

Appendix D: questionnaire applied in Study 4

Trail visitor questionnaire

This questionnaire is anonymous, confidential, and will be used only for scientific research purposes. The questionnaire has been approved by the ethics committee of the University of Algarve with the reference number CEUAlg Pn° 52/2021.

1. Where do you live?

a) I am a local resident (I live in the municipality of Lagoa)

b) I am from another location (within the country, please specify) _____

c) I am from abroad (please, specify the country) _____

2. How old are you? _____

3. What is your gender? Female Male

4. What is your academic degree?

a) Elementary school b) Secondary school c) B.Sc degree d) M.Sc or PhD degree

5. How long do you intend to be/have you been on the trail today in this visit?

a) Less than 30 min b) 30-60 min (approx.) c) 1-2 hours (approx.) d) Half a day e) All day f) Overnight

6. How often do you use the trail?

a) First time user b) Every day c) Several times a week d) Once a week e) Once a month f) Few times a year g) Less than a few times a year

7. What is your main activity on the trail today?

a) Walking/hiking b) Exercise/training c) Family activities d) Social activities e) Pet walking f) Wildlife watching g) Sightseeing h) Photography

8. Was the trail the main reason for you be in this area (Carvoeiro, Seven Hanging Valleys)? Yes/No

9. What suggestions do you have to improve your experience at the trail?

a) Improve condition of the path b) Improve signage c) Improve connection/accessibility to the trail d) Improve or add facilities nearby (please, specify) _____

10. How satisfied are you with the following features of the trail? (1-very dissatisfied; 2-dissatisfied; 3-neutral; 4-satisfied; 5-very satisfied)

	1	**2**	**3**	**4**	**5**
Condition of the path					
Signage					
Information available (brochures, online)					

Toilet facilities					
Crowdedness on the trail					
Litter facilities					
Parking					
Amenities in proximity					
Leisure opportunities					
Safety and security					
Vegetation health and biodiversity					
Opportunities to observe wildlife					
OVERALL SATISFACTION					

11. Would you consider returning to the trail in the future? Yes/No

12. Would you be willing to be charged a fee to use the trail services (e.g. parking, facilities and etc.)? Yes/No

Resident questionnaire

This questionnaire is anonymous and confidential and will be used only for scientific research purposes. The questionnaire has been approved by the ethics committee of the University of Algarve with the reference number CEUAlg Pn° 52/2021. The aim is to get information about residents' household consumption in the local area and calculate the ratio of income to total expenditure per month. The results will help to investigate how trail-related tourism contributes to local economic development and how both tourism and economic impact might be improved. Your answers are very important, and we would like to thank you for your willingness to participate.

1. How much do you spend per month in each of the following categories?

	Euros
01 Food and non-alcoholic beverages	
02 Alcoholic beverages, tobacco and narcotics	
03 Clothing and footwear	
04 Housing, water, electricity, gas and other fuels	
05 Furnishings, household equipment and routine household maintenance	
06 Health	
07 Transport	
08 Communication	
09 Recreation and culture	
10 Education	
11 Restaurants and hotels	
12 Miscellaneous goods and services	

2. How much do you spend per month in each of the following categories <u>in the local area?</u>

	Euros
01 Food and non-alcoholic drinks	
02 Alcoholic beverages, tobacco and narcotics	
03 Clothing and footwear	
04 Housing, water, electricity, gas and other fuels	
05 Furnishings, household equipment and routine household maintenance	
06 Health	
07 Transport	
08 Communication	
09 Recreation and culture	
10 Education	
11 Restaurants and hotels	
12 Miscellaneous goods and services	

3. What is the proportion of your monthly income that you spend per month? ____

4. What are your total expenditures per month in Euro? _____

5. How many people do the figures provided relate to (including you)? Adults _____Children (under 18) _____

6. What is your gender? Male/Female

7. What is your age? _____

8. What is your occupation?

a) Employed b) Self-employed c) Unemployed d) Student e) Managing household f) Retired

9. How many people live in your household? _____