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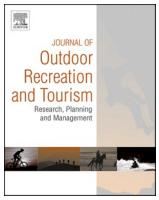

Research Article

Participatory development and management of eco-cultural trails in sustainable tourism destinations

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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 development and management of all landscape elements, emphasizing and protecting cultural and natural assets. This research aims to provide a sustainable strategy for developing eco-cultural trails, applying a qualitative approach and stakeholder participation. Two focus groups and a workshop were conducted involving stakeholders representing governmental agencies, private enterprises, academic experts, students, and environmental organizations. A case study trail "Seven Hanging Valleys" was used in this study to develop an eco-cultural trail development and management strategy. Natural and cultural landscapes, trail infrastructure, trail visitor experience, and marketing and collaboration were the examined dimensions. Based on stakeholders' visions, a destination development and management plan was established, aligning the environmental objectives to preserve natural and cultural assets, with improved overall experience for travellers and the community.

Management implications:

- Community collaboration provides trail managers and policymakers with a framework that identifies the essential levels of investment, programming, and management required to assist trails in becoming more economically and socially driven.
- The proposed management plan for eco-cultural trails can assist landscape managers with indicated management priorities when developing eco-cultural trails that aim to respect natural and cultural assets and provide memorable trail-related experiences.
- The process of creating a stakeholders' shared vision for the sustainable development of the trail site provides trail managers with a better understanding of existing and future threats and allows them to future-proof trail maintenance and service plans.

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, 2006; 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 and management 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 (Oishi, 2013; Timothy & Boyd, 2015). The main recreational trail

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categories described in the literature are as follows: backcountry trails, recreational greenways, multiple-use trails, rail trails, and water trails (Moore & Ross, 1998). Recently, trails have been implemented as an alternative visitor attraction with a growing recognition of the importance of preserving nature, cultural heritage, and promoting sustainable tourism practices (Lukoseviciute et al., 2021). Considering rising heritage trail ecotourism activities worldwide (Boyd, 2017; Ismail et al., 2021; Kim et al., 2014), and currently existing insufficient trail categories, this study introduces the new concept of an eco-cultural trail by adhering to the definition of eco-cultural tourism (Wallace & Russel, 2004). The concept of eco-cultural trail aligns with the principles of ecotourism by providing opportunities for visitors to engage with nature and culture in a sustainable manner. 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 settings to create a destination for sustainable 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.

Following the definition of eco-cultural trails, which represent a specific type of trail that incorporates both ecological and cultural elements into the visitor experience, one can describe them as a form of manifestation of TRT to offer visitors engaging experiences and support destination sustainability, community development, and nature conservation. The general increase in trail development, including eco-cultural trails, 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 and management 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., 2017), providing easy access to nature, exercise and interactions with cultural and natural landscapes (Božić & Tomić, 2016; 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, their development and 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 and Russel (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 an assessment of the attributes of the trail itself neither of the development and 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 development and management plans. Therefore, it is critical to address eco-cultural trails and their destination development and management planning.

It is important to note that creating an eco-cultural trail development and 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 the 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 development and 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 development and 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). Several authors have suggested that TRT may support sustainable destination development (Kato & Progano, 2017; Santarém et al., 2015; Schweinsberg, 2017) and achieve sustainability goals to improve eco-cultural tourism development and create memorable trail-related experiences. This can be achieved with a well-balanced eco-cultural trail development and management plan.

As is the case for conventional trails and eco-cultural tourism destinations, eco-cultural trail development 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 form an eco-cultural trail development and management strategy that assists in providing high-quality visitor experiences, supports local communities, and provides sustainable destination trail development and management plans that protect the area's natural and cultural assets.

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 (Kim et al., 2015), of which one of the most common is TRT. However, studies have shown that unsustainable trail development and management 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 development and 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 developed and 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. 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, 2007). 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 (Svensson et al., 2021). Recreational trail development that preserves the cultural and natural assets, 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 development and 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 and 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 the development and management of physical trail infrastructure, trail users, provision of trail-related services, actions for the preservation of heritage - embedded in cultural and natural landscapes, where stakeholder perceptions about trail development and management are crucial. The assumption follows that well-planned, developed, and managed 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 mass 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; Timothy & Boyd, 2015).

With regards to trail development and management, four main dimensions, adapted from the outdoor recreation development roadmap provided by the State Outdoor Business Alliance Network (2021), were used to develop this research conceptual framework: 1) Trail Development Design - 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, community collaboration and sustainable trail destination development; 3) Supply and Demand – monitoring of trail site attributes and stakeholder perceptions, applying innovative smart technologies in socio-economic impact assessment; 4) Marketing and Communication of trail destination - investing in marketing campaigns, promotion channels, communication with stakeholders that drive local development.

With no exception, eco-cultural trails and their development and management 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 and management of eco-cultural trails that are sustainable, protect natural and cultural assets, 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 (Davies, 2018; Davies et al., 2012; Power et al., 2023). 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.

Applying previous knowledge of recreational trails to eco-cultural trails, the assumption that sustainable development and management of eco-cultural trails requires not only good trail infrastructure development but also knowledge of natural resource management can be formulated (Lekies & Whitworth, 2011; Timothy & Boyd, 2015). The importance of multiple stakeholder involvement is widely acknowledged and considered to be beneficial to the 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 heterogeneous 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 development and 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 the diminishment of conflicts between stakeholders, enhancement of expertise and knowledge in effective eco-trail development and management of local natural and cultural environments (Molnár, 2021). Furthermore, constant stakeholder involvement in trail development and a positive feedback mechanism, emphasizing 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 developing eco-cultural trails, in pursuance of a more integrated and holistic sustainable TRT development. Based on the literature review, Fig. 1 demonstrates the four main dimensions of sustainable TRT development and management.

3. Methodology

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, 2010) 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 (Fig. 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 more than 260 visitors a day during the high season and around 150 visitors a day 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

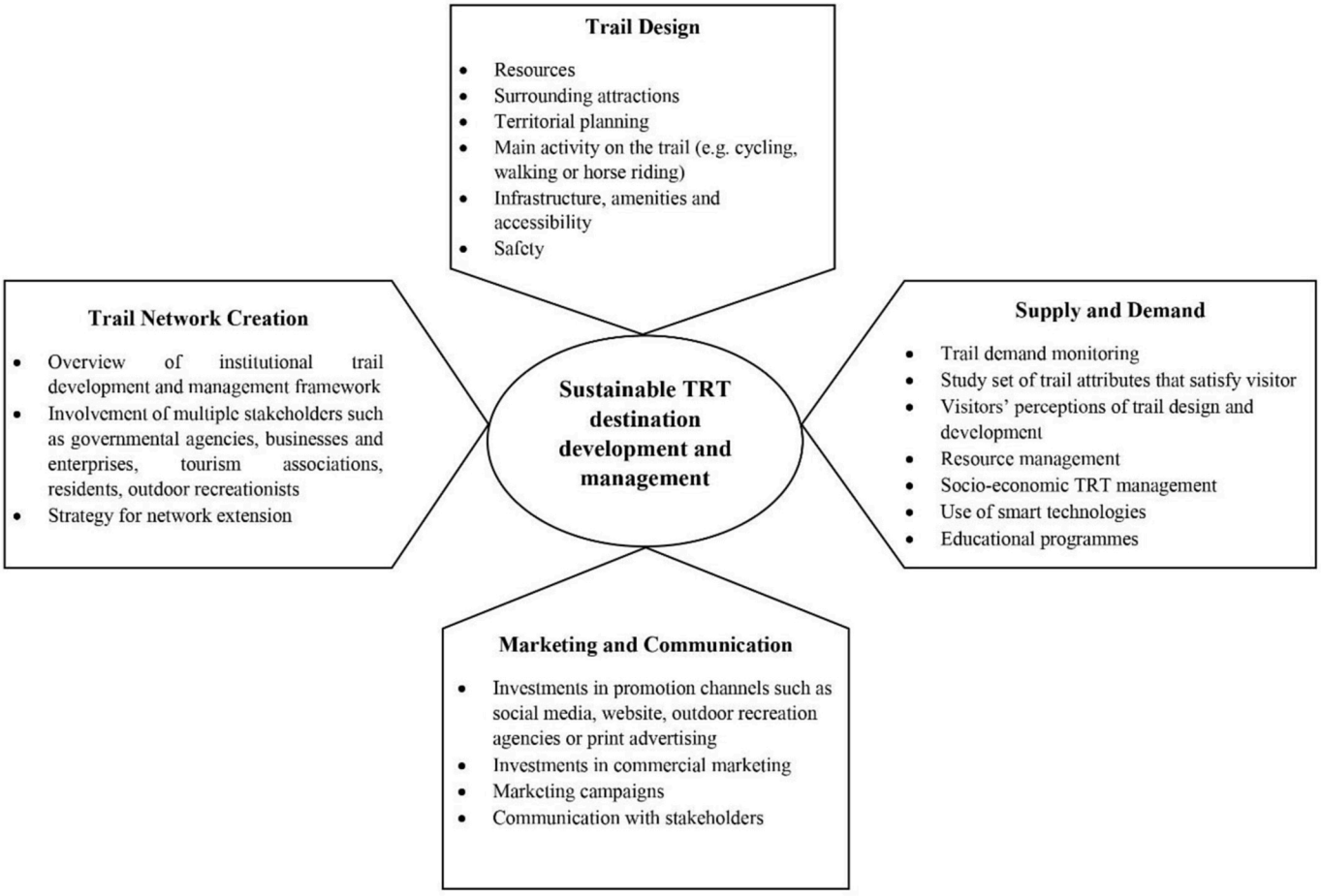

Fig. 1. Four TRT development and management dimensions are displayed in the figure, namely trail design, supply and demand, marketing and communication, and trail network creation.

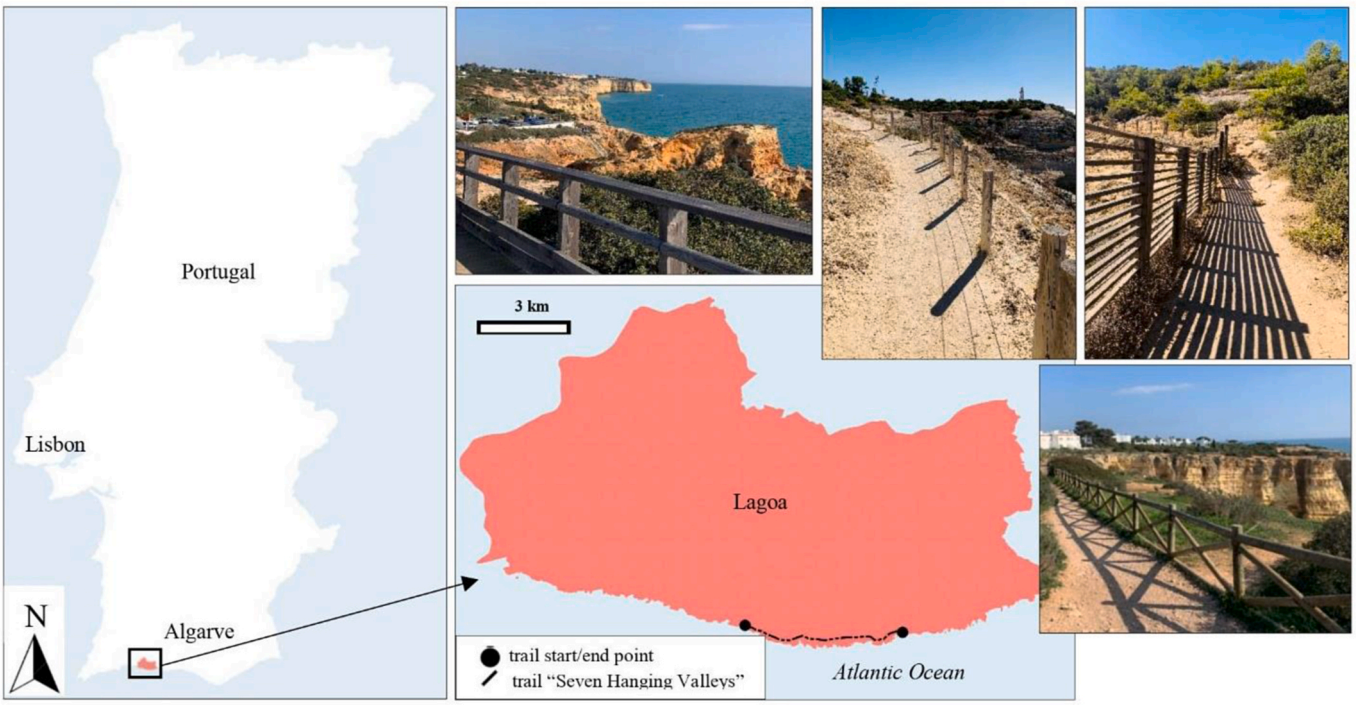

Fig. 2. Location of the "Seven Hanging Valleys" trail in Lagoa municipality, Portugal.

sea recreation and introduce visitors to trail-related eco-cultural recreation in the region. The trail's management and future development should therefore follow the guidelines of an eco-cultural trail and be in line with the Portuguese Territorial Programme, which takes into account the sustainable management of natural resources and the connection of both nature-based and seaside recreations (DRE, 2019). Additionally, the Municipal Master Plan of Lagoa seeks to promote sustainability and boost economic activity through tourism in the context of a proactive governance model that is in line with territorial intelligence and cohesion (PMDL, 2021).

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 development and 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 (Fig. 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 development and 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

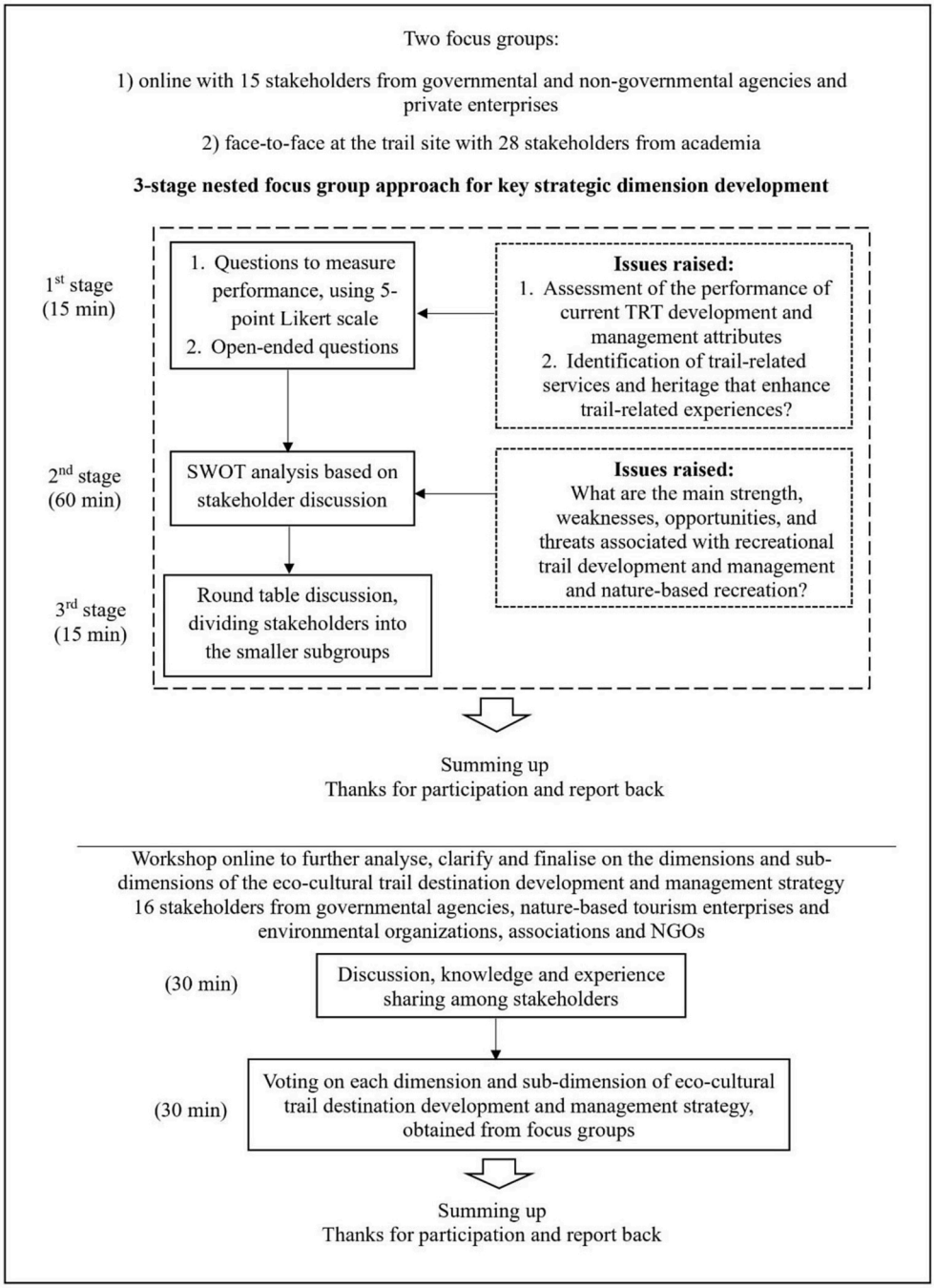

Fig. 3. A flowchart illustrating the methodology stages used during focus groups and the workshop.

conservation, rural tourism management, and economic development (Tavares & Camões, 2010). The second mini-focus group represented private enterprises and their consultants (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 landscape conservation, local economic, social and cultural development, and ecotourism promotion (Nogueira & Pinho, 2015). 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, by 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 stakeholders was taken from earlier workshops and focus groups held as part of a larger research project, managed by other researchers from the university, that covered a range of subjects in the same community. 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, the 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 dimensions for sustainable eco-cultural trail development and management. With regards to students, those showing interest in eco-cultural trail development and management and who was familiar with the trail were included in the database. Individuals from the database with appropriate profiles for the study were invited to participate. The authors did not have any connections with local stakeholders prior to study. None of the authors are residents of the study area nor do they possess any business interest.

3.2.1. Focus groups

The first focus group was held online (October 27, 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 (November 4, 2021) with 28 stakeholders from academia and business consultation (7 professors and business consultants in tourism, environmental science, and economics, and 21 master's students in tourism). Both focus groups followed a three-stage nested focus group approach (Fig. 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 using simultaneous translation.

The first stage aimed to assess the performance of current TRT development and management attributes, which facilitates further SWOT analysis performance and elaboration on the final strategic dimensions of an eco-cultural trail development and management strategy. Consequently, a quantitative survey, including 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 was 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 the 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, 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 development and 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.

In the second stage, 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 and management, with the 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 smaller subgroups based on the area of expertise since it allows brainstorming and better stakeholder interaction. Large group divided into smaller groups is a standard tool in corporate planning and it is effectively a nested focus-group approach (Buckley et al., 2021). Each roundtable subgroup was assigned with a moderator, who was a scientific researcher from the authors' team. Moderators were assigned to pose questions, lead and sum up focus group discussions. Besides the discussion of SWOT analysis results, researchers asked stakeholders to discuss the most important trail development and management 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.

3.2.2. Online workshop

On the December 9, 2021, an online interactive workshop was held with stakeholders from 3 governmental institutions, 5 representatives of nature-based tourism businesses, 4 representatives of environmental associations, and 4 local development NGOs, which lasted around 60 min. Aacademics were excluded from the workshop to ensure that the discussion of the key strategic dimensions was oriented towards 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 workshop using simultaneous translation.

The workshop aimed to further analyse, clarify and finalise on the dimensions and sub-dimensions of the eco-cultural trail development and 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 min 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 development and 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 development and management, if any. Following the group vote for each dimension proposed, the most popular dimensions for strategic trail development and management were selected for the final 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 development and management strategy.

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 development and management was analysed following Braun and 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 development and management. The analysis of internal and external factors was based on seeking a fit between the two perspectives.

Audio files of focus groups and workshop results 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). In this stage, open coding was used initially to identify key concepts (Merriam, 2009). 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 development and management dimensions (Merriam, 2009). At this stage, cross-checking by 3 independent analysts was performed and repeated until 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).

4. Results and discussion

4.1. Assessment of stakeholder perception of TRT development and management

Table 1 presents the preliminary findings of the assessment of stakeholder perception of TRT development and management 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 1 shows that 13 attributes were highlighted for registering high and very high average values ($\geq$3.0) and are as follows: points of interest, visitor information online, trail condition, picnic areas, navigation signage around the trail, visitor information boards, parking, accessibility, access roads to the trail, pedestrian links to trail's network, directional signage to the trail, promotional trail brochures, leaflets and posters, and digital promotional links to a wider trail network. The least performance was given to the following 6 attributes, registered at low and very low values ($<$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.

Stakeholders stressed natural and cultural landscapes 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 referring to other types of heritages that should be combined with the "Seven Hanging Valleys" trail development and management. 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 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.

4.2. SWOT analysis

SWOT analysis is the final and most essential part of stakeholder

Table 1
Stakeholder perception of trail development and management 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.

Table 2
Frequency of the most cited words by stakeholders.

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

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, p. 103). Scanning both internal and external factors is an important part of further elaboration on key dimensions and sub-dimensions of eco-cultural trail development and management strategy. The SWOT model is applied to illustrate the results (Table 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 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,

Table 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 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) and Vandalism (7%)(3 ref) • Limited access for disabled people (7%)(3 ref) • Lack eco-cultural trail tourism advocacy (7%)(3 ref) • Crowdedness (7%)(3 ref) • Lack 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) • Trail access control (6%)(3 ref) • Accommodation near the trail (6%)(3 ref)	• Environmental 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) • Lose visitation due to climate change (7%)(3 ref) • Landscape deterioration due to overcrowding (7%)(3 ref)

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 recognize 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, Burkhart, & Nicholson, 2015). Stakeholders have highlighted the 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 been destroying cultural heritage resources 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 (Reimann 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) rapid urban sprawl in the coastal area of Algarve significantly deteriorates 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 development and management strategy.

4.3. Key strategic dimensions of eco-cultural trail development and management

After analysing the interactive workshop's data, we were able to better construct the four strategic dimensions and their sub-dimensions (Table 4 and Fig. 4), which are as follows: natural and cultural landscapes, trail infrastructure, trail visitor experience, and marketing and community collaboration.

4.3.1. 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.

In regard to identified sub-dimension of physical, ecological and social carrying capacity, landscape protection requires to study physical,

Table 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 · Environmentally sustainable behaviour · Environmental protection measures · Environmental awareness	· Accessibility · Safety · Trail facilities and design · Maintenance · Public transportation	· Digital tools · Network of recreational activities · Eco-cultural and educational tours · Public cultural services and activities · Food and drink service · Accommodation	· Partnership · Marketing initiatives · Promotion channels · Identification of marketing target audience · Land-use conflict management
Codes	Monitor trail visitors, monitor visitor volume, introduce an entrance fee, limit the number of trail users, encourage sustainably responsible behaviour, 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, tourism tax for infrastructure maintenance, 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, willingness to pay for experiences, 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, business donations to preserve natural and cultural assets, collaboration with trail managers with regards to their donations

ecological, and social carrying capacities in order to understand the maximum capacities of the trail and thus implement the environmental protection measures. As per prior indication of exceeded trail carrying capacity (Madden et al., 2023), stakeholders stressed the significance of an entrance fee, which has been widely acknowledged as an effective trail access control measure, which also facilitates dispersion from overloaded parts of the trail (Keske & Mayer, 2014; Wang et al., 2017). Prior research supports stakeholder perceptions by indicating that entrance fee is one method of shifting use away from over-used trail parts and time periods and toward other locations and times (Chase et al., 1998). Understanding trail carrying capacity can assist in effectively estimating the degree of trail usage in eco-cultural trails. Moreover, it can effectively support the 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).

Since natural and cultural landscapes are heritages, stakeholders agreed on the significance of environmentally sustainable behaviour sub-dimension and its promotion in order to preserve the destination's beauty, which is in line with previous scholars (Gronau, 2017). Moreover, TRT activities have been found to encourage environmentally sustainable behaviours (Kil et al., 2014). With regard to environmental protection measures, tourists put an environmental strain on the eco-cultural trail; thus, stakeholders proposed enforcing stricter regulations. 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, as per stakeholder identification of the environmental awareness sub-dimension as an opportunity to sustainably develop eco-cultural trails; environmental awareness can be increased by participation in TRT via providing a foundation for environmental education (Ferreira, 1998). In addition, environmental awareness is associated with trail visitor place attachment, thus encouraging trail visitors' environmentally sustainable behaviour (Lin & Lee, 2020).

4.3.2. *Trail infrastructure*

Referring to the dimension of trail infrastructure, the following five associated sub-dimensions, resulting from the content analysis were identified: accessibility; safety; trail facilities and design; maintenance; public transportation. Trail infrastructure is critical because it protects natural and cultural landscapes (Tomczyk & Ewertowski, 2013) while improving trail-related experiences (Kelley et al., 2016).

Stakeholders highlighted the sub-dimension of accessibility in the strategic planning, tied to visitors and their required experiences, which is supported by previous findings of Moseley (1979). Stricter trail accessibility controls enable 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 sub-dimension, which according to Wolch et al. (2010) affects 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 discussed safety in a context of visitors' willingness to pay for it, which is tied to the establishment of an entrance fee.

In regard to identified sub-dimensions of the trail facilities and design, according to stakeholders, installation of proper trail facilities

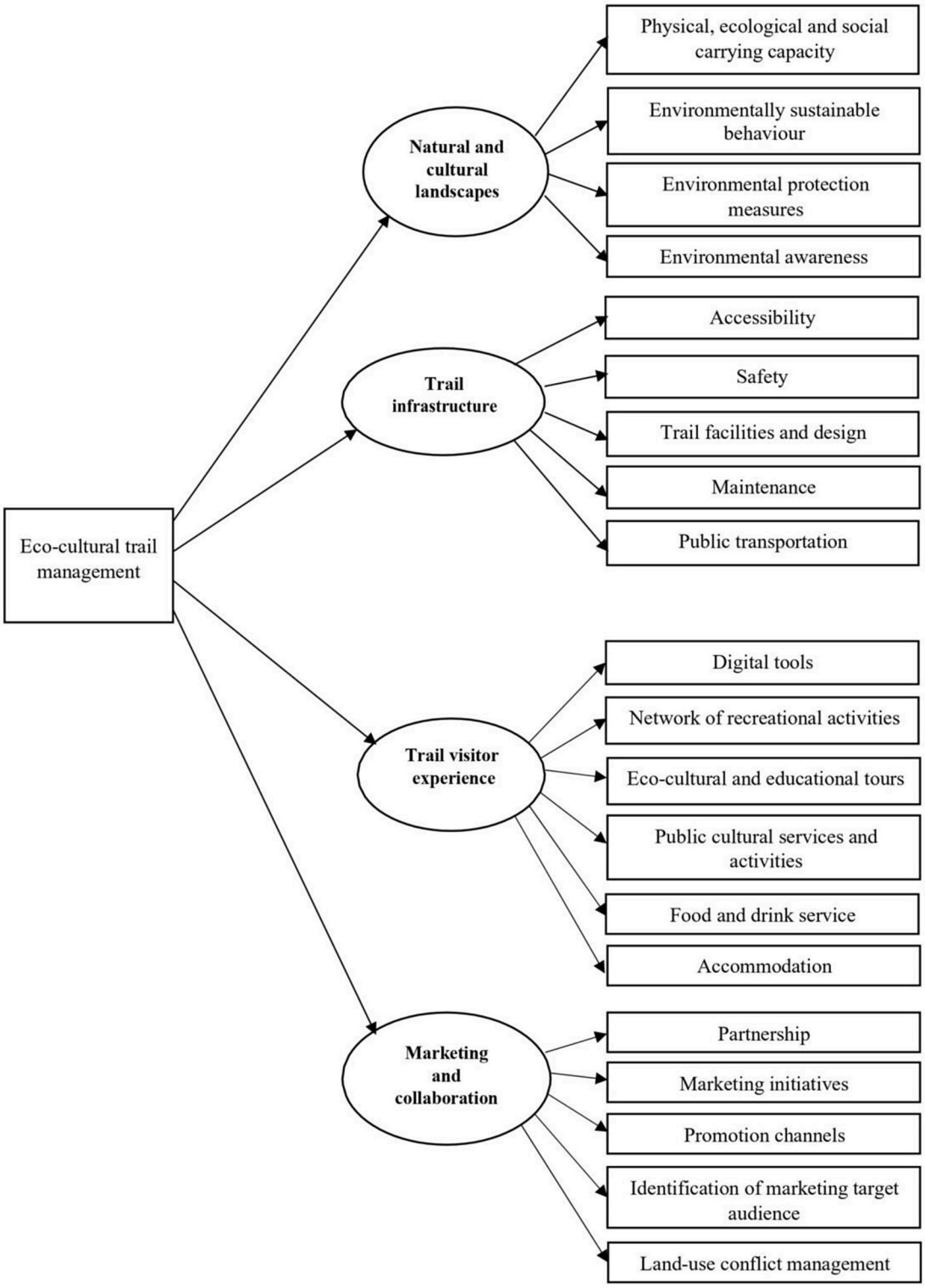

Fig. 4. A map of four dimensions with its sub-dimensions of eco-cultural trail development and management strategy.

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 the importance of trail infrastructure maintenance sub-dimension as a crucial strategic eco-cultural trail management element, which significantly contributes protection of natural resources and to trail condition advancement, including increased safety (Marion & Wimpey, 2017). According to Lukoseviciute and Panagopoulos (2021), the installation of sanitary elements such as litter bins or toilets is essential to prevent pollution within fragile natural and cultural landscapes.

With regards to the identified sub-dimension of public transportation, stakeholders argued that instead of building new parking lots, it is better to urge authorities to 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 & Russel, 2004).

4.3.3. Trail visitor experience

Referring to the dimension of trail visitor experience, the following six associated sub-dimensions, resulting from the content analysis were identified: digital tools; network of recreational activities; eco-cultural and educational tours; public cultural services and activities; food and drink service; and accommodation.

Referring to the current digital era, the sub-dimension of digital tools, which is most relevant to the identified sub-dimension of eco-cultural and educational tours, was highlighted. 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 also by providing cost advantages for TRT providers (Bilgili & Koc, 2021).

Further, 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 the management of over-used trail sections.

In relation to the building of a network of recreational activities, 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 having been identified by Jopp et al. (2022). Therefore, a sub-dimension of eco-cultural and educational tours has been addressed in relation to trail visitor clusters and their potential needs. 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 public cultural services and activities - a sub-dimension identified based upon stakeholders - designed to fulfil trail visitors' needs and enrich an eco-cultural trail visit experience (O'Dell, 2005; Tiberghien et al., 2018).

The sub-dimension of food and drink service was identified by stakeholders as an important enhancement for visitor experience, as also observed by Sundqvist (2023) and Gómez-Martín, 2019).

Finally, the sub-dimension of 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 tourists appreciate a well-preserved natural environment with accommodation provided (Tyrväinen et al., 2014).

4.3.4. Marketing and collaboration

Referring to the dimension of marketing and community collaboration, the following five associated sub-dimensions, resulting from the content analysis were identified: partnership; marketing initiatives; promotion channels; identification of marketing target audience; and land-use conflict management.

Since eco-cultural trails are relatively recently acknowledged nature-based tourism products and sophisticated consumers seek authentic and unique experiences (Buhalis, 2000), the sub-dimension of partnership has been heavily debated among stakeholders.

Further, stakeholders thus have called attention to the sub-dimension of marketing initiatives since every new product seeks to raise consumer awareness and strengthen loyalty (Gamboa & Gonçalves, 2014). Marketing is extremely critical for eco-cultural trails in the Mediterranean region since one of its roles is to divert visitors away from an excessive motivation on sun and sea leisure and toward nature and cultural landscape discovery (Farmaki, 2012; Tomljenović & Kunst, 2014). Collaborative marketing initiatives within the TRT framework will bring up innovation, progress, and change through the frequently intricate land use interaction process. (Ford et al., 2023).

In reference to the sub-dimension of promotion channels, stakeholders and other scholars concur that collaborations ought to incorporate funding agencies along with diverse stakeholders who can offer their knowledge, skills, and other abilities, in addition to creating channels for trail promotion (Wang & Xiang, 2007). 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.

Based upon stakeholder input, the sub-dimension of identification of a marketing target audience must be addressed. Moreover, 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) and Mitova et al. (2021). Stakeholders proposed fostering improved management of destination marketing and monitoring promotional trail content, in particular on social media.

Regarding the subdimension of land-use conflicts management, stakeholders agreed that the growth of outdoor recreation has turned land-use conflict management an issue in many tourist 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 or partnerships between public and private entities.

4.4. Summary discussion of eco-cultural trail development and management strategy

The generic TRT destination management model described in Fig. 1 and the four-dimension eco-cultural trail development and management strategy might be compared. The dimensions of trail infrastructure and design, marketing and collaboration follow a similar dimensional pattern to the TRT destination management model. This implies that trail management plans for all kinds of trails should prioritize trail infrastructure. 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 (Andersen et al., 2014). 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. Understanding the importance of trail infrastructure and design with its specific sub-dimensions is crucial for eco-cultural trail developers and managers; to implement development and management strategies that protect natural and cultural heritages and create a linkage for human-nature interactions via eco-cultural trails, especially in places where sustainable tourism practices are neglected. 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) with very important dual management implications for eco-cultural trail developers and managers – to collaborate with local communities and strictly control marketing of eco-cultural trails in places with already existing high volume of tourism and put more emphasis on raising environmental awareness and environmental education, while directing more marketing efforts to eco-cultural trails in low tourist volume areas in order to diversify mass sun and sea tourism.

The result that the natural and cultural landscape dimension was exclusive to eco-cultural trails was not surprising, given that it was left out of the general TRT management paradigm. This dimension is novel and applicable exclusively to eco-cultural trail development and 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 service and facility provisions, this dimension was also novel for eco-cultural trails. As a result, the eco-cultural trail development and management strategy places an emphasis on the interconnection between visitor interaction and the natural and cultural landscape. The study findings suggest that both the dimensions of natural and cultural landscape and trail visitor experience should be prioritized by eco-cultural trail managers to prioritize the preservation of natural and cultural landscapes, shape the identify and sense of place for visitors and thus enhance visitor experiences. This implies that natural and cultural landscapes, which trail visitors explore, are places requiring informative signage, guided tours, exhibitions or events organized to enhance visitor experiences and awareness of eco-cultural trail value.

Results from the study yielded several of the aforementioned implications for developing and managing eco-cultural trails that assist in providing high-quality visitor experiences, supporting local communities, and protecting the area's natural and cultural assets. Trail managers can use the strategy as an indicating tool to better understand eco-cultural trail features and shift their development and management from general trails to eco-cultural trails. The proposed strategy 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 strategy 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 eco-cultural trail development and management strategy, the current study provides TRT stakeholders such as policymakers, planners, destination management organizations, non-governmental organizations, local businesses and communities with valuable inputs. It implies the appropriate procedures to address sustainable eco-cultural trail development and management.

This study offers some important theoretical contributions. First, as identified through literature review, it is the first study to define eco-cultural trails and introduce this concept into the literature. This newly suggested definition reflects an interdisciplinary perspective of developing and managing eco-cultural trails and bridges the gap between environmental and cultural disciplines from a tourism perspective, which recently has been widely discussed among scholars as a new form of sustainable tourism (Guri et al., 2021; Jopp et al., 2022; Sendra, 2017; Tiberghien, 2019). Towards this end, the results of this study bring a significant theoretical contribution to trail development and management literature (Ballantyne & Pickering, 2015; Davies et al., 2012), expanding the current knowledge of complex eco-cultural trail systems via a four-dimensional eco-cultural trail development and management strategy within natural and cultural landscapes. This study suggests that adopting natural and cultural landscapes, trail infrastructure, trail visitor experience, and marketing and community collaboration dimensions into strategic TRT development and management helps to introduce a new niche of eco-cultural trail tourism and increase destination competitiveness thereby boost destination benefits (Dwyer, 2015).

5. Conclusions

This study aimed to establish an agreement among stakeholders to develop a sustainable development and management strategy for eco-cultural trails by using a popular trail in southern Portugal as a case study. The multidisciplinary approach comprised of initial trail assessment, SWOT analysis, focus groups and a workshop with a wide range of stakeholders to develop a sustainable eco-cultural trail destination. The main findings of this study revealed that eco-cultural trail management encompasses more than preservation of the trail's natural and cultural assets, crucial to the ecotourism industry, but also enhance the quality of life for communities and improve the overall experience for travellers.

This study proposes a new holistic four-dimensional strategy for eco-cultural trails that integrates stakeholder theories with eco-cultural tourism principles to develop sustainable eco-cultural trails. The strategy comprises of the following dimensions: natural and cultural landscapes, trail infrastructure, trail visitor experience, marketing and community collaboration. It can be concluded that perceiving eco-cultural trails as a shared endeavour towards sustainable use for present and future generations is crucial. The proposed strategy can serve as a blueprint for trail development and management stakeholders to consider the abovementioned dimensions as common agendas in their decision-making, irrespective of individual interests. Moreover, the strategy provides an agenda for developing eco-cultural recreational opportunities combined with high-quality visitor experiences while protecting natural and cultural resources in perpetuity.

The present study has expanded the theoretical framework of trail development by presenting a novel eco-cultural trail concept, and suggesting a strategic management plan that improves the overall experience for visitors, upholds the interests of nearby communities, and safeguards the region's natural and cultural assets. Further research is needed to apply the methodological approach of eco-cultural trail development and management in different geographic, climatic, and political contexts, adding new dimension/sub-dimensions.

CRediT authorship contribution statement

Goda Lukoseviciute: Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Claudia Nunes Henriques:** Writing – original draft, Resources, Investigation. **Luís Nobre Pereira:** Validation, Supervision, Formal analysis. **Thomas Panagopoulos:** Writing – review & editing, Writing – original draft, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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