Intervening in Pustec:
Development of a matrix for evaluating intervention models, promoting sustainable tourism in the Prespa Lake area.

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Abstract - *Intervening in protected areas, such as Prespa Lake and Pustec Municipality (AL), is delicate due to the sensitive environment and the rural nature of the lifestyle.Protected by UNESCO since 1979, it strives to defend the area from extreme human interventions that could devastate the ecosystem. However, considering its significant distance from cities, lack of essential services, and job opportunities, it faces ever-increasing abandonment. To avert this scenario and recognize the value of the natural environment, the studio aims to explore opportunities, measure potential impacts generated from the interventions, and encourage sustainable tourism. One of the challenges lies in the unique aspects of the area, which necessitate a thorough analysis of the context and the potential impact on the natural and rural environment.*

A methodological framework is proposed, based on the connection and classification of each category of actions. Specifically, a visual matrix was developed to evaluate tourism-related interventions based on seven key indicators—including green impact, pollution risk, cultural enhancement, and susceptibility to mass tourism—across three categories: services, activities, and transport.

The matrix draws on data collected during a field survey in November 2023 across Albania, North Macedonia, and Greece, integrating stakeholder input, infrastructural analysis, and landscape assessment. The tool aims to support participatory decision-making among municipalities and residents, encouraging strategies that promote nature-based tourism while preserving local identity and natural heritage. Though tailored to the Pustec area, the matrix can be adapted to similar rural contexts, particularly when paired with tools such as Life Cycle Assessment (LCA) or social impact analyses. Limitations include the exclusion of non-documented activities and emerging literature, underscoring the need for continuous refinement and local engagement.

Keywords - Sustainable tourism, Decision tool support, Intervention strategies, Scale interventions.

Introduction

Since the 1990s, rural and sustainable tourism has emerged as a promising alternative to conventional mass tourism, offering the potential to foster sustainable development while preserving the cultural and ecological integrity of sensitive regions (Hardy, Beeton, and Pearson 2002). However, the expansion of tourism in rural areas, if not carefully managed, can lead to significant environmental degradation, sociocultural disruption, and unbalanced economic growth (Alaeddinoglu, Turker, and Can 2016). This is particularly relevant in the border area of Prespa Lake, encompassing the Municipality of Pustec (Albania), North Macedonia, and Greece, a region characterized by high ecological value, rich cultural traditions, and a protected area by UNESCO since 1979 due to its significant nature and cultural heritage (UNESCO).

The object of this research is to develop a visual decision-making tool - specifically, a matrix -that allows local authorities, tourism stakeholders, and travel agencies to assess the sustainability of various tourism-related interventions. This matrix connects environmental, social, and economic criteria derived from both literature and field research. It aims to guide investments and policy decisions toward sustainable tourism development, while minimizing the risk of mass tourism in a holistic view that aims to be used in a participatory design and integrating more precise analysis for environmental sustainability that, at the moment, have no other design or management tools (De Camillis, Raggi, and Petti 2010).

The research adopts a participatory and place-based approach, combining theoretical frameworks with a field survey conducted in November 2023 across the three national territories. It examines tourism potentials and threats by analysing key elements: the natural environment and the landscape, the agricultural and rural lifestyle of the local population, the availability of tourism services, and existing infrastructure. The resulting matrix enables a preliminary visual evaluation of activities, identifying their potential impacts and supporting dialogue between local communities and policymakers. In doing so, it promotes an integrated, cross-border vision of tourism planning, aligned with sustainability goals and UNESCO protection frameworks.

Literature Review

Tourism is one of the most important sectors in the global economy (Gössling 2002) and plays a key role in the socio-economic development of countries (Campos et al. 2023). Several studies in the academic literature highlight the positive correlation between tourism and improved quality of life for local populations (Alaeddinoglu et al. 2016), while also warning against tourism strategies that marginalise local communities (Alaeddinoglu et al. 2016).

In 2023, Albania was ranked 4th globally in terms of growth in international tourist arrivals, with a 56% increase compared to 2019. The country welcomed 7.5 million international visitors in 2022 and 10.1 million in 2023 (UNTO 2024). This strong rebound in tourism contributed to an economic growth rate of nearly 5% in 2022, reaching a Gross Domestic Product (GDP) in 2023 of approximately 23 billion USD dollars (UNTO 2024), which led the United Nation for Tourism (UNTO) to produce guidelines for tourist development in Albania, highlighting the importance of the topic nowadays, in order to avoid mass tourism development. Such development can pose risks to the surrounding environments, particularly due to large-scale infrastructure projects (Akın 2021). In fact, tourism is also a major contributor to environmental degradation, accounting for approximately 8% of global greenhouse gas emissions (WTTC and Oxford 2018). Not only, mass tourism is huge social threat, risking increasing marginalization of the local community, and social disparities (Kumar and Mandal 2025).

In response, theories from research try to solve this issue: the concept of sustainable tourism began to emerge in the 1990s, as a response to the negative impacts of mass tourism, aiming instead to promote tourism that respects environmental and social systems (Hardy et al. 2002). During this time, the international community started to define sustainable tourism within the broader framework of sustainable development (Bac 2014).

Sustainable tourism is defined by the Worls Tourism Organization (WTO) as meeting the needs of present tourists and the host community while protecting and enhancing opportunities for the future, aiming to manage resources in a way that meets economical, social and aesthetic needs while preserving cultural integrity, ecological processes, biodiversity and life-support systems (WTO 2005). A balance among sustainability principles as the environmental, economic, and socio-cultural aspects of tourism, is crucial for long-term sustainability (WTO 2004). Including tourism activity and environmental quality as reported by Middleton and Hawkins (Middleton and Stabler 1997). Nevertheless, good tourism performance should not only be evaluated based on short-term economic returns or visitor satisfaction, but also on the environmental and sociocultural consequences it produces (Huang et al. 2019).

Challenges to sustainable tourism include inadequate green logistics, limited public infrastructure, poor road networks, increasing air pollution, and insufficient wastewater treatment systems (Perkumienė et al. 2020).

Tourism marketing, widely implemented by destinations and organizations, has attracted growing attention in the academic literature (Huang et al. 2019). Education in certification and sustainability marketing plays a crucial role in ensuring the success of ecotourism initiatives, helping to build a shared philosophy between operators, visitors, and local residents (Bustam and Stein 2012). At the same time, tourism activities can be understood as extensions of the brand-consumer relationship, meaning that providers must meet visitor expectations to encourage loyalty and return visits (Chang and Katrichis 2016).

Pustec Area geography and context

Pustec is an Albanian municipality protected by UNESCO since 1979 due to its unique landscape and cultural heritage (UNESCO).

Located in the Korça region of Albania, within the broader context of the Prespa Lake, which extends across the border of North Macedonia and Greece (Figure 1). The region hosts several natural parks and two other lakes, Ohrid and Small Prespa.

The commune historically developed mainly through the primary sector. In the Albanian part of the lake, farming was the predominant activity, while the North Macedonian side was known for apple cultivation. Tourism was not considered a relevant sector until the 1990s (Muslli 2016). Later, by 2003, around 30 families were employed in tourism (Muslli 2016). Despite this, the villages are experiencing high emigration rates, particularly among young professionals, as reported during the survey of the area (paragraph 3.1), due to a lack of job opportunities and their remote location.

Given the growing international interest in the area and the economic investments by the European Union in Albania, it is crucial not to overlook both the opportunities and risks associated with tourism development in this sensitive zone. Tourism could promote a more sustainable future for the local population, biodiversity, and landscape, while also improving quality of life (QOL) and supporting economic growth (Alaeddinoglu et al. 2016).

Nevertheless, tourism expansion poses potential threats to key environmental elements such as the landscape, water bodies, and aquatic ecosystems (Kokkranikal and Morrison 2002). While low cost can be an advantage for service providers, a lack of environmental awareness and poor tourism resource management undermine the long-term success of a destination (Rodríguez Díaz and Espino Rodríguez 2016). Therefore, decision-making processes must prioritize environmental and cultural preservation alongside the pursuit of sustained economic benefits.

Tools Methodology

This research aims to develop a visual matrix that can be used by the Municipality of Pustec and other stakeholders or Municipalities across the borders to identify potential environmental, economic, and social threats and avoid mass tourism through informed investment, to be used accompanying other analysis such as Life Cycle Assessment (LCA), gap identified by De Camillis et al. (De Camillis et

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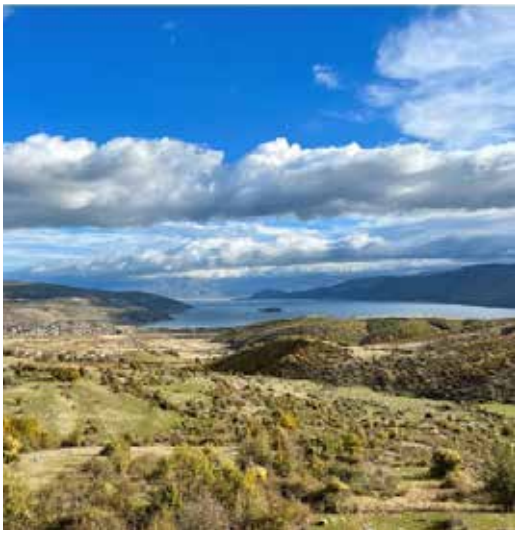
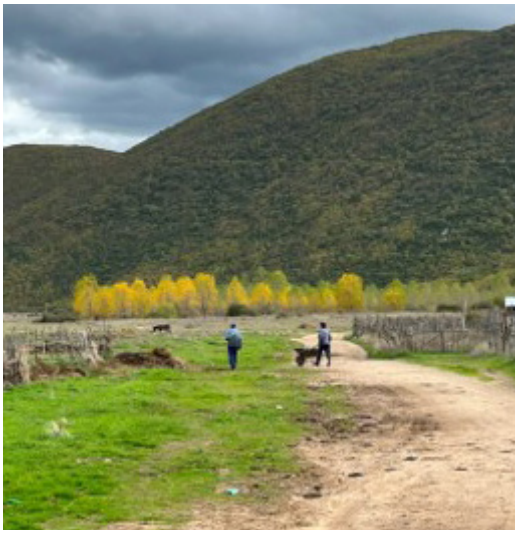


(b)

Fig.1. .Survey documentation: natural environment. (a) Pustec municipality, (b) Greek area, (c) North Macedonia area.

(a)



(b)

Fig.2. .Rural life and agriculture. (a) Albania, (b) North Macedonia, and (c) Greece.

al. 2010) The matrix also serves as a guideline for travel agencies to identify and propose more sustainable actions to their clients, promoting cultural understanding of the local population and offering unique and meaningful experiences.
A field survey was conducted in November 2023, which included visits to the surrounding areas of Albania, North Macedonia, and Greece, meetings with local authorities, and the organization of workshops. The goal of this survey was to gain a deeper understanding of the territory, the lifestyle of the local population, and the area's tourism potential, in order to support the development of a guidance matrix for responsible tourism implementation.
The survey focused on four main topics: the naturalness of the area (Figure 3); the rural lifestyle and agricultural nature of the region (Figure 4); existing tourism services and cultural heritage (Figure 5); and infrastructure (Figure 6). These elements were compared with the scientific literature to assess environmental threats and evaluate the feasibility of sustainable tourism strategies. This analysis led to the creation of a matrix, designed through a local survey and scientific evidence interpretation, to connect different types of activities and assess, through a visual representation, their potential impacts on this specific protected area. The matrix adopts a holistic approach, encouraging cross-border cooperation to establish a unified natural park recognized by UNESCO.

Survey Results and connection with literature

The survey aims to assess four key parameters of the analysis in the area: 1) Natural features of the landscape (Figure 2); 2) The agricultural and rural lifestyle (Figure 3); 3) The existing tourism services, natural hiking opportunities, and cultural heritage (Figure 4); 5) Infrastructure and transport connection (Figure 5).
Natural areas are the most vulnerable to the effects of mass tourism, which threatens local cultural identity, and degrades ecosystems. It often leads to the commodification of indigenous identities, historic rituals, and religious practices, while destroying biodiversity and natural landscapes (Akın 2021).
The agricultural tradition and respectful interaction with the environment make this region particularly suitable for the development of rural tourism. Rural

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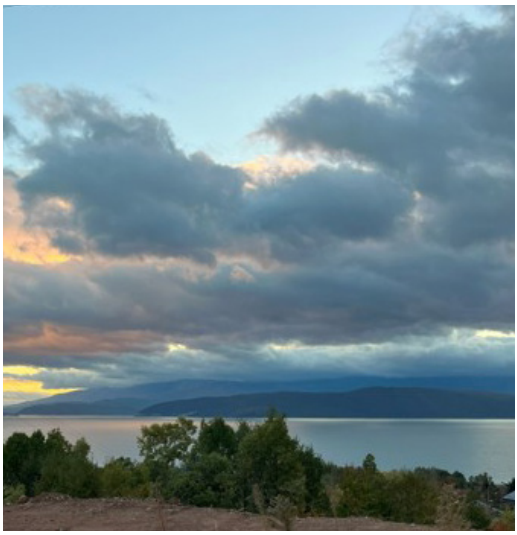

source/ author (2023)

(b)

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tourism focuses its concept in the interaction of tourists with the material characteristics of the countryside, together with the culture of the area, aiming to revitalize the area (Saparov et al. 2024). However, many areas lack adequate infrastructure, such as hotels, road networks, and public transport, making access tricky; together with challenges in rural communities adaptation of these new changes (Saparov et al. 2024), which highlights the importance of controlling investment and activities in order to create the infrastructure needed in balance with the social, economic and environmental aspects (Middleton and Stabler 1997; WTO 2004). Surveyed services include: Churches and traditional villages (Figure 4a); Traditional restaurant and typical lake cuisine (Figure 4, b.2, c.2); Equipped beaches (Figure 4, b.2); Hiking trails (Figure 4, c.1).
While heritage villages offer cultural and architectural value that can attract diverse tourists (Zhang, Wei, and Nie 2022), they are highly vulnerable to pollution, overdevelopment, and resource exploitation caused by mass tourism, endangering both their authenticity and sustainability (Zhang et al. 2022). Similarly, service beaches, if not properly managed, could attract mass tourism and result in overuse. By contrast, hiking and local restaurants can enhance tourists' experience without harming the environment. According to Torabi et al. (Torabi et al. 2025), environmental interpretation significantly strengthens the link between tourists and local operators, increases tourists' awareness and engagement. These evidences align with previous research highlighting the role of interpretation in converting environmental intentions into responsible tourism behaviors (Ballantyne and Packer 2011). Tourism activities, energy sources account for nearly 100% of the environmental impact, and it is a predominant component also in the water scarcity component, in which water consumption contributes 23% (Campos et al. 2023). Tourist accommodation, as well, has a crucial environmental impact, in particular, food and beverage consumption ranging from 32% and 77% (Campos et al. 2023). These data enlighten once again the need for accurate tourist planning.The current infrastructure in the region is a light structure that would not stand the arrival of mass tourism. This helps preserve the surrounding environment by protecting the social, environmental, and landscape integrity. However, the Korça region lies relatively close to two of the EU corridors, specifically the 10th (from Salzburg/Budapest to Belgrade, Nis, Thessaloniki/Igoumenitsa) and the 8th (from Varna/Burgas to Sofia, Skopje, Tirana, Durres). If transport and infrastructure investments are managed carefully, the area could achieve better connectivity with suppliers and tourists without

Fig.3. .Survey documentation: existing services for tourism and cultural heritage. (a) Albania, (b) North Macedonia, and (c) Greece.

collapsing existing systems or requiring invasive new developments aimed at mass tourism. Instead, developing a circular lake route connecting Albania, North Macedonia, and Greece could enhance regional accessibility while supporting the creation of a cross-border protected park without physical boundaries.The absence of a railway system is notable, but it presents an opportunity: a sustainable train connection could reduce environmental impact and improve access to the region.
As noted by Campos et al. (Campos et al. 2023), transport is one of the leading contributors to tourism's environmental footprint, requiring substantial energy, land, and resources (Gössling 2002).

Matrix Development

Based on the considerations developed so far, the matrix was created using all the parameters developed in Table 1 and derived from the field survey. It is intended to mantein a broader perspective when planning tourism development; in fact, often, the need for balance is overlooked in the rush to attract tourists, leading to fragmented analysis focused only on one of the three main aspects. The matrix is designed to be read systematically by intersecting pairs of selected parameters. This approach allows users to assess whether and how an activity/service/transport investment might affect the balance between social, economic, and environmental dimensions (Middleton and Stabler 1997; WTO 2004). The goal is to avoid the simplistic judgments that label intervention as inherently "good" or "bad". Instead, the matrix provides a nuanced scale that aims to scale the interventions and enables more informed decision-making. For instance, rather than investing solely in highway connections to the area and then taxi/private hire of cars and boats, the matrix suggests considering balanced solutions such as railway (in the future), public transport, or non-motorized rental options. This compromise acknowledges that tourism will inevitably arrive and must be managed responsibly. In addition, the categorisation of tourism interventions into services, activities, and transport allows for a cleaner understanding of the consequences of each decision, promoting a more holistic planning approach. The methodology can be replicated and adapted in other regions, and the matrix can be expanded with new activities, especially those emerging from participatory engagement with local communities.
The matrix was developed by classifying selected tourism activities – derived from common tourism practices – and analysing them through seven key indicators (Table 1).

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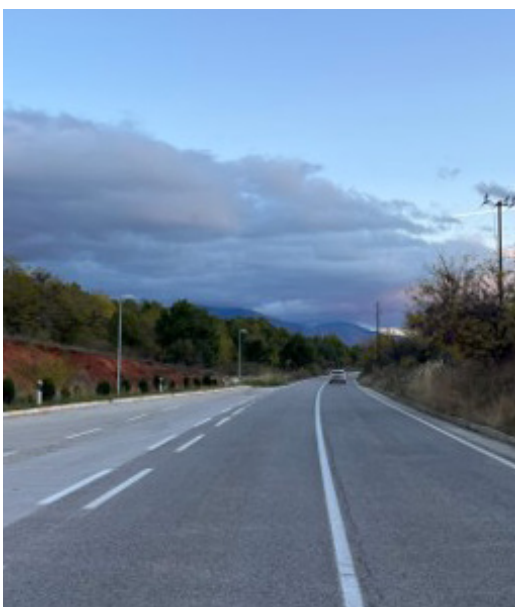

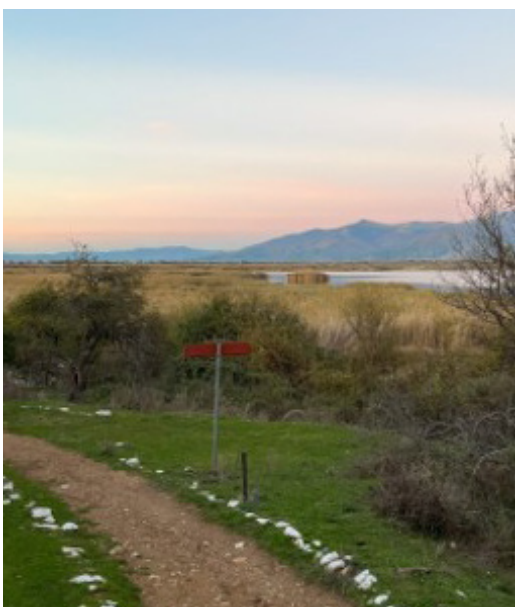

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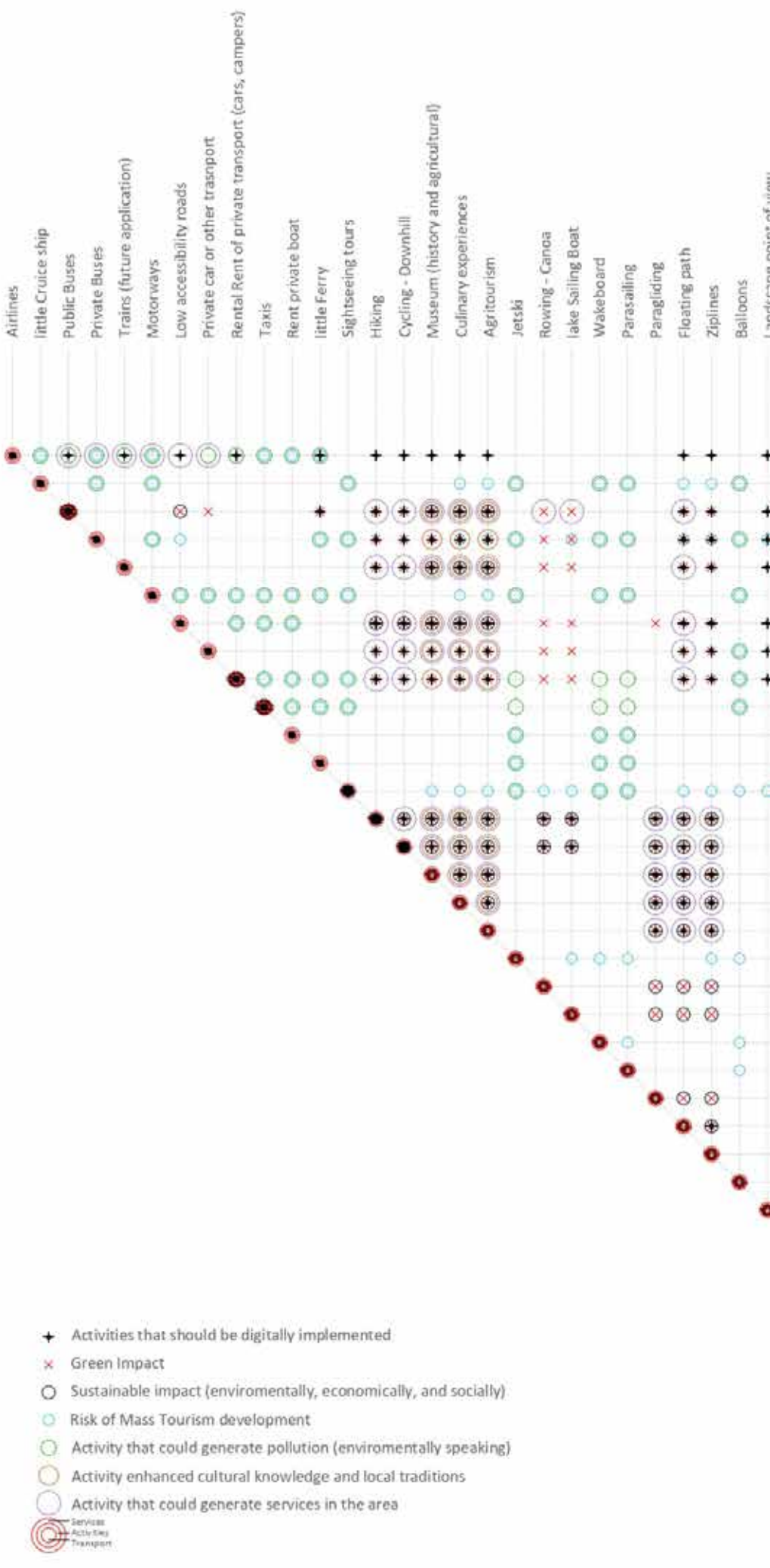

Fig.4. .Matrix of intervention. Scale the impact actions for tourism interventions.

source/ author (2023)

No	Symbol	Action	Description and Assignment parameters
01		*S/A/T*	*Categorises each action as either a Service (e.g., accommodation, restaurants), Activity (e.g., cultural or leisure experiences), or Transport (means by which tourists travel).*
02		*Activities that should be digitally implemented*	*Actions that would benefit from digital tools for promotion or management (e.g., tourist planning, group coordination), helping to easily access information and promote the area initiatives, and select the type of tourist the authorities want to attract.*
03		*Green Impact*	*Activities with a positive or neutral effect on the environment, causing no pollution, waste, or ecological losses or harm.*
04		*Sustainable Impact*	*Defined according to the WTO and Middleton et al. frameworks (Middleton and Stabler 1997; WTO 2004), including environmental, economic, and social dimensions. Activities that benefit social, economic, and environmental aspects without evident risks of mass tourism development.*
05		*Risk of Mass Tourism development*	*Actions, investments, activities, or services which, if not size-controlled, might lead to mass tourism of the areas with important consequences on cultural, social, and environmental losses.*
06		*Activity that could generate pollution*	*Action, investments, activities, or services that, if not size-controlled, might lead to air/water and land pollution of the area, waste management problems with consequences on tourism activities, and biodiversity losses.*
07		*Activity able to enhance cultural and traditional knowledge*	*Action, investments, activities, or services that have the potential to be used for the cultural enrichment of tourists and keeping alive local traditions, fostering cultural exchange and appreciation, without evident threat to local traditions.*
08		*Activity that could generate services in the area*	*Action, investments, activities, or services that may stimulate service development (e.g., accommodations, transports, wellness*), with the caveat that poor management could harm traditional architecture and local identity.*

Tab. 1: Matrix indicators. *source/ author (2023)*

Conclusion and Recommendations

The matrix provides a preliminary overview of tourism activities and their alignment with sustainability goals in Pustec Municipality and the Prespa Lake area. It is designed to support future participatory decision-making processes involving local communities and municipal authorities across borders. Rather than evaluating individual actions in isolation, the matrix considers the cumulative impact of various activities, helping to scale interventions appropriately and assess their social, environmental, and economic implications. Following the methodological framework and criteria detailed in Table 1, the matrix can be adapted and personalized through local dialogue, encouraging collaborative planning that reflects the specific needs and values of the region. Its use is particularly recommended within participatory processes to foster Pro-Environmental Behaviour (PEB) (Huo et al. 2025), which is especially impactful in rural areas (Wang et al. 2018).However, several limitations should be acknowledged. The indicators and activities included were selected based on the available literature and field survey data. As such, the matrix may exclude relevant activities or impacts not identified during the research. Additionally, although the guidelines are generally applicable, the tool is context-specific, developed for the unique geographic, cultural, and ecological features of the Pustec Municipality and Prespa Lake, and may require adaptation or a new survey before being blindly applied in other contexts.

This matrix is intended as a holistic tool, not a stand-alone solution. It should be complemented by more specialised instruments, such as Life Cycle Assessment (LCA) for environmental impacts, or socio-economic/cost-benefit analysis, to ensure comprehensive planning. Future research should aim to refine and expand indicators based on stakeholder input and empirical data, and to test the matrix in similar rural contexts.

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