

## Regular article

## Digital sustainability communication in tourism

 Flavio Tiago<sup>a,\*</sup>, Artur Gil<sup>b</sup>, Sara Stemberger<sup>c</sup>, Teresa Borges-Tiago<sup>d</sup>

<sup>a</sup> Advance/CSG, ISEG & Centre of Applied Economics Studies of the Atlantic, School of Business and Economics, University of the Azores, Ponta Delgada, Portugal

<sup>b</sup> Centre for Ecology, Evolution and Environmental Changes (Ce3C) & Azorean Biodiversity Group, Faculty of Sciences and Technology, University of the Azores, Ponta Delgada, Portugal

<sup>c</sup> Punto 3, Ferrara, Italy

<sup>d</sup> Centre of Applied Economics Studies of the Atlantic & Advance/CSG, ISEG, School of Business and Economics, University of the Azores, Ponta Delgada, Portugal

## ARTICLE INFO

## Article history:

Received 1 December 2019

Accepted 19 December 2019

Available online 17 January 2020

## JEL classification:

Z1

Z3

## Keywords:

Sustainable tourism

SME

Accommodation

Website sophistication

Digital communication

Eco-labels

## ABSTRACT

The relevance of sustainable tourism is unquestionable. Tourism and hospitality firms worldwide are moving toward more sustainable product offerings. However, not all firms communicate their achievements and commitments in this area. This study assesses the sustainable digital communication of small and medium accommodation firms and relates that information to the sophistication of their online presence. For this purpose, data were retrieved from the websites of 759 accommodation firms located in the Azores (São Miguel Island), classified as a sustainable island destination. The results indicate that international accreditations are less commonly adopted than local accreditations and that smaller firms tend to value eco-labeling when promoting their offers online. It is also noticed that sustainable achievements are highlighted on more sophisticated websites. This is one of the first studies to explore online sustainability communication; more specifically, the link with website sophistication among tourism SMEs. It is hoped that this study will stimulate further research on communication and SME practices on tourism sustainability and improve policy efforts to promote wider adoption of sound practices.

© 2019 Journal of Innovation & Knowledge. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### Introduction

Since the 1990s, tourism businesses, especially hotels, have undertaken different voluntary activities to show their commitment to sustainable tourism: from adopting codes of conduct to obtaining eco-labels and implementing environmental management systems (Ayuso, 2007). However, some firms consider obtaining tourism eco-labels to be expensive and time-consuming (Karlsson & Dolnicar, 2016). Additionally, eco-labels seem to have limited marketability judging from the varied visitor responses (Patterson et al., 2007). The fact that these labels are expensive to obtain and not highly valued by clients could explain the reluctance of lodging providers to invest in these strategies (Karlsson & Dolnicar, 2016; Karuma, 2016). Most of these studies, however, rely solely on a single stakeholder point of view.

It has now become clear to policymakers, managers, and academics that the future of the tourism industry cannot be defined by the actions of individual entities or organizations, implying that a larger local and global movement toward sustainable tourism is needed. This need has led to the development

of plans and principles by organizations in the tourism sector worldwide.

However, consensus is lacking on two key points: (1) whether policy efforts are aligned with private firms' sustainable practices (Yasarata, Altinay, Burns, & Okumus, 2010), and (2) whether private tourism firms communicate on eco-labels following a contamination process. This study contributes to a larger understanding of the latter question.

Thus, data were gathered related to online communications of lodging businesses in the Azores, classified as a sustainable island destination. The data cover five macro-areas: firm characteristics, communication platforms adopted, website quality, sustainable practices, and digital communication of sustainable practices. The results show that most firms do not emphasize the sustainable tourism practices they follow in their digital communication nor do they possess any type of eco-label certification. However, because of a local government initiative, several small and medium accommodation firms have adopted a local sustainability accreditation, which indicates the implementation of good environmental practices and corporate social responsibility (CSR).

\* Corresponding author.

E-mail addresses: [flavio.gb.tiago@uac.pt](mailto:flavio.gb.tiago@uac.pt) (F. Tiago), [artur.jf.gil@uac.pt](mailto:artur.jf.gil@uac.pt) (A. Gil), [sara@punto3.it](mailto:sara@punto3.it) (S. Stemberger), [maria.tp.tiago@uac.pt](mailto:maria.tp.tiago@uac.pt) (T. Borges-Tiago).

**Literature review**

In the last four decades, the concept of sustainability has been applied to different sectors using different scientific approaches. The sustainability paradigm encompasses complex systems, integrating interactions between natural, social, and economic development (Kates et al., 2001). Initially, it was closely linked with environmental issues and industrial pollution only. Later, with greater environmental pressures, sustainability spread to a wider range of industries and led to the emergence of sustainable tourism (Chan & Hsu, 2016; Kirk, 1995).

**Tourism and sustainability**

As noted by several authors, the paradigm of sustainable tourism has become one of the most impactful fields in tourism studies (Budeanu, Miller, Moscardo, & Ooi, 2016; Ruhanen, Weiler, Moyle, & McLennan, 2015). Despite being a relatively new sector, tourism has always been considered a fast adopter of sustainability-related processes and strategies.

This rapid adoption of sustainability-related actions could be an industry response to the global concerns over tourism’s trade-off between the positive and negative impacts on the tourist destinations, given that it continues to be one of the most resource-consuming activities (Cater & Goodall, 1992). The negative impacts accelerate environmental degradation since the industry is also associated with other negative externalities, such as economic leakages and cultural erosion (Hunter & Green, 1995).

The debate on sustainable tourism is not new; the term sustainable tourism emerged in the late 1980s (Budeanu et al., 2016). In the late nineties, Dymond suggested that sustainability and sustainable need consideration in tourism as well. However, as in other research domains, the notion of sustainable development is an ongoing debate. Lélé (1991) argued that development and sustainability cannot be viewed in isolation and that they must be considered together as an achievable process to “meet present generational needs and at the same time ensur[e] the ability of future generations to provide for themselves” (Bruntland, 1987).

Since the emergence of the concept of sustainable tourism, the term sustainable tourism development (STD) has been used to represent different ideas. Its evolution can be observed from the documents published by the World Tourism Organization (WTO) over the years (Bramwell & Lane, 1993; Cernat & Gourdon, 2007; Technology, 2005), as presented in Fig. 1.

A common theme in all these interpretations is the notion that, regardless of the terminology adopted, STD should maintain the economic, social, and ecological balance of an area for an unlimited period. Examining the term’s semantic roots will help to increase understanding of the interconnections within the paradigm.

The initial framework developed by Lélé (1991) was broadened to apply to the tourism industry. The word “sustainability” includes both ecological and social dimensions and the word “development” refers to a process of growth or change to satisfy basic needs (Lélé, 1991). The word “tourism” contextualizes sustainable development into the tourism ecosystem (Karuma, 2016). Dwyer (2005) reinforces this line of thought, noting that the triple

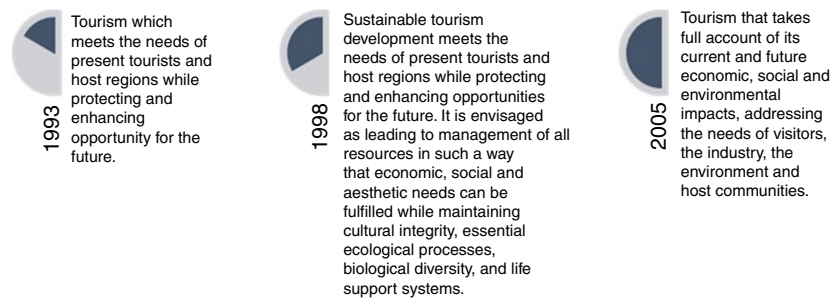


Fig. 1. Different interpretations presented by WTO over time.

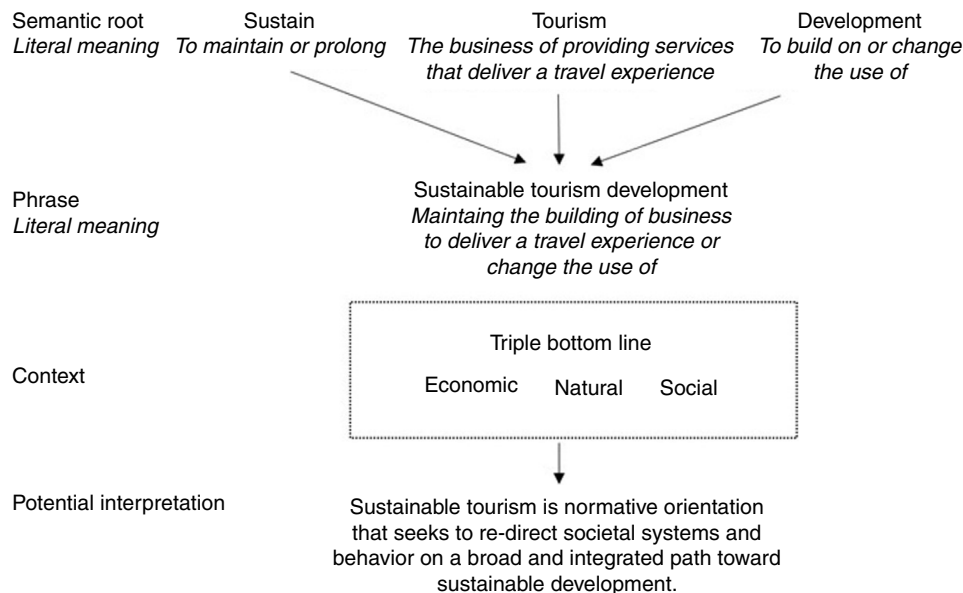


Fig. 2. Semantic roots of sustainable tourism development.

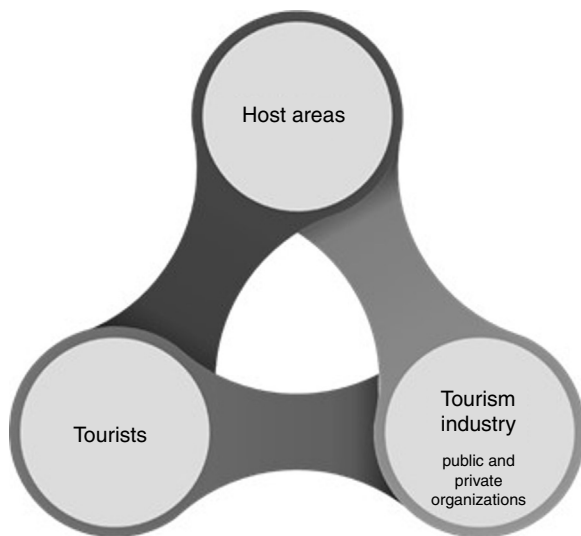


Fig. 3. Sustainable Tourism Ecosystem.

bottom line dimensions (illustrated in Fig. 2) are the core pillars of sustainability.

Regardless of the characterization of STD chosen by the actors to achieve their socio-economic and political objectives, the economic, ecological, and social dimensions are the global drivers of change in the tourism industry (Dabphet, Scott, & Ruhanen, 2012; Ruhanen et al., 2015). Thus, as Butler (1999) notes, the term “sustainable tourism” has become commonly known as tourism operated in consideration of the bottom-line dimensions.

STD is most commonly framed in relation to tourist destinations and was only recently expanded to hospitality management. Hence, it is often viewed as encompassing a triangular connection between host areas, the tourism industry, and tourists (Butler, 1999).

Regardless of the recognized level of importance of STD, both public and private firms have been criticized for their limited progress in applying the concept. As noted by Bramwell and Lane (2013) “tourism businesses often have few reasons to want to promote sustainable tourism”. Most industry initiatives aim to achieve clear competitive advantages and/or improve results. To do so, firms need to pursue a holistic strategy and include all stakeholders on a micro and/or macroeconomic level (Cuculeski, Petrovska, & Cuculeski, 2016).

Thus, STD relies on the combined actions of all actors in pursuit of four main goals: (1) fostering the well-being of communities by ensuring economic, social, and cultural wealth creation for local communities; (2) supporting the preservation of natural and cultural resources by balancing the current use of these resources and safeguarding them for future generations; (3) acknowledging and promoting product quality and tourist satisfaction as key factors for the economic success of tourism; and (4) applying adequate management and monitoring strategies that permit, maintain, or obtain a balance between development and conservation (Bramwell & Lane, 2013; Budeanu et al., 2016; Cuculeski et al., 2016; Yasarata et al., 2010).

As the tourism industry adopts a more sustainable approach, there is a need to establish a comprehensive methodology for evaluating the impacts of tourism development on the local people and environment (Torres-Delgado & Saarinen, 2014). However, no universal set of indicators have been established for all regions and contexts. For instance, presented a set of indicators that measure tourism sustainability and highlight its main impacts, while Lee and Hsieh (2016) identified 141 indicators for sustainable wetland tourism (Fig. 3).

Ahi and Searcy (2015) advocated that the application of sustainability principles require the triple bottom-line approach, integrating a “stakeholder-focused intra- and inter-organizational business systems that address the integrated economic, environmental and social aspects of performance”. Thus, in addition to establishing a balance among the three dimensions, different stakeholder objectives should also be considered. Recently, it has been argued that this balance can only be achieved with a strong commitment from policymakers (Hall, 2011).

Therefore, considering that sustainable tourism “requires both an awareness of tourism activities that have a relatively low impact on nature and a consideration of whether all stakeholders’ support is warranted” (Lee & Hsieh, 2016: 779), the content communicated by the different stakeholders can be considered an indicator of their STD commitment and practices.

### The accommodation dilemma from a communicational perspective

Tölkes (2018) noted that most studies, until 2018, were related to sustainability communication in tourism and focused on specific green hotel contexts or sustainable destinations. According to him, 57% of the articles looked at sustainability communication from an environmental perspective, overlooking the challenges posted by sustainability to hospitality and tourism firms.

When considering sustainability in the context of hospitality and tourism industry, a paradox arises: on the one hand, hospitality and tourism firms communicate unique and exquisite experiences to meet and overwhelm visitors’ expectations and on the other hand, firms communicate the measures they have taken related to the development of tourism infrastructure and reduction of resource consumption (e.g., recommending tourists to use their towels for more than one day), which could diminish the overall experience (Jones, Hillier, & Comfort, 2016).

Arnould, Price, and Zinkhan (2002) explained that the tourism experience is the sum of four distinctive phases—pre-consumption experience, purchase experience, core consumption, and nostalgia experience. In this sense, all tourist-accommodation touchpoints influence the overall experience. In the pre-consumption experience phase, the tourist to-be searches for information regarding destination offers and books the vacation based on his/her personal preferences and criteria (Cuculeski et al., 2016).

The tourist to-be conducts online and offline searches for this information, relying on official information provided by firms and non-official information generated by peers. Arnould et al. (2002) noticed that information is considered more credible if the content is consumer-generated or editorial. As tourists tend to rely less on manager-generated content, tourism and hospitality firms seek other forms of quality indicators, such as eco-labels, accreditations, or certifications (Sparks, Perkins, & Buckley, 2013). However, the literature shows that eco-labels and environmental accreditation are controversial (Buckley, 2002; Sparks et al., 2013).

In 2002, Hamele (2002: 207) noticed that, for Europe “the vast majority of holidaymakers are unaware of the existence of environmental certification schemes in the tourism sector”. A similar situation was reported by Tiago, Faria, Cogumbreiro, Couto, and Tiago (2016); they emphasized that not all tourists value the green efforts of lodging firms. The authors found that tourists, regardless of their personal level of environmental concern, do not consider eco-labels as an important criterion when choosing their lodging. Instead, they search and decide according to the experiences offered. More, Cvelbar, Grun, and Dolnicar (2017) found that tourist behavior toward sustainability efforts in accommodations tends to vary according to the travel characteristics of hotel guests.

Conversely, some studies point out that, in the tourism and hospitality industry, there is clear evidence of CSR measures and, within those, of sustainable development practices (Ettinger, Grabner-Kräuter, & Terlutter, 2018; Frey & George, 2010).

Mette and Majken (2006) found that an efficient communication strategy for CSR requires the involvement of all stakeholders in a two-way communication process. According to them, this process relies on an ongoing “interactive sense-giving and sense-making process” which implies that a firm seeks to be constantly connected to their stakeholders. Therefore, those in the accommodation industry constantly seek ways to improve their online and offline presence to enhance their unique value proposition, and consequently, their competitiveness and profitability (Qi, Law, & Buhalis, 2017).

Alongside this organizational perspective, Tölkes (2018) considers that “sustainability communication sets out to make consumers aware of the availability of sustainable travel products, to inform consumers how these offerings meet their needs and comply with sustainability criteria, and ultimately to stimulate pro-sustainable purchases” (Tölkes, 2018, p. 10).

For many accommodation firms, websites are the first point of contact with guests, providing information regarding their facilities and services. As Moisescu (2015) noticed, tourists to-be tend to visit hotel websites before deciding to purchase. The sophistication of the website and the type of content available influences the image formation and the buying decision.

For a long time, the star classification has been the most common ranking system for the quality and attributes of a service (Baker & Crompton, 2000). Hence, it is a mandatory element of accommodation firms' digital communication. While this classification scheme was mostly controlled by the supplier, the evolution of tourism and technology created new criteria and ranking systems, such as the TripAdvisor rankings, related to overall quality, and eco-labels, like the EU Eco-Management and Audit Scheme (EMAS) and Green Leaf certification. In most cases, the use of an environmental accreditation label or the communication of CSR elements linked to sustainable practices enhances product differentiation.

Villarino and Font (2015) analyzed the online presence of 40 hotel websites and found that sustainability is still a less-explored dimension in organizational communication. They found that firms tend to communicate sustainable achievements in common text and with low persuasion. These findings, combined with tourism digital behavior, pointed to a need for rethinking the tourism and hospitality firms' digital presence.

### Sustainable tourism development in Islands destinations

Dwyer, Edwards, Mistilis, Roman, and Scott (2009: 63) recalled that “tourism stakeholders can strategically act as ‘future makers’ rather than ‘future takers.’”

As noted above, the theoretical approach of STD highlights the role of the host areas, implying that each destination, due to its unique economic, social, and natural dimensions, will have particular needs to be accounted for.

Islands have long been tourist destinations (Parra-López & Martínez-González, 2018), offering rest and relaxation for visitors. However, for most islands, tourism is the main industry and achieving a balance between social, economic, and environmental objectives can be challenging. According to Connell (2018), the main challenges from tourism to island destinations are the following: “limited biodiversity, migration, external interventions and directives, scarce human resources, weak management, inadequate data (and problems of interpretation), social divisions and tensions and simultaneous quests for modernity and conservation.”

The number of papers published recently regarding tourism on island destinations demonstrates the relevance of this field and highlights the opportunities for sustainable tourism (Parra-López & Martínez-González, 2018). Regarding this increasing focus on island tourism, Connell (2018) recalls that initial research primarily highlighted all the negative impacts, especially on small islands. Most studies focused on the negative impacts on the triple bottom-line dimensions (Cave & Brown, 2012; Ioannides, 2008). Dodds and Graci (2012) summarized the challenges posed to the balance of the triple bottom-line dimensions in the island context. These authors added that apart from the challenges in balancing these three dimensions, tourism can produce economic and social benefits for local communities, since it promotes and enhances small business activities and helps consolidate local culture and traditions. More recent studies have highlighted the relevance of studying the participation of local communities in tourism development (Budeanu et al., 2016; Connell, 2018; Cuculeski et al., 2016; Galvez, Granda, Lopez-Guzman, & Coronel, 2017; Mester et al., 2016; Parra-López & Martínez-González, 2018), since balancing the triple bottom-line dimensions requires an increased level of cooperation among businesses, nonprofit organizations, governments, and citizens.

Nevertheless, some tourism stakeholders emphasize the challenges in promoting and creating value from sustainable practices on small islands (Tiago et al., 2016), highlighting inadequate access to revenue sources and the difficulties in dealing with different green-driven tourist behavior. Thus, STD is not a simple matter. In the island destination context, it can be considered a critical element that needs to be incorporated into the sustainability communication efforts. As Tölkes (2018) found that most studies tend to neglect the communication of sustainable tourism products from a marketing perspective integrating all sustainability attributes. Thus, this study attempts to overcome this gap.

### Case study area: São Miguel Island (Archipelago of the Azores, Portugal)

- 1 We focus on island destinations to maintain the context of information search. For a small island destination, delivering and promoting a combination of competitiveness and sustainability is crucial. Therefore, managers and policymakers need to commit to the establishment of strategies and operational processes that would lead to the achievement of sustainable competitive advantages.
- 2 This study considers the biggest island of the Azores Autonomous Region (RAA) in Portugal as a case study. This archipelago is composed of nine islands and their economies rely on only a few products (dairy and other agricultural products and fisheries). In the last two decades, tourism industry has been promoted by the local government to sustain economic development.

The opening of the Azores airspace in 2015 led to significant changes in the islands' economy. Until then, the islands' remoteness and middle north-Atlantic location worked as a “fortress”, preventing a mass-tourism industry from developing and encouraging unique tourist experiences centered on nature on all nine islands (Tiago et al., 2016). The peripheral location of the Azores also accentuates some vulnerabilities; its unique characteristics also provide opportunities for an innovative development strategy.

The population of the Azores is distributed unevenly across the nine islands. Most of the inhabitants live on São Miguel (around 53%), which also attracts the majority of tourists. The Azores were chosen because it only recently became a holiday destination for international tourists (see Fig. 4). The recent growth provides several opportunities for sustainable tourism growth.



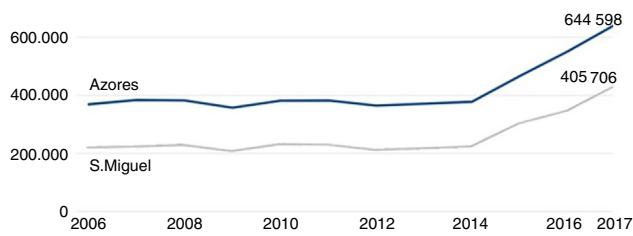


Fig. 4. Number of tourists staying in official accommodation.

Source: Data retrieved from SREA.

São Miguel was selected for this study because it is the largest and most mature in terms of tourism offerings. It is also in the growth phase of the product life cycle. Baldacchino and Ferreira (2013: 95) reinforced the relevance of tourism in São Miguel, stating that “most tourists who come to the Azores return to their country of origin having visited only one island (usually São Miguel).”

As noted in the work of in the Azores, there is minimal expression of international eco-labels for two reasons: the high cost associated with the accreditation process and unique local conditions. To overcome the inadequacy of some of the international eco-labels’ criteria for the local conditions and ensure appropriate environmental practices by small and medium enterprises (SMEs), the Miosotis accreditation was created by the Azorean Government.

Miosotis is a regional accreditation system that enhances sustainable tourism recognition in the RAA and was first proposed in 2015 as a rigorous certification for accommodations implementing sound practices following specific environmental indicators. Thus, it promotes the SMEs entrepreneurs’ awareness of sustainable tourism as well as the tourists’ awareness of the sustainable practices by their local accommodation (LA). It uses 36 monitoring criteria under five themes—recycling processes, water management, energy management, biodiversity and local valorization, and environmental management and structured information (Governo dos Açores, 2018).

In December 2017, the regional policy commitment to sustainable tourism led the government to promote the signing of the Azores Sustainability Primer by different local stakeholders. During the signing, the President of the Autonomous Region of Azores expressed a public commitment towards sustainable tourism and announced the regional government’s application to the Sustainable Label of the Global Sustainable Tourism Council (GSTC). In 2019, the Azores was distinguished with the bronze status by Earth-Check and received the Green Destination Award.

Other than the local government initiatives, the Portuguese Society for the Study of Birds (ONG SPEA a Birdlife International partner, has been developing a set of action points for nature conservation since 2003 and has recently focused on sustainable tourism. One of its initiatives is the LIFE + Project Lands of Priolo (LIFE12 NAT/PT/000527), the result of a partnership between SPEA and the Azorean regional government, with contributions from the LIFE financial instrument of the European Union. This project has given visibility to sustainable tourism activities and provides support and training to SMEs aiming toward more sustainable business activities and has an eco-label called Priolo Brand.

## Method and results

As the internet is a rich source of information, data were gathered directly from the official websites, Facebook, and booking pages of all the accommodation firms’ operating on the island. We examined the content regarding sustainable practices as well as the sophistication of the communication in digital media. As evaluating STD is a complex endeavor, we focus on defining the concept and

listing a set of sustainable performance indicators. The importance of each criterion or indicator cannot be assumed to be equal since each consumer attaches his or her own significance and meaning to them.

The steps taken to assemble the database were as follows:

- I Data collection on the tourist receptive structures and online presence and descriptions from structured and unstructured sources on accommodation on São Miguel;
- II Frame state-of-the-art sustainable certification on São Miguel;
- III Assess the digital sophistication level of the webpages
- IV Estimate the relationship between digital sophistication and sustainable communication using a partial least squares model.

The evaluations criteria used to establish digital sophistication were based on a range of factors adopted from the study of Limayem, Hillier, and Vogel (2003): interface—navigation, English language support, and multiple ways of access; content—depth of information, photos, videos, comments/reviews, links to social network pages, and organization; e-business services—email contact, online booking, personal offline contact, payment handling, and online promotions; and organizational information—mission statement, vision, links to other organizations, and security/privacy concerns.

Other than checking for references to eco-labels or accreditation, the existence of a CSR page or statement was also considered to assess the richness of sustainable tourism communication. The main issues arising under the WTO sustainability indicators were transposed into the following measurements: economic viability—financial results, competitiveness, business conditions, and access to markets; employment quality—number and quality of local jobs, pay and conditions, labor supply, and training; visitor fulfillment—security and safety and quality of experience; community wellbeing—impacts on social structures, quality of life, access to resources; cultural richness—conservation and presentation of cultural heritage; and resource efficiency—reducing the use of scarce and non-renewable resources, such as energy, water etc. These elements were retrieved from the content published on the websites.

The database was built using a matrix with two options for most of the dimensions examined (1-present; 0-not present) or a schema analysis that requires analyzing the meaning behind word relationships for employment quality, visitor fulfillment, community wellbeing, cultural richness and resource efficiency dimensions, with reliability being assessed by comparing the two coders’ frames. Reliability was measured by the percentage of phrases with the same classification between coders weighted by the number of categories for each variable. As a result, the average agreement between the coders for all variables was over 0.96 (Eyck & Williment, 2003). The coding frame meets the criteria of reliability and validity in this study.

## Data analysis

There are 759 authorized accommodation, with a total of 9,910 beds. The online presence of every accommodation was screened, taking into consideration the presence of and descriptions given on websites, booking engines, and social media. While 14.36% of these locations were present on the website of the Azorean destination marketing organization—Visit Azores, others were present on other booking engines, such as Booking.com, Airbnb, TripAdvisor, and Homeaway in addition to personal websites or booking blogs. These accommodation’ characteristics are: 89.4% are small firms, mostly bed and breakfasts or guest houses, owned by locals (87.8%). Regarding their digital presence, 32.4% have a website,

**Table 1**  
The Azores Islands.

Compared dimensions	Azores (Portugal)
Islands characteristics	9 volcanic islands Main industries: agriculture, dairy farming (for cheese and butter products primarily), livestock ranching, fishing, and recently tourism
Current offer strategy Sustainability paradigm	Boosterism and sustainable tourism approach Destination received several sustainability awards in the last 6 years Hotels certificated with EMAS: 2 units
Accommodation typology	Hotels; apartment hotel; hostel; and cottage or lodge

Source: Adapted from Tiago et al. (2016).

**Table 2**  
PLS-POS results and mean group differences.

	Average Weighted R-Squares	Digital sophistication			Eco labels			Sustainable communication			Sustainable practices		
		Original path	1st Seg	2nd Seg	OP	1st Seg	2nd Seg	OP	1st Seg	2nd Seg	OP	1st Seg	2nd Seg
Digital sophistication	0.961							0.100	-0.003	0.055 <sup>a</sup>	0.137	-0.061	0.158
Eco labels	0.915							0.632	1.861	0.771 <sup>a</sup>			
Firms characteristics		0.092	0.748	0.078 <sup>a</sup>	0.296	-0.004	0.298	0.224	0.003	0.061	0.184	0.154	0.597 <sup>a</sup>
Sustainable communication	0.320												
Sustainable practices	0.179				0.572	1.000	0.683	0.009	-0.862	0.144 <sup>a</sup>			

<sup>a</sup> Indicates p-value smaller than 0.005 or larger than 0.95.

11.3% use Facebook, and 1.41% use Twitter to communicate online. TripAdvisor, Booking.com, and Airbnb are commonly used by the firms (58%). Regarding the sophistication of the website and its content, 19.8% have websites that allow interaction to receive tailored information and 9.78% have interactive features, such as booking forms.

Additionally, screening the online presence of tourist accommodation shows an emphasis on the occurrence of sustainability related remarks and/or agendas and to indicators given by WTO sustainability marks. We surveyed awards, certificates, and labels recognizing sustainability practices as well as the presence of sustainable agendas and information published online and directly available to the public to review sustainability practices and their promotion among tourism SMEs, specifically lodgings. To do so, a matrix was created to account for the presence of these indicators. The results were added to construct a three-point classification for sustainability practices among the 759 lodgings. The database analysis found that 39 out of 759 (5.14%) presented one or more of the chosen indicators.

Although some units have known practices of STD, only 9 have specific sustainable related pages or are in the process of acquiring international certification as a sustainable tourist accommodation. The most common eco-labels acquired by these units are Chave Verde, Five Leaf, and TripAdvisor Green Booking, in that order.

EMAS (1 AL), Green Key (15 AL), Miosotis Azores Accreditation (29 AL), and Priolo Brand (26 AL) certificates of sustainable tourism were benchmarked on the island of São Miguel. Additionally, the use of online sustainable tools was evaluated, including TripAdvisor's Green Booking (4 AL) and the Five Leaf System (5 AL). There is a relatively low level of participation in global sustainable tourism standards, such as the EMAS and Green Key. However, the Miosotis and Priolo Brand are more significantly used. Finally, it is necessary to consider that 5.53% of the registered LAs have one of the regional sustainability certificates.

We develop and empirically test a five-construct model that examines the effect of firm characteristics of digital communication related to sustainability practices. The model was tested using a partial least square-structural equation modeling (PLS-SEM) approach, to uncover relationships that had never been tested. This approach was the most suitable for this study, since it allows segmentation by applying unobserved heterogeneity techniques.

To evaluate the underlying theory of the model and after validating the measurement model, the structural model estimation was conducted. The internal reliability of all the constructs was achieved since all the Cronbach's alpha values are higher than 0.7. The path coefficients of the estimated model were observed since the relevance and extent to which the examined path changes the explaining power of the endogenous construct has to be established. The results point to large effects in the firm characteristics influence on the sophistication of digital presence (0.748) and sustainability practices on eco-label accreditation (0.683) and sustainability digital communication (0.771) relationships. The relationship digital presence sophistication with sustainability digital communication showed the weakest effect (0.055).

Two groups were defined using a PLS prediction-oriented segmentation, with 1,000 iterations and a search depth of 757 (the sample size). The first segment had 429 firms, while the second had 328 (Table 1).

After assessing the models for the two clusters, a PLS multigroup analysis was conducted to determine the significant difference between these two groups, as highlighted in Table 2. The group that shows a more sophisticated online presence shows higher levels of sustainability digital communication, and sustainability practices. The grouping outcome of the PLS-POS was transposed into SPSS software and Chi-square and Mann-Whitney U tests were conducted to assess the group differences based on sample characteristics. Firm location and dimension are the two variables found significantly different: the first group consists of small bed and breakfasts located in the two main districts (Ponta Delgada and Ribeira Grande), while the second consists of medium and small firms from all accommodation types, mostly located near natural landmarks.

**Final considerations**

In many sectors, consumers consider eco-labels as warranties that firms are acting on sustainability principles. The same was found to be partially true in the tourism sector. The results indicate, that (1) eco-labeling promotion by local official entities does not have a significant impact on the rates of local accommodation certification but (2) smaller firms value eco-labeling when promoting their offers online. These results are similar to the ones reported

by Villarino and Font (2015) who noted that most firms could make substantial improvements in their digital communication related to sustainability practices and commitments. A third (3) finding is that firms with a more sophisticated online presence tend to better communicate their sustainability concerns and practices. However, as Villarino and Font (2015) pointed out, the references found on the websites are mostly concerned with the environmental dimension and tends to neglect the social and economic dimensions.

The results also indicate that international accreditations are less adopted by small and medium firms. The regional accreditation Miosotis along with the county-based non-governmental initiatives, such as the eco-label Priolo brand, seem to be more suitable for small firms. This could reflect the high costs and stringent standards associated with these certifications, that are usually seen as barriers for small business.

These results reinforce the need to overcome nature-based-only communication and incorporate other dimensions in marketing sustainable tourism offers. There are two main approaches in the current practices: a less careful online presence and a preemptive reaction to possible criticism of greenwashing.

The research results not only provide useful insights to policy-makers but also highlight the weak use of sustainability eco-labels in the digital communications of tourism businesses, which leaves many questions for future research.

## Acknowledgements

We gratefully acknowledge financial support from FCT-Fundação para a Ciência e Tecnologia (Portugal), national funding through research grant UIDB/04521/2020 of the Advance/CSG, ISEG and (UID/ECO/00685/2016) of the Centre of Applied Economics Studies of the Atlantic, and the Project ACORES-01-0145-FEDER-000017 from AÇORES 2020, through FEDER – European Union.

## References

- Ahi, P., & Searcy, C. (2015). Assessing sustainability in the supply chain: A triple bottom line approach. *Applied Mathematical Modelling*, 39(10–11), 2882–2896.
- Arnould, E. J., Price, L., & Zinkhan, G. M. (2002). *Consumers*. McGraw-Hill/Irwin.
- Ayuso, S. (2007). Comparing voluntary policy instruments for sustainable tourism: The experience of the Spanish hotel sector. *Journal of Sustainable Tourism*, 15(2), 144–159. <http://dx.doi.org/10.2167/jost617.0>
- Baker, D. A., & Crompton, J. L. (2000). Quality, satisfaction and behavioral intentions. *Annals of Tourism Research*, 27(3), 785–804.
- Baldacchino, G., & Ferreira, E. C. D. (2013). Competing notions of diversity in archipelago tourism: Transport logistics, official rhetoric and inter-island rivalry in the Azores. *Island Studies Journal*, 8(1), 84–104.
- Bramwell, B., & Lane, B. (1993). Sustainable tourism: An evolving global approach. *Journal of Sustainable Tourism*, 1(1), 1–5.
- Bramwell, B., & Lane, B. (2013). Getting from here to there: Systems change, behavioural change and sustainable tourism. *Journal of Sustainable Tourism*, 21(1), 1–4.
- Bruntland, G. H. (1987). *Our common future: Report of the world commission on environment and development*. World Commission on Environment and Development.
- Buckley, R. (2002). Tourism ecolabels. *Annals of Tourism Research*, 29(1), 183–208. [http://dx.doi.org/10.1016/S0160-7383\(01\)00035-4](http://dx.doi.org/10.1016/S0160-7383(01)00035-4)
- Budeanu, A., Miller, G., Moscardo, G., & Ooi, C.-S. (2016). Sustainable tourism, progress, challenges and opportunities: An introduction. *Journal of Cleaner Production*, 111, 285–294. <http://dx.doi.org/10.1016/j.jclepro.2015.10.027>
- Butler, R. W. (1999). Sustainable tourism: A state-of-the-art review. *Tourism Geographies*, 1(1), 7–25.
- Cater, E., & Goodall, B. (1992). Must tourism destroy its resource base. In *Environmental issues in the 1990s*. pp. 309–324.
- Cave, J., & Brown, K. G. (2012). Island tourism: Destinations: An editorial introduction to the special issue. *International Journal of Culture Tourism and Hospitality Research*, 6(2), 95–113.
- Cernat, L., & Gourdon, J. (2007). Is the concept of sustainable tourism sustainable. In *Developing the sustainable tourism benchmarking tool*. [http://www.unctad.org/en/docs/ditctncd20065\\_en.pdf](http://www.unctad.org/en/docs/ditctncd20065_en.pdf)
- Chan, E. S. W., & Hsu, C. H. C. (2016). Environmental management research in hospitality. *International Journal of Contemporary Hospitality Management*, 28(5), 886–923. <http://dx.doi.org/10.1108/ijchm-02-2015-0076>
- Connell, J. (2018). Islands: Balancing development and sustainability? *Environmental Conservation*, 1–14. <http://dx.doi.org/10.1017/S0376892918000036>
- Cuculeski, N., Petrovska, I., & Cuculeski, V. (2016). Sustainable marketing and consumers' preferences in tourism. *European Journal of Tourism Hospitality and Recreation*, 7(2), 84–90. <http://dx.doi.org/10.1515/ejthr-2016-0010>
- Cvelbar, L. K., Grun, B., & Dolnicar, S. (2017). Which hotel guest segments reuse towels? Selling sustainable tourism services through target marketing. *Journal of Sustainable Tourism*, 25(7), 921–934. <http://dx.doi.org/10.1080/09669582.2016.1206553>
- Dabphet, S., Scott, N., & Ruhanen, L. (2012). Applying diffusion theory to destination stakeholder understanding of sustainable tourism development: A case from Thailand. *Journal of Sustainable Tourism*, 20(8), 1107–1124. <http://dx.doi.org/10.1080/09669582.2012.673618>
- Dwyer, L. (2005). Relevance of triple bottom line reporting to achievement of sustainable tourism: A scoping study. *Tourism Review International*, 9(1), 79–938.
- Dodds, R., & Graci, S. (2012). *Sustainable tourism in island destinations*. Routledge.
- Dwyer, L., Edwards, D., Mistilis, N., Roman, C., & Scott, N. (2009). Destination and enterprise management for a tourism future. *Tourism Management*, 30(1), 63–74.
- Ettinger, A., Grabner-Kräuter, S., & Terlutter, R. (2018). Online CSR communication in the hotel industry: Evidence from small hotels. *International Journal of Hospitality Management*, 68, 94–104. <http://dx.doi.org/10.1016/j.ijhm.2017.09.002>
- Eyck, T. A. T., & Williment, M. (2003). The national media and things genetic: Coverage in the New York Times (1971–2001) and the Washington Post (1977–2001). *Science Communication*, 25(2), 129–152.
- Frey, N., & George, R. (2010). Responsible tourism management: The missing link between business owners' attitudes and behaviour in the Cape Town tourism industry. *Tourism Management*, 31(5), 621–628. <http://dx.doi.org/10.1016/j.tourman.2009.06.017>
- Galvez, J. C. P., Granda, M. J., Lopez-Guzman, T., & Coronel, J. R. (2017). Local gastronomy, culture and tourism sustainable cities: The behavior of the American tourist. *Sustainable Cities and Society*, 32, 604–612. <http://dx.doi.org/10.1016/j.scs.2017.04.021>
- Governo dos Açores (2018). Press release from the Regional Government, available at <http://www.azores.gov.pt/GaCS/Noticias/2018/Marco/Galard%C3%A3o+Mios%C3%B3tis+distingue+mais+18+novos+alojamentos+tur%C3%ADsticos+nos+A%C3%A7ores.htm>
- Hall, C. M. (2011). Policy learning and policy failure in sustainable tourism governance: From first- and second-order to third-order change? *Journal of Sustainable Tourism*, 19(4–5), 649–671.
- Hamele, H. (2002). *Eco-labels for tourism in Europe: moving the market towards more sustainable practices*. Washington DC: Island Press.
- Hunter, C., & Green, H. (1995). *Tourism and the environment: A sustainable relationship? (Vol. null)*.
- Ioannides, D. (2008). Hypothesizing the shifting mosaic of attitudes through time: A dynamic framework for sustainable tourism development. In S. McCool, & R. Moisey (Eds.), *Mediterranean Isle. Tourism, recreation and sustainability: Linking culture and the environment* (pp. 51–75). Oxford: CAB.
- Jones, P., Hillier, D., & Comfort, D. (2016). Sustainability in the hospitality industry: Some personal reflections on corporate challenges and research agendas. *International Journal of Contemporary Hospitality Management*, 28(1), 36–67.
- Karlsson, L., & Dolnicar, S. (2016). Does eco certification sell tourism services? Evidence from a quasi-experimental observation study in Iceland. *Journal of Sustainable Tourism*, 24(5), 694–714. <http://dx.doi.org/10.1080/09669582.2015.1088859>
- Karuma, A. K. (2016). South Eastern Kenya University. In *Assessing the role of eco-rating certification scheme in promoting responsible tourism*. Doctoral dissertation.
- Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., et al. (2001). Sustainability science. *Science*, 292(5517), 641–642. <http://dx.doi.org/10.1126/science.1059386>
- Kirk, D. (1995). Environmental management in hotels. *International Journal of Contemporary Hospitality Management*, 7(6), 3–8.
- Lee, T. H., & Hsieh, H.-P. (2016). Indicators of sustainable tourism: A case study from a Taiwan's wetland. *Ecological Indicators*, 67, 779–787. <http://dx.doi.org/10.1016/j.ecolind.2016.03.023>
- Lélé, S. M. (1991). Sustainable development: A critical review. *World Development*, 19(6), 607–621.
- Limayem, A., Hillier, M., & Vogel, D. (2003). Sophistication of online tourism websites in Hong Kong: An exploratory study. *AMCIS 2003 Proceedings*, 142.
- Mester, I., Badulescu, D., Badulescu, A., Bac, D., Simut, R., & Sehleanu, M. (2016). Attitudes and practices concerning sustainability. A research case on Romanian tourism ventures. *Journal of Environmental Protection and Ecology*, 17(2), 687–695.
- Mette, M., & Majken, S. (2006). Corporate social responsibility communication: Stakeholder information, response and involvement strategies. *Business Ethics A European Review*, 15(4), 323–338. <http://dx.doi.org/10.1111/j.1467-8608.2006.00460.x>
- Moisescu, O. I. (2015). Communicating CSR in the online environment: Evidence from the Romanian tourism distribution sector. *Tourism and Hospitality Management*, 21(1), 79–94.

- Parra-López, E., & Martínez-González, J. A. (2018). Tourism research on island destinations: A review. *Tourism Review*, 73(2), 133–155. <http://dx.doi.org/10.1108/TR-03-2017-0039>
- Patterson, T. M., Niccolucci, V., & Bastianoni, S. (2007). Beyond “more is better”: Ecological footprint accounting for tourism and consumption in Val di Merse, Italy. *Ecological Economics*, 62(3–4), 747–756.
- Qi, S., Law, R., & Buhalis, D. (2017). Comparative evaluation study of the websites of China-based and international luxury hotels. *Journal of China Tourism Research*, 13(1), 1–25. <http://dx.doi.org/10.1080/19388160.2017.1289135>
- Ruhanen, L., Weiler, B., Moyle, B. D., & McLennan, C.-I. J. (2015). Trends and patterns in sustainable tourism research: A 25-year bibliometric analysis. *Journal of Sustainable Tourism*, 23(4), 517–535.
- Sparks, B. A., Perkins, H. E., & Buckley, R. (2013). Online travel reviews as persuasive communication: The effects of content type, source, and certification logos on consumer behavior. *Tourism Management*, 39, 1–9. <https://doi.org/10.1016/j.tourman.2013.03.007>
- Technology, U. D. o. (2005). *Making tourism more sustainable: A guide for policy makers*. World Tourism Organization Publications.
- Tiago, T., Faria, S. D., Cogumbreiro, J. L., Couto, J. P., & Tiago, F. (2016). Different shades of green on small islands. *Island Studies Journal*, 11(2), 601–618.
- Tölkes, C. (2018). Sustainability communication in tourism – A literature review. *Tourism Management Perspectives*, 27, 10–21. <http://dx.doi.org/10.1016/j.tmp.2018.04.002>
- Torres-Delgado, A., & Saarinen, J. (2014). Using indicators to assess sustainable tourism development: A review. *Tourism Geographies*, 16(1), 31–47. <http://dx.doi.org/10.1080/14616688.2013.867530>
- Villarino, J., & Font, X. (2015). Sustainability marketing myopia: The lack of persuasiveness in sustainability communication. *Journal of Vacation Marketing*, 21(4), 326–335.
- Yasarata, M., Altinay, L., Burns, P., & Okumus, F. (2010). Politics and sustainable tourism development—can they co-exist? Voices from North Cyprus. *Tourism Management*, 31(3), 345–356.