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OPENNESS TO EXTERNAL COLLABORATIONS AND SUSTAINABILITY PRACTICES IN TOURISM FIRMS

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ABSTRACT

THIS STUDY EXAMINES THE RELATIONSHIP BETWEEN OPENNESS TO EXTERNAL COLLABORATIONS AND THE ADOPTION OF SUSTAINABILITY MANAGEMENT PRACTICES IN TOURISM MICRO-FIRMS. WE CONSIDER THE VARIETY OF PARTNERS INVOLVED IN THE RELATIONSHIPS, THE GEOGRAPHICAL OUTREACH OF THE RELATIONSHIPS AND THE INTENSITY OF THE RELATIONSHIPS. A SURVEY TARGETING TOURISM MICRO-FIRMS OPERATING IN THE ITALIAN ALPS WAS USED TO GATHER DATA FOR THIS STUDY. THE RESULTS SHOW THAT A GREATER DIVERSITY OF SUSTAINABILITY PRACTICES IMPLEMENTED IS RELATED TO A HIGHER OPENNESS TO COLLABORATIONS WITH EXTERNAL STAKEHOLDERS. HOWEVER, SOME DIFFERENCES EMERGED WHEN ANALYZING SOCIAL AND ENVIRONMENTAL PRACTICES INDIVIDUALLY. THIS STUDY ADDS TO THE BODY OF KNOWLEDGE ON SUSTAINABILITY IN THE CONTEXT OF MICRO-FIRMS IN THE TOURISM INDUSTRY, WHICH HAVE RARELY BEEN EXAMINED ON THEIR OWN. MOREOVER, IT RESPONDS TO REQUESTS FOR MORE COMBINED STUDIES OF ENVIRONMENTAL AND SOCIAL MANAGEMENT STRATEGIES FOR SMALL BUSINESSES.

KEYWORDS: rural tourism; sustainability; tourism micro-firms; sustainability practices; environmental management; social management

1. INTRODUCTION

The implementation of sustainability practices in tourism plays a crucial role in for maximizing benefits and reducing the adverse effects on natural environments, wildlife and natural resources. Sustainable tourism development and management contribute to cultural preservation, employment generation, financial progress, and overall socio-economic expansion (United Nations World Tourism Organization, 2018). This aligns with the tourism sector's specific mention in three Sustainable Development Goals of the 2030 Agenda for Sustainable Development, respectively in SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production) and SDG 14 (Life Below Water). Indeed, tourism is advocated as a means to foster sustainability practice that create employment opportunities and promote inclusive growth, while guaranteeing suitable working conditions for individuals employed (SDG 8). Further, emphasis is placed on promoting sustainable tourism practices aimed at reducing waste, mitigating pollution and safeguard the ecosystems and encouraging responsible utilization of resources, thereby mitigating the environmental impact associated with tourism activities (SDG 12 and 14).

Literature on sustainable tourism has highlighted the significance of rural tourism settings, where firms have access to distinctive “rural” assets, including mountains, farms and local culture. By leveraging these cultural and natural resources effectively, firms can craft and deliver unique value to tourists, boost rural income, and address environmental and social issues, such as pollution, unequal distribution of benefits, and cultural erosion (Lee et al., 2021; Yachin & Ioannides, 2020).

Mountains, characterized by low population density, scenic landscapes, and traditional social structures, are ideal settings for rural tourism (Sharpley, 2002; Madanaguli et al., 2023). However, they are also highly vulnerable to the negative impacts of human activity; therefore, the development

of mountain tourism requires a sustainable approach, that promotes local economies, preserves cultural identities, and ensures a balanced use of resources (Romeo et al., 2021; Martínez et al., 2019). There is a growing interest across both public and private sectors to enhance the sustainability of tourism, with mountain regions emerging as promising targets for green investments (Romeo et al., 2021). However, in spite of the recognition of sustainability within mountain tourism and the pressures exerted by external actors towards sustainable behavior, research attention remains lacking in this area.

Furthermore, despite much attention has recently been paid to the adoption of sustainability management practices in the context of tourism small and medium-sized enterprises (Johnson, 2015; Burrows & Rozier Rich, 2016; Alonso-Almeida et al., 2018; Buffa et al., 2018), few studies have focused on micro-enterprises, which comprise most of the tourism and hospitality sectors, especially in rural areas such as mountain destinations (Agyeiwaah, 2019; Yachin, 2021).

Tourism micro-firms, particularly those situated in rural areas, encounter unique challenges in adopting sustainability practices. These challenges stem not only from limitations in resources, time constraints, and underdeveloped capabilities in key business areas, but also from the absence in the proximity of supporting bodies, adequate infrastructures, and possible collaboration partners with specialized sustainability knowledge and resources (Ates & Ates, 2019; Ristic et al., 2019; Yachin & Ioannides, 2020 Kelly et al., 2020). Moreover, since they receive less public attention compared to larger firms (Sánchez-Medina et al., 2016), many micro-firms are unaware of the tourism industry's role in intensifying global environmental concerns and their contributions to this issue (Kornilaki et al., 2019).

This study addresses a literature gap concerning the significance of openness to collaborations with external stakeholders in facilitating the implementation of sustainability management practices in the context of rural tourism micro-firms. Literature on tourism sustainability has emphasized the positive role of external stakeholders in promoting sustainability adoption and overcoming associated challenges; however, these studies relied on qualitative methodologies (Journeault et al., 2021; Boiral et al., 2019; Khattel et al., 2020) or did not analyze the direct relationship between collaborations and adoption of environmental and social management practices (Islam et al., 2020; Martínez-Martínez et al., 2019; Collins et al., 2007).

This work explores the relationship between different types of openness to collaborations with external stakeholders and sustainability practices adoption, to fill this gap. In particular, we investigate whether increasing the variety of external stakeholders involved in collaborative relationships and the intensity of the interactions, will increase the number of practices adopted. Indeed, each sustainable management practice may necessitate specific expertise, which could be complemented by different collaborative partners. Further, we considered the frequency of the relationships to analyze how intensive knowledge exchange can contribute to adopting the practices. Given the different social and environmental sustainability characteristics, we investigate how different types of openness affect them.

Data for this study were collected through a survey addressing micro-business operating in alpine rural tourism destinations in Italy and analyzed through ordinal generalized linear models.

The findings suggest that a higher number of sustainability practices are adopted as tourism micro-firms increase their collaborative efforts towards a larger variety of external stakeholders. .

Moreover, the variety of external stakeholders involved in collaborations and the higher geographical outreach of those relationships benefit the adoption of more environmental practices since they allow firms to access an extensive knowledge source.

On the other hand, a higher frequency of interactions with external stakeholders and establishing collaborations at the local level encourage the adoption of social management practices. Engaging locally and intensively enhances trust among the members of local networks, effectively disseminating knowledge, raising awareness, and mobilising support for sustainable behaviours by leveraging existing social ties and networks.

2. LITERATURE BACKGROUND

2.1 ADOPTION OF SUSTAINABILITY PRACTICES IN TOURISM MICRO-FIRMS: MOTIVES AND CHALLENGES

The patterns of implementation of sustainability practices within the tourism and hospitality industry have garnered increasing attention recently (Cantele & Cassia, 2020; Alonso-Almeida et al., 2018; Buffa et al., 2018; Agyeiwaah, 2019; Perramon et al., 2022).

A primary catalyst driving the adoption of sustainability management practices in the tourism context is the recognition of the pivotal role of quality in enhancing customer satisfaction. This acknowledgment becomes increasingly relevant as tourists perceive an increase in service value from destinations boasting natural resources, local attractions, gastronomy, and green products, all while seeking affordability, reliability, and facilitated connections (Liu et al., 2023; Ruhanen et al., 2015).

This trend is particularly conspicuous in rural areas, where there has been a notable surge in demand, further compounded by the impacts of the COVID-19 pandemic (Vaishar & Šťastná, 2022). In response, rural tourism has demonstrated adeptness in adapting to these evolving demand dynamics in the effort to embrace environmental and social sustainability management practices proactively in their daily routines (Juschten & Hössinger, 2021).

Micro-enterprises play a crucial role in rural tourism (Komppula, 2014), serving as catalysts for local development, providing the majority of customer experiences, and maintaining strong ties to specific areas (Cunha et al., 2018). Despite their prevalence in the tourism and hospitality sectors, especially in rural settings, micro-enterprises have received limited attention in sustainability management research (Agyeiwaah, 2019). Furthermore, although recent literature has begun to investigate the distinctive features influencing the adoption of sustainability practices in small and medium-sized tourism enterprises (Alonso-Almeida et al., 2018; Garay and Font, 2012; Garay et al., 2017), the focus has been put on environmental management practices (EMP) , such as waste recycling, the adoption of energy-efficient and water-saving technologies or utilizing alternative energy sources, while less emphasis has been put on the adoption of social management practices (SMP) focusing on the well-being of individuals and the community (Moldan et al., 2012), such as promoting local heritage conservation, fostering social equality, and access to job opportunities (Alonso-Almeida et al., 2018; Bagur-Femenèas et al., 2015; Font et al., 2016; GRI, 2006).

While the literature on small and medium-sized tourism enterprises is primarily focusing on the transition from quality management systems to environmental management systems (Alonso-Almeida et al., 2011; 2018), as well as on the specificities of corporate social responsibility frameworks in SMEs compared to large enterprises (Lee and Park, 2009; Lee et al., 2012), the case of micro-enterprises is notably distinct.

This is because both the nature of micro-firms' management practices and the unique challenges they face originate from inadequacy of internal resources and inherent liabilities (Aldrich and Auster, 1986) forcing them to operate under severe time, financial and expertise constraints (Tzschentke et al., 2008).

Furthermore, the exploitation of external opportunities and the development of adaptive responses in tourism micro-firms are constrained by their frequent localization in rural areas (Phillipson et al., 2004). This "overembeddedness" in a local context may further limit their access to relevant external knowledge, expertise and complementary assets, and the development of internal capabilities (Czernek-Marszałek, 2020). Essentially, due to the identification between owners and their businesses and the absence of a structured decision-making process, micro-firms heavily rely on the values of owner-managers and their competences in allocating resources towards internal capability development (Kelliher & Reinl, 2009). As a result, external *stimuli* are sometimes necessary to prompt the adoption of sustainability management practices.

In tourism micro-firms, where operational capacities are predominant, the adoption of sustainability management practices is foremost impeded by a lack of specialized human resources,

inadequate knowledge and skill sets (Kelly et al., 2020; Khatter et al. 2020). Time, and resources constraints represent the major barriers to get control over relevant technical knowledge, EMP are often perceived as potential disturbances to daily operations, diverting attention from core activities. One of the reasons for the reported low adoption of environmental sustainability practices in smaller firms is that a substantial portion of them remain unconvinced about the importance of addressing environmental and social issues (Johnson, 2015), being unsure of the benefits to be gained (Burrows & Rozier Rich, 2016) and not aware of how their own business can contribute to global issues (Kornilaki et al., 2019). In addition, as smaller firms receive a lower level of public attention, they do not perceive high institutional pressure for the implementation of SMP (Sánchez-Medina et al., 2016).

In the context of small and micro-firms, external incentives can significantly influence the initiation of sustainability management practices (Testa et al., 2016). Recent literature highlights the positive impact of external stakeholders in promoting the adoption of environmental and social management practices, facilitating the resolution of associated challenges (Journeault et al., 2021; Boiral et al., 2019; Khattel et al., 2020; Collins et al., 2007).

Customers, suppliers, competitors, public entities, intermediaries, and other companies outside the area can serve as valuable sources of knowledge for the adoption of environmental sustainability practices in smaller firms by sharing technical expertise, providing specialized information, or offering mentoring (Gombault and Versteege, 1999; Hillary, 1999; Fernández-Viñé et al., 2010). For instance, Islam et al. (2020) and Martínez-Martínez et al. (2015; 2019) argue that intermediaries and knowledge agents play a crucial role in stimulating the development of sustainable tourism services through collaboration with firm owners and managers.

Similarly, local society plays a primary role in promoting the adoption of social sustainability practices in smaller firms. Small tourism businesses engage in daily interactions with family members, local communities, business associates, authorities, and clients. Collaborations with external entities offer notable advantages, particularly potential access to skilled human resources and other external assets related to innovation. Literature on sustainable tourism identifies tourists, local inhabitants, government officials, and small and medium-sized tourism entrepreneurs as four key drivers of sustainable tourism development (Su et al., 2018). Indeed, the perceptions of local stakeholders' interests by tourism firms have been recognized as drivers of adopting social sustainability practices (Sánchez-Medina et al., 2016).

Based on these arguments, we contend that openness to collaborations with external stakeholders represents a key driver of adoption of sustainability practices in tourism micro-firms.

H1. *The adoption of sustainability practices in tourism micro-firms is positively related to their openness to collaborations with external stakeholders.*

However, we argue that different types of openness are relevant when considering both the environmental and social dimensions.

2.2 OPENNESS TO EXTERNAL COLLABORATIONS AND ADOPTION OF ENVIRONMENTAL SUSTAINABILITY PRACTICES

The successful introduction of EMPs imposes broad knowledge requirements, which are challenging for small and micro-firms to fulfill internally and to procure from a singular or limited number of external stakeholders (Ghisetti et al., 2015).

A growing body of literature underscores the significance of collaboration with different external stakeholders in mitigating resource and knowledge constraints in tourism micro-firms. This perspective emphasizes that a variety of external stakeholders can contribute to micro-firms' efforts by sharing expertise, providing specialized information, or offering mentoring, thereby assisting in

overcoming specific knowledge challenges (Journeault et al., 2021; Boiral et al., 2019; Khattel et al., 2020; Collins et al., 2007).

Given the substantial transformations in the competitive landscape of tourism micro-firms and the lack of specialized human resources, external relationships become crucial for identifying and leveraging relevant technical knowledge and expertise on environmental sustainability (Kelliher et al., 2018; Yachin, 2021). Indeed, although significant knowledge may already be present within the firm, the search, assimilation and integration of external knowledge may be necessary to stimulate learning dynamics (Barney, 2001).

In the tourism context, the implementation of EMPs encompasses a variety of simple measures and ad-hoc actions, each with different enabling conditions, including specialized knowledge, infrastructures, tax incentives and subsidies to sustain the investment over time (Kasim et al., 2014; Hatem et al., 2010; Pace, 2016; Buffa et al., 2018). Consequently, some EMPs are more "accessible" than others to small and micro-firms, depending on the complexity of the knowledge requirements to evaluate diverse technology options and facilitate informed decision-making processes. For instance, Buffa et al. (2018) demonstrate that the adoption of infrastructural EMPs -such as installation of solar or photovoltaic panels- in small and medium hospitality firms is highly related to firms' access to subsidies to sustain the investment over time. Knowledge from engineering consulting firms has been found to play a crucial role in the adoption of energy efficiency measures (Pace, 2016). Regarding water management in the tourism industry, technological and financial knowledge is needed as well as managerial capacities to obtain commercial benefits (Kasim et al., 2014). Networks of small tourism firms and local authorities are considered as a solution to address technical and economic challenges connected with waste management in small tourism firms. Hatem et al. (2010) and Islam (2020) underscore the imperative for active collaboration among firm owners and stakeholders from both public and private sectors for adopting EMPs, aiming to improve efficiency through optimal utilization of resources.

In summary, eco-innovative endeavors in tourism necessitate accessing a greater array of external knowledge sources and information compared to other types of innovations (Horbach et al., 2013). Specifically. in the case of micro-firms, sourcing knowledge from a variety of external stakeholders is crucial to identify potential opportunities, gain a comprehensive understanding of the processes, simplify the identification of costs associated with each activity, prioritize the adoption of EMPs, and leverage them internally (Gherhes et al., 2016). From a knowledge management perspective, the development of relational capacities involving search, collaboration and knowledge sourcing from various external stakeholders enables to develop a roadmap for the implementation of EMPs and assists owners-managers in prioritizing initiatives (Lee et al., 2010; Li et al, 2008). Based on these arguments, we hypothesize that openness to a broad range of external environmental knowledge sources enables micro-firms to overcome obstacles to the adoption of EMPs.

H2: *The adoption of EMPs in tourism micro-firms is positively related to the breadth of collaborations with external stakeholders*

Collaborations with external stakeholders become crucial for micro-firms operating in geographically dispersed contexts (Ates & Ates, 2019; Yachin & Ioannides, 2020; Ristic et al., 2019). Rural tourism enterprises, reliant heavily on their surrounding natural environment, are incentivized to preserve their region's natural heritage (Carlsen et al., 2001). While local embeddedness ensures the survival of tourism micro-firms (Brouder & Eriksson, 2013) and fosters the adoption of EMP (Kallmuenzer et al., 2018), it may also constrain access to external knowledge assets.

The limited exposure of micro-firms to technical and market knowledge and expertise on environmental sustainability due to their "overembeddedness" in local contexts restricts their search processes and access to external ideas and opportunities, limiting access, exchange and integration of relevant knowledge (Czernek-Marszałek, 2020). Challenges to EMP implementation in rural tourism include the absence of supporting bodies (Ates & Ates, 2019), inadequate waste management

infrastructure (Ristic et al., 2019), and a lack of local collaboration partners (Yachin & Ioannides, 2020). Moreover, the absence of significant tourism players, such as intermediaries, and local authorities (Kornilaki et al., 2019) negatively influences micro-firms' perception of their capacity for sustainability engagement (Kornilaki et al., 2019).

Relying solely on local resources may then hinder EMP adoption in tourism micro-firms operating in rural areas, necessitating a broader knowledge search strategy beyond the local context. Previous studies underscore the importance of the geographical diversity in external stakeholder networks to mitigate lock- in effects resulting from overembeddedness (Biconne et al., 2023; Brandão et al., 2019; Pikkemat, 2019). A broader geographical reach in external collaborations offers advantages such as access to novel ideas and complementary resources, reduced costs and risks in innovation implementation, expansion into new markets, and an enhancement overall competitiveness (Kapetaniou & Lee, 2019).

Hence, in the realm of environmental sustainability, particularly for tourism micro-firms situated in remote regions, the willingness to collaborate with stakeholders beyond the immediate vicinity proves to be highly advantageous.

H3. *The adoption of EMPs in tourism micro-firms is positively related to the geographical outreach of collaborations with external stakeholders*

2.3 OPENNESS TO EXTERNAL COLLABORATIONS AND ADOPTION OF SOCIAL SUSTAINABILITY PRACTICES

The adoption of SMPs hinges primarily on engagement with the community in which firms operate, and is achieved through the development shared objectives and purposive knowledge exchange with external stakeholders (Alonso-Almeida et al., 2018; Garay & Font, 2012; Jenkins, 2006). Some studies have demonstrated that SMPs adopted by small firms, when compared to large firms, are more streamlined and less strategic (Font et al., 2016; Garay & Font, 2012).

For instance, Jenkins (2006) analyzed small firms' social behaviour and found that they believed that to accomplish social goals, they would need to primarily support the local economy and community by employing people and being profitable. Furthermore, studies on small tourism firms have shown that SMPs were often related to employee's well-being and training (Dodds & Kuehnel, 2010). Regarding external activities, small firms prefer local activities, such as involvement with local charities (Dincer & Dincer, 2013). For example, Garay and Font (2012) have observed that the most adopted SMPs by small and medium accommodation enterprises were related to the support of local development and heritage conservation.

The adoption of the abovementioned practices requires less specialized knowledge compared to EMPs. Indeed, social practices are typically learned through socialization processes and may not require in-depth scientific or technical knowledge. In exploring the social dimension of sustainability, the quest for external knowledge is rooted in the cultivation and preservation of common values and mutual trust, facilitated by intensive and recurring interactions aimed at sharing refined knowledge and enabling learning mechanisms (Ghisetti et al., 2015; Goodland and Daly, 1995). Moreover, in the context of small firms, some studies have found that motivation for sustainability actions is stirred by altruistic and social capital reasons instead of commercial reasons (Font et al., 2016; Garay & Font, 2012).

Social capital theory provides a comprehensive framework for understanding micro-firms' engagement in SMPs (Perrini, 2006; Tsai and Ghoshal, 1998), emphasizing the value of intangible resources accessible through the owner's network of relationships. Specifically, the implementation of SMPs is significantly enabled by the relational dimension of social capital (Nahapiet and Ghoshal,

1997). The development of relational capital plays a pivotal role in enabling knowledge exchange processes as it underpins mutual trust (Goodland and Daly, 1995; Mu et al. 2008).

Up to this point, Strazzullo et al. (2023) propose that fostering enduring relationships with external stakeholders motivates firms to pursue a diverse array of social responsibility initiatives. To fully leverage the advantages of external collaboration for social sustainability, companies are encouraged to adopt medium to long-term strategies. This involves identifying reliable partners, and allocating resources toward establishing effective engagement and mutual interaction mechanisms.

The development of interdependencies with external stakeholders emerges as a pivotal asset in the implementation of SMPs. By fostering "relational rents" among partners, alignment of knowledge and expectations is facilitated, leading to the development of mutual trust through sustained interactions (Dyer & Singh, 1998). Intensive and repetitive engagements result in the development of routines for knowledge sharing, mutual learning mechanisms, and the formation of relational norms among partners. To foster trust-building mechanisms, partners must acquaint themselves with each other, share values and business culture, align incentives and cultivate effective communication channels, thereby fostering confidence and mutual understanding (Beritelli, 2011; Gonzalez-Moreno et al., 2019). Positive and intensive interactions have been shown to continually enhance trust among actors in tourism networks (Kelliher et al., 2018).

Given the significance of establishing robust relationships with external stakeholders based on trust and legitimacy, we hypothesize that the intensity of collaboration with external stakeholders positively influences the adoption of SMPs.

H4. *The adoption of SMP in tourism micro-firms is positively related to the intensity of collaborations with external stakeholders*

Small firms prioritize social practices focused on interactions with employees and the community in which they operate (Jenkins, 2006). Moreover, Alonso-Almeida (2012) observed that small tourism companies enhance their public image when actively engaged with the local community.

The perception of a rural destination as "socially responsible" hinges on the collective, socially responsible actions of all public and private actors involved in its development (Su et al., 2018). In this sense, implementing SMPs at the destination level necessitates a shared understanding and coordinated efforts among all pertinent stakeholders, working collaboratively toward a common goal that benefits local society.

Small firms are embedded in their local societies, as evidenced by the tendency of their owner-managers to come from the same geographic area as their business, employ residents and collaborate with local suppliers (Kornilaki and Font 2019; Darnall et al., 2010). Some have argued that these firms are inclined to experience social duties due to their integration within the local community with shared or common norms (Darnall et al., 2010). Indeed, small firms have been observed to conform or mimic the behaviour of significant local stakeholders due to their embeddedness (Lepoutre & Heene, 2006). Nevertheless, Kornilaki and Font (2019) found that in the context of small tourism firms, the adoption of SMPs was not primarily driven by their explicit recognition and endorsement of social sustainability principles. Instead, these behaviours were dictated by their shared socio-cultural values deeply integrated into their community. For example, Abaeian et al. (2019) reported that most managers of independent hotels that have been interviewed agreed that it is a moral obligation to "give back" to the community through charity and community involvement initiatives.

Hence, in the context of social sustainability, community embeddedness can play a pivotal role in shaping attitudes, behaviours and decision-making processes related to sustainability practices. One of the primary ways community embeddedness facilitates the adoption of SMPs is through the transmission and reinforcement of social norms.

By being embedded in a local community, individuals can be exposed to norms that prioritize sustainability. Through social learning and conformity mechanisms, individuals align their behaviours with these norms, thereby contributing to the diffusion of sustainability practices. Moreover, community embeddedness fosters the accumulation of social capital, encompassing the resources embedded within social networks, such as trust, reciprocity and social support (Kelliher et al., 2018). Community-based interventions and grassroots initiatives can effectively disseminate knowledge, raise awareness, and mobilize support for sustainable behaviours by leveraging existing social ties and networks. In this context, Kallmuenzer et al. (2018) provided evidence of the importance of regional embeddedness, local networks, and reciprocity in sustainability decision-making in the context of family firms in rural tourism regions.

Thus, since social sustainability relies on active community and community engagement, which could be measured in terms of cooperation for local development and the firm's commitment toward territorial social issues (Cantele & Cassia, 2020), we hypothesize that collaborating with various stakeholders at local level positively influence the adoption of SMPs.

H5: *The adoption of SMPs is positively related to the local outreach of external collaborations.*

3. MATERIALS AND METHODS

3.1 SAMPLE AND DATA COLLECTION

The study relies on survey data collected between December 2021 and March 2022 on tourism micro-firms situated in Piedmont, specifically in the cross-border regions between Italy and France (namely, the Susa Valley, the Sangone Valley and the Pinerolo area), operating within the tourism value chain.

The classification of relevant economic activities was based on the NACE Rev.2 coding. The study considered the following industries: hospitality (NACE code 55); food and beverage services (NACE code 56); human transportation (NACE codes 49.1, 49.2, 49.3, 50.1, 50.3, 51.3); travel agencies, tour operators, other reservation services, and related activities (NACE code 79); entertainment, recreation and sports activities (NACE codes 90, 91, 92, 93), and local food production (NACE code 10). The target population encompassed 1,569 micro-firms operating in the tourism value chain as of December 2021. The survey was conducted through computer-aided telephone interviews spanning a three-month period.

Companies were contacted via telephone communication, during which the operator provided a comprehensive overview of the survey's objectives and key concepts outlined in the questionnaire. The initial inquiry focused on assessing each firm's willingness to participate in the survey. After multiple attempts, 897 companies from the sample were successfully contacted by phone. A total of 248 completed questionnaires were collected, resulting in a response rate of 27.65%. Out of these, 216 were considered valid for subsequent analysis. Table 1 presents the sample distribution by economic activity, size and age.

The survey incorporated 11 items addressing sustainability management practices, explicitly encompassing six items concerning Environmental Management Practices (EMP) and five items related to Social Management Practices (SMP).

Responding firms were required to evaluate, for instance, whether they had implemented measures to reduce waste at the source, to reuse waste materials, methods of energy production through renewable sources, or innovations aimed at water conservation) and/or practices of social responsibility, such as voluntary activities, subsidiarity, support for the welfare of the territory, service offerings accessible to target groups facing specific access conditions).

In a second section of the questionnaire, firms were asked to assess the intensity of collaborative relationships over the past three years. This assessment pertained to five distinct types of partners: with respect to a list of five different types of partners: SMEs, large companies, universities and research centers, government and public institutions, other entities.

Furthermore, firms were asked to gauge the geographical outreach of each collaboration, categorizing it as local, regional, national, international.

Table 1. Sample distribution by economic activity, size and age (n=216)

Economic activities	Size classes (%)				Total sample	Age (avg)
	0 (no employees)	1 to-2	3 to 5	6 to 9		
Accommodation	18.6	30.2	34.9	16.3	100.0	21.6
Food & Beverage	15.6	51.0	30.2	3.1	100.0	13.6
Recreation	36.0	24.0	32.0	8.0	100.0	21.6
Food Production	16.0	44.0	20.0	20.0	100.0	24.0
Transportation	50.0	30.0	0.0	20.0	100.0	18.9
Associations	20.0	40.0	20.0	20.0	100.0	7.8
Travel Agencies	16.7	75.0	8.3	0.0	100.0	20.8
Total	20.4	43.1	27.3	9.3	100.0	17.8

3.2 VARIABLES DEFINITION AND OPERATIONALIZATION

3.2.1 DEPENDENT VARIABLES

The three dependent variables represent count measures of the number of ESMP, EMP and SMP practices adopted by firms in the sample.

In line with previous empirical literature (Memili et al., 2018) N_ESMP denotes the total number of environmental management practices (EMP1-6) and social management practices (SMP1-5) adopted by firms.

Similarly, N_EMP and N_SMP were operationalized as the sum of environmental management practices (EMP1-6) and social management practices (SMP1-5) adopted by firms in the sample.

3.2.2 INDEPENDENT VARIABLES

The scope and the intensity of firms' openness to collaborative relationships with external stakeholders were regarded as the key predictors for the analysis.

In accordance with the predominant body of empirical literature in the field of open innovation, and drawing upon the metrics developed by Laursen & Salter (2006), we regarded firms' strategic choices on the scope (breadth) and the intensity (depth) of collaborative relationships with various types of external actors (SMEs, large companies, universities and research centers, government and public institutions, other entities) as indicators of openness, aligning with the perspectives outlined in studies such as Ghisetti et al., (2015); Gonzalez-Moreno et al., (2019); Strazzullo et al., (2023).

The construct BREADTH was formulated to denote the range of collaborative connections a firm establishes with external partners. It reflects the number of types of external partners engaged in collaborative efforts aimed at knowledge acquisition and exchange. At the firm level, items COLL1-COLL5 were coded as binary variables, with "0" indicating no relationship with a particular type of partner and "1" indicating the presence of a relationship with that partner, regardless of the collaboration's intensity. BREADTH was operationalized as the sum of these five binary variables. Consequently, a firm receives a score of 0 when no collaborative relationship exists with a specific partner, and a score of 5 when collaborative relationships are established with all partner types. BREADTH serves as a proxy for the extent of a firm's openness, operating on the premise that firms involved in collaborative relationships with a higher number of external partners exhibit a broader scope of external knowledge sourcing compared to those with fewer or no such relationships (Laursen & Salter, 2006:140).

Similarly, DEPTH is a measure of the number of external partners with whom a firm engages in high-intensity (more frequent) collaborative relationships. In this context, each of the five items (COLL1-COLL5) is assigned a code of "1" when the firm reported a high frequency of collaboration with the external partner, and "0" in the absence, low, or medium frequency of collaboration. Similar to the construction of BREADTH, DEPTH was derived by summing up the scores of the five items. Consequently, a firm receives a score of 0 when no high-intensity collaboration is in place, and a score of 5 when all collaborative relationships are characterized by high frequency of interaction (i.e. higher intensity of knowledge sourcing/exchange). The underlying assumption is that firms with a greater number of intensive collaborative relationships with external partners, aimed at knowledge sourcing and exchange are more 'open' in terms of depth compared to firms without such relationships. The internal consistency of the two constructs was confirmed by means of Cronbach's Alpha tests ($\alpha_{BREADTH} = 0.67$; $\alpha_{DEPTH} = 0.66$).

Moreover, at the firm level, four dummy variables were generated to capture the geographical reach of external collaborative relationships with the different actors (Local, Regional, National,

International). OUTREACH was formulated as the weighted mean of each firm's geographical extension of external collaborations, where values were assigned as follows: 1 = local, 2 = regional, 3 = national, and 4 = international.

3.3.3 CONTROL VARIABLES

Our hypotheses revolve around the relationship between the scope of external collaborative relationships and their intensity and tourism micro firms' inclination to embrace environmental and social sustainability management practices, respectively.

Consistent with the prevailing empirical literature, which strongly advocates the positive influence of human resources training on the adoption of sustainability practices (Coppola et al., 2022; Alonso-Almeida, 2018), and drawing from the open innovation paradigm, placing significant emphasis on a firm's internal absorptive capacity to effectively leverage knowledge acquired through external collaborations (Brunswicker & Van de Vrande, 2014; Leiponen & Helfat, 2010; Lopes et al., 2017), we introduced HRES as a control variable.

This variable is associated with employee training and serves to account for its potential influence on a firm's inclination (or preparedness) to adopt a greater number of sustainability practices. Specifically, HRES is represented as a binary variable, indicating whether the firm provided additional training to its employees in the preceding three years ("1") or not ("0").

Furthermore, to consider the influence of expedited and diversified access to external knowledge, as well as the potential benefits of frequent direct relationships in building social capital, as emphasized in previous research (Mu et al., 2008; Goodland and Daly, 1995, Tsai and Ghoshal, 1998; Gonzalez-Moreno et al., 2019), two control variables were introduced.

CONNECT was defined as a binary variable, indicating whether the firm possessed a high-speed connectivity ("1") or not ("0"). Simultaneously, URBAN was operationalized as a binary variable, assigned "1" if the firm was situated in an urban center and "0" otherwise, considering the relevance of agglomeration economies in tourism micro-firms' activities. Indeed, rural tourism literature individuated within significant barriers the lack of local actors available for collaboration (Yachin & Ioannides, 2020) and the absence of supporting bodies (Ates & Ates, 2019). Thus, we anticipate that the localization of the firm and the presence of adequate connectivity can affect the search for knowledge, the building of social capital and the implementation of ESMPs. Additionally, the age (AGE) and size (SIZE) of the firm were introduced as control variables, as well as seven industry dummies.

Descriptive statistics and the correlation matrix can be found in Table 2.

Table 2. Descriptive statistics and correlation matrix

	N	mean	sd	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) NumESMP	216	4,63	2,13	1							
(2) NumEMP	216	2,78	1,43	0,81	1						
(3) NumSMP	216	1,85	1,28	0,76	0,24	1					
(4) C_BREA~H	216	1,87	0,96	0,28	0,18	0,26	1				
(5) C_DEPTH	216	0,25	0,71	0,25	0,1	0,31	0,48	1			
(6) geoout~h	216	1,41	1,82	0,34	0,24	0,3	0,7	0,75	1		
(7) Age	216	17,84	18,14	-0,01	0,05	-0,07	-0,01	-0,07	-0,02	1	
(8) Size	216	2,3	2,09	0,14	0,04	0,19	0,08	0,12	0,15	0,1	1

3.3.4 EMPIRICAL STRATEGY

Our dependent variables were characterized as count data, displaying a small number of zeros and low overdispersion. Considering that the specific values of the dependent variables are of limited relevance for the analysis -except for larger values assumed to correspond to "higher" outcomes in terms of ESMP adoption- ordered logit models for N_ESMP, N_EMP, and N_SMP, in relation to the independent variables appeared appropriate for the analysis.

However, as the chi-squared approximate likelihood-ratio test of proportionality of odds was significant in our models -indicating that assuming equal error variances for all cases might be incorrect, potentially to inaccurate standard errors and biased parameters estimates- we conducted three ordinal generalized linear models (OGL), specifically heterogeneous choice models. These models employed a logit link function and were executed using the oglm package in Stata® 16.1 (Williams, 2010).

Heterogeneous choice models are applicable when the variance or variability of attitudes underlying a specific choice – in this case, the adoption of ESMP practices- is of substantive interest. This variability contributes to variations in error variances in the outcome variable, thereby violating the assumption of proportionality of odds. Utilizing OGL models enabled us to specify how the choice of adoption of a higher number of ESMP practices changed with covariates, taking into account the potential for heterogeneous choices arising from different underlying attitudes towards sustainability management practices, without assuming proportionality of odds.

Given the observed correlations, the continuous covariates were standardized to z-scores to mitigate potential multicollinearity issues (Cronbach, 1987). Standardizing with z-scores also facilitated the comparison of estimated coefficients by eliminating the influence of different units of measurement. Following standardization, all variables underwent evaluation for multicollinearity through variance inflation factors (VIF). While the literature suggests a maximum VIF of 5 (Rogerson, 2001), a VIF of 10 is generally acceptable. In our analysis, multicollinearity was not detected, as all VIF values fell below 2.

4. RESULTS

Table 3 presents the results of the analysis, where models 1 and 2 consider the number of ESMP adopted by tourism micro-firms (N_ESMP) as the dependent variable.

We observe a positive and significant association between the scope and intensity of firms' collaborative relationships with external partners and the probability of adopting a higher number of ESMP. Specifically, the coefficient for BREADTH is significantly positive in Model 1 ($\beta_{BREADTH}=0.635$, $p=0.000$) and Model 2 ($\beta_{BREADTH}=0.460$, $p=0.002$), where DEPTH is also included in the analysis ($\beta_{DEPTH}=1.042$, $p=0.005$). These results strongly support H1. Additionally, we find positive and significant coefficients for HRES ($\beta_{HRES}=0.891$, $p=0.001$) and CONNECT ($\beta_{CONNECT}=0.600$, $p=0.029$).

The association between openness to external collaborative relationships and the number of sustainability management practices adopted by tourism micro-firms is also significant across different typologies of ESMP.

Models 3-6 test the hypothesized differences between the type of openness to external collaborative relationships and the type of ESMP practices adopted. In more detail, Model 3, considering the number of environmental management practices (EMP) as a dependent variable, reveals a positive and significant coefficient for BREADTH ($\beta_{BREADTH}=0.483$, $p=0.003$), while the coefficient for DEPTH is positive but not statistically significant. This finding supports the contention that collaborative relationships aiming at external knowledge sourcing across a variety of external partners will favor the adoption of EMP in tourism micro-firms (H2). Model 4 tests the

relationship between the geographical outreach of external collaborative relationships and the probability of adopting a higher number of EMP practices (H3).

Model 4 reveals a strongly positive and significant probability of adopting EMP practices as the geographical outreach of external collaborative relationships increases (βOUTREACH=1.536, p=0.001). This result is reinforced by the fact that, in Model 4, the coefficient for BREADTH loses its significance and the coefficient of DEPTH is negative and weakly significant (βDEPTH=-0.872, p=0.091), emphasizing the importance of distance in sourcing knowledge through extensive relationships well beyond the local area for the adoption of EMP practices, especially those which are far from the firms' core business. In further support of this contention, the coefficient for URBAN is negative and significant (βURBAN=-0,674, p=0.037) indicating that a higher variety of collaborative relationships is particularly advantageous for tourism micro firms located in remote areas (i.e. not in a city or urban center). Additionally, the adoption of EMP seems to be characteristic of older and larger firms (βAGE=0.205, p=0.098; βSIZE=-0,221, p=0.094).

In Model 5, considering the number of social management practices (SMP) as the dependent variable, the coefficient of DEPTH is positive and significant (βDEPTH=1.310, p=0.002), supporting the hypothesis that collaborative relationships with external partners aimed at intensive knowledge exchange contribute to the adoption of social management practices (H4). Differently from models predicting the number of ESP adopted by tourism micro-firms, the coefficient for OUTREACH in the case of SMP adoption (Model 6) is negative but not significant. In the case of intensive relationships aimed at knowledge exchange the geographical distance has a negative role but we do not find statistical support to this contention.

To better investigate this issue, we construct three dummy variables specifying the if the maximum geographical outreach of external relationships being local (LOCAL_D), extends to the region to the national level (NATIONAL_D) or international (INTERNATIONAL_D). Models 7-8 test the influence of these variables in the two equations, predicting the number of EMP and SMP adopted respectively.

The dummy variable detailing the specifics of geographical outreach yields interesting results. In the case of EMP practices (Model 7), the coefficient increases with geographical distance, with NATIONAL_D being positive and statistically significant (βNATIONAL_D=0.720, p=0.084), while the coefficient of BREADTH does not assume relevance in the model. This leads to the conclusion that the geographical outreach of external relationships at the national level has a strong and positive association with the adoption of environmental management practices. Conversely, Model 8 shows a positive and significant coefficient for DEPTH (βDEPTH=2.366, p=0.000) and for the dummy indicating local relationships (βLOCAL_D=1.037, p=0.004) while the coefficient turns negative and not significant for relationships extending to the regional and international levels.

Table 3. Ordinal generalized linear (OGL) models (heterogeneous choices models) estimates.

Dependent variables	(1) N_ESMP	(2) N_ESMP	(3) N_EMP	(4) N_EMP	(5) N_SMP	(6) N_SMP	(7) N_EMP	(8) N_SMP
BREADTH	0.635***	0.460***	0.483***	0.163	0.231	0.235	0.236	-0.085
DEPTH		1.042***	0.343	-0.872*	1.310***	1.323**	-0.237	2.366***
OUTREACH				1.536***		-0.017		
LOCAL_D							0.316	1.037***
NATIONAL_D							0.720*	-0.123
INTERNATIONAL_D							1.004	-0.591
HRES	0.875***	0.891***	0.558**	0.545**	0.851***	0.850***	0.553**	0.803***
CONNECT	0.539**	0.600**	0.485*	0.451	0.410	0.411	0.469*	0.396
URBAN	-0.460	-0.575**	-0.668**	-0.674**	-0.324	-0.324	-0.665**	-0.439

AGE	0.008	0.043	0.202	0.205*	-0.073	-0.073	0.198	-0.050
SIZE	0.019	-0.032	-0.183	-0.221*	0.167	0.167	-0.217	0.170
Industry dummies	YES	YES	YES	YES	YES	YES	YES	YES
/cut1	-3.562***	-3.743***	-0.842	-1.125	-3.182***	-3.180***	-0.336	-3.377***
/cut2	-1.749*	-1.918**	0.607	0.355	-1.301	-1.299	1.125	-1.446
/cut3	-0.747	-0.891	2.320**	2.103**	-0.032	-0.030	2.850***	-0.129
/cut4	0.382	0.259	3.629***	3.451***	1.077	1.079	4.177***	1.024
/cut5	1.195	1.084	5.308***	5.229***	3.529***	3.533***	5.908***	3.590***
/cut6	2.200**	2.112**	6.818***	6.764***			7.416***	
/cut7	2.989**	2.928***						
/cut8	4.016***	3.985***						
/cut9	5.629***	5.664***						
/cut10	7.534***	7.605***						
N	216	216	216	216	216	216	216	216
Mc Fadden R2	0.093	0.102	0.141	0.071	0.074	0.074	0.134	0.091
Mc Fadden's Adj. R2	0.046	0.052	0.090	0.019	0.021	0.018	0.076	0.030
LR test	86.371***	94.53***	106.31***	49.08***	50.64***	50.64***	101.32***	62.46***
Akaike crit. (AIC)	884.61	878.45	687.16	688.36	673.78	675.77	698.15	687.98
Bayesian crit. (BIC)	958.87	956.03	751.29	755.86	734.53	739.90	772.40	738.83

*** p<.01, ** p<.05, * p<.1

5. DISCUSSION

This study has tested the relationship between openness to collaborations with external stakeholders and the adoption of sustainability practices by rural tourism micro-firms.

Firstly, we have investigated whether deeper and broader relationships positively influence the adoption of ESMPs. The findings indicate that collaborating with a higher number of different stakeholders and with a higher intensity increases the number of different typologies of ESMPs implemented. Hence, both the variety and the intensity of the firm's search for external knowledge can assist tourism micro-firms in adopting ESMPs, overcoming challenges they often encounter, including lack of specialized human resources, inadequate knowledge and skill sets (Kelly et al., 2020; Khatter et al., 2020) and raising awareness about the importance and benefits of addressing environmental and social issues (Johnson, 2015; Burrows & Rozier Rich, 2016; Sánchez-Medina et al., 2016). This aligned with previous studies about larger firms from other industries and focused on the relationship between openness and sustainability performance, advocating for opening up to external collaborations to gain opportunities to achieve sustainability objectives and economic results simultaneously (Rauter et al., 2019; Strazzullo et al., 2023). Existing literature on the tourism sector has already furnished evidence regarding the positive influence of stakeholders on the implementation of sustainability; nevertheless, these studies relied on qualitative methodologies (Journeault et al., 2021; Boiral et al., 2019; Khattel et al., 2020). While some empirical studies are available, they have not thoroughly analyzed the direct relationship between collaboration and the adoption of sustainability practices (Islam et al., 2020; Martínez-Martínez et al., 2019). Moreover, tourism micro-firms have not been the object of such investigations.

Secondly, we have explored if different types of openness are relevant when considering the environmental and social dimensions. Up to now, empirical works in the tourism context have

predominantly focused on environmental sustainability or without making distinctions between these two dimensions.

Regarding the adoption of EMPs, the results support the contention that collaborative relationships aiming at external knowledge sourcing across a variety of external partners favour the adoption of practices. Specifically, the variety of external collaboration partners (including SMEs, large firms, universities and public institutions, as well as other entities, such as intermediaries and trade associations) is positively associated with the number of EMPs adopted. As previous literature argued, each EMP can be characterized by different enabling conditions, including more or less technical and specialized knowledge, infrastructures, managerial support, awareness, and access to subsidies to sustain investment over time (Kasim et al., 2014; Hatem et al., 2010; Pace, 2016; Buffa et al., 2018). Thus, certain EMPs are more accessible to micro-firms based on the complexity of knowledge required to assess different technology options and facilitate informed decision-making processes. Micro-firms that intend to adopt simultaneously different EMPs will be required to access knowledge from different stakeholders to identify the best opportunities for each type of sustainability action and understand the processes. Moreover, as argued by previous literature (Journeault et al., 2021; Boiral et al., 2019; Khattel et al., 2020), each external stakeholder can contribute to the process of adoption of a certain EMP by providing complementary knowledge or playing a different supporting role. Hence, introducing these practices requires a broader knowledge, which is challenging for small and micro-firms to fulfil internally and procure from a singular or limited number of external stakeholders.

Further, introducing the geographical outreach of collaborations in our investigations, the results suggest that micro firms must seek this knowledge outside the local context. Specifically, we found that micro-firms that are more open to collaborative relationships with external partners located at a greater distance will be more likely to benefit from EMP implementation. However, it is the variety of external partners at the national level that most positively influence the adoption of these practices. These results emphasize the importance of distance in sourcing knowledge through extensive relationships well beyond the local area for adopting EMPs, especially those far from the firm's core business. An explanation of this outcome could be associated with knowledge exchange with specialized suppliers, SMEs, or other actors, such as universities or public institutions that are not locally involved. The finding is consistent with previous literature that identified the absence of supporting bodies and significant tourism players, as well as a lack of local collaboration partners, as barriers to EMP implementation in rural tourism (Ates & Ates, 2019; Yachin & Ioannides, 2020; Kornilaki et al., 2019). Furthermore, it is congruent with those studies highlighting the significance of the geographical diversity in external stakeholder networks to mitigate lock-in effects resulting from overmbeddedness (Biconne et al., 2023; Brandão et al., 2019; Pikkemat, 2019). Rural micro-micro firms limit their exposure to external sustainability information, resources, and crucial market knowledge by confining themselves to local ties.

However, given the dispersed locations often associated with rural micro-firms, ensuring consistent communication with distant partners can pose challenges. For instance, such challenges can be identified as time and resource constraints, considering the cost and effort to maintain face-to-face interactions due to the geographic isolation, thus making it essential to find alternative ways to connect and establish intense relationships. However, rural firms, especially those in mountain destinations, may suffer from poor internet connectivity, which can hinder virtual communication efforts with distant partners. Tackling these challenges can funnel away precious resources that would be otherwise invested in the business's core activities. Hence, our results shown that deepening the interaction with distant external knowledge sources negatively affects the adoption of EMPs due to the explicit and implicit cost of its management.

Conversely, regarding social sustainability, collaborative relationships with external partners aimed at intensive knowledge exchange contribute to implementing practices. Specifically, a higher frequency of the firm's engagement with the various partners is positively associated with the number of SMPs adopted. Those practices require less specialized knowledge, and they are generally learned

through the socialization process. This finding aligns with previous statements regarding how the social capital theory can explain how SMEs engage in social sustainability (Perrini, 2006). Specifically, the implementation of SMPs is significantly enabled by the relational dimension of social capital. Developing relational capital is pivotal in enabling knowledge exchange processes as it underpins mutual trust (Goodland & Daly, 1995; Mu et al., 2008). In this context, the search for external knowledge is embedded in the cultivation and preservation of common values and mutual trust, facilitated by intensive and recurring interactions to share refined knowledge and enable learning mechanisms (Ghisetti et al., 2015; Goodland & Daly, 1995). Hence, as the frequency of the interaction increases, knowledge sharing is more fluent as trust also increases with frequency of interaction.

Differently from the case of EMPs, where the variety of partners at the national level favours the implementation, in social sustainability, local collaborations have proved to be the most beneficial. Local stakeholders, including residents, community leaders, associations and organisations, often have a primary understanding of their communities' social issues and needs. Working with them ensures that social sustainability practices are tailored to local issues and priorities. Indeed, social sustainability in small tourism firms relies on active community and community engagement, which could be measured in terms of cooperation for local development and the firm's commitment toward territorial social issues (Cantele & Cassia, 2020). In this sense, the overembeddedness can positively affect the adoption of SMPs (Kallmuenzer et al., 2018). Undoubtedly, social embeddedness presents various benefits (Czernek-Marszałek, 2020), including more accessible access to local resources, knowledge about the local community and its opportunities and threats, access to local entities and knowledge about them and their potential impact on the development of the destination, building a common identity among socially embedded actors, easier acquisition and transfer of knowledge available locally. Rural micro-firms embedded in their local society are inclined to experience social obligations and tend to conform or mimic the behaviour of significant local stakeholders (Darnall et al., 2010; Lepoutre & Heene, 2006). As stated by previous literature (Kornilak et al. 2019), small tourism firms tend to adopt SMPs not for their explicit recognition and endorsement of social sustainability principles but because they are driven by their shared socio-cultural values deeply integrated into their society.

Consistently with other studies highlighting the role of employee cooperation in adopting ESMPs (Alonso-Almedia et al., 2018; Coppola et al., 2022), we also observed the positive influence of human resources training.

Concerning the adoption of EMPs, having a high-speed internet connection is positively impactful, as it is considered the preferred channel for acquiring sustainability information (Garay et al., 2017), and it is also used for effective communication. On the other hand, as far as SMPs are concerned, we have seen that meaningful relationships are close and frequent, and face-to-face relationships are preferred to build trust.

Undoubtedly, being located in an urban context positively affects various economic aspects of a firm, leveraging the availability of different services, the presence of more potential collaboration partners, significant tourism actors, and adequate infrastructure. On the other hand, concerning EMPs, the correlation between the adoption of such practices and the firm being located in an urban context is negative. Hence, rural firms located in more dispersed locations tend to be more incentivized to preserve their region's natural heritage, and their local embeddedness fosters the adoption of EMPs.

6. CONCLUSIONS

This study analyzed the relevance of collaborations with external stakeholders in promoting the adoption of ESMPs in rural tourism micro-firms. an area that has been relatively understudied within the context of sustainability (Agyeiwaah, 2019; Yachin, 2021), despite the potential role of

those firms in promoting local economies, preserving cultural identities, and mitigating global environmental impact. We examined the influence of different characteristics of external collaborations, thereby integrating tourism sustainability literature with the research framework on external knowledge search and organizational openness to external collaborations (Laursen & Salter, 2006). Previous studies on tourism sustainability were almost exclusively focused on the environmental dimension, neglecting the social one. In contrast, we presented SMPs as separate constructs and studied them both alone and combined with EMPs to verify differences in the enabling conditions.

Based on the analysis of data collected from 216 tourism micro-firms in alpine destinations in Piedmont, this research has implemented OGL models to test the formulated hypotheses.

The findings disclose that the variety and intensity of the firm's collaborations with external partners can assist in adopting different typologies of sustainability practices. However, some differences are outlined in our research when EMPs and SMPs are individually analyzed.

This study extends the literature on tourism sustainability. Firstly, we delved deeper into the role of collaborations in this sector, examining different types of openness to collaborations with external stakeholders and providing empirical evidence. Additionally, we considered the geographical outreach of such collaborations, which had previously been only explored in the context of innovation introduction. Second, our research contributes to the tourism literature by studying both EMPs and SMPs. Research on the determinants of those practices has predominantly focused on the environmental dimension without distinguishing between the two dimensions. Hence, we draw attention to the SMPs, which are usually neglected, especially in the case of small firms. In this regard, we have demonstrated that while environmental sustainability in micro-firms requires broader knowledge sources, often unavailable locally, the social one relies more on active engagement and attachment to the local community. In this sense, we also enriched the literature on rural tourism firms' embeddedness. Specifically, our findings highlight the advantages of local embeddedness regarding social issues while emphasizing the importance of not locking in local ties to achieve environmental goals. Third, our study focuses on rural tourism micro-firms, an area that has been relatively understudied within the context of sustainability despite their potential role in promoting local economies, preserving cultural identities, and mitigating global environmental impact.

Our practical implications suggest that micro-firm tourism managers should actively seek partnerships with a wide array of partners, including governmental bodies, non-governmental organizations (NGOs), research institutions and large firms. By developing collaborative relationships with diverse partners, managers can leverage a rich pool of expertise, resources, and perspectives to effectively address environmental challenges and drive EMPs within their businesses. Even if the collaborations were established for another purpose, accessing various reliable sources of knowledge can help managers find adequate information and support for the business's non-core activities, such as sustainability implementation. Moreover, given the geographical isolation of rural firms, managers should also open up to stakeholders beyond the regional borders since it allows access to relevant knowledge and information unavailable locally.

Further, predominant local actors should establish strong networks in their community characterized by frequent engagement to build trust and promote social behaviour within the local community. By promoting transparent communication and cooperation among community members, local stakeholders may create an environment that is favourable for the exchange of information, sharing of resources, and mutual support.

Lastly, policymakers at local, regional, and national levels should recognize the role of collaboration in fostering sustainability practices for tourism micro-firms and incorporate support mechanisms into relevant policies and regulations. Initiatives to facilitate collaboration, such as networking events and knowledge-sharing platforms, could be incorporated into existing tourism development policies. Additionally, information campaigns could raise awareness among tourism micro-firm managers regarding specific practices and provide examples of fruitful collaboration cases in sustainability.

A notable limitation of this study is its methodological nature, which refers to the dichotomous nature of sustainability variables. Hence, sustainability, as the dependent variable, may be conceptualized as a measure of non-economic performance; nevertheless, the study's reliability might be increased using a more developed scale of firm performance. Furthermore, future research should collect more details on sustainability practices, providing a richer list of sustainability items, also encompassing the economic sphere of the Triple Bottom Line, to provide a more detailed overview of openness effectiveness in the tourism industry.

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